2. FINANCIAL STABILITY OR INSTABILITY? IMPACT FROM CHINESE CONSUMER CONFIDENCE

Shi-Qi LIU[1]
Xin-Zhou QI[2]
Meng QIN[3]
Chi-Wei SU[4]

Abstract

This paper attempts to study the dynamic causal relationship between Chinese consumer confidence and financial stability by using a sub-sample time-varying rolling window test. Through empirical research, it is proved that consumer confidence improves the stability of the financial market, ensure the smooth operation of the financial system, and reduce the possibility of financial risks. Similarly, financial stability has a positive impact on consumers. Due to the government's intervention in the economy, the financial market is relatively stable, thus consumers are full of confidence in the market. Therefore, we find that the causal relationship between consumer confidence and financial stability is consistent with financial system volatility model, which contributes to the stability of financial markets and the reduction of financial crises. This finding helps monetary authorities maintain financial stability by increasing consumer confidence and making the most effective decisions based on economic trends.

[1] *Qingdao University, School of Economics, No. 308 Ningxia Rd., Qingdao, Shandong, China; E-mail: liusq940328@sina.com.cn*

[2] *Corresponding Author. Qingdao University, School of Economics, No. 308 Ningxia Rd., Qingdao, Shandong, China; E-mail: xzqrio@163.com*

[3] *Party School of the Central Committee of the Communist Party of China (National Academy of Governance), Graduate Academy, No. 100 Dayouzhuang, Beijing, China; E-mail: meng575316928@126.com*

[4] *Corresponding Author. Qingdao University, School of Economics, No. 308 Ningxia Rd., Qingdao, Shandong, China; E-mail: cwsu7137@gmail.com*

1. Introduction

The traditional rational expectation theory holds that participants in the economic system have sufficient knowledge and ability to understand all the confidence about the entire socio-economic situation (Muth, 2016). However, with the outbreak of global financial crises in recent years, Goetzmann *et al.* (2016) find that consumers lack confidence in macroeconomic development is not conducive to financial stability. The instability of the financial system will lead to the formation of a "bubble economy", which will make the real economy unable to support the huge financial system and inevitably lead to the financial crisis (Shang, 2019). In addition, the globalization and internationalization of financial markets have brought countries together into a global financial system (Dietz *et al.*, 2016). This has led to a country's financial instability that will spread to countries around the world, which will cause financial instability in the entire world, therefore, it is important to ensure the stability of the financial market (DeglInnocenti *et al.*, 2018). At the same time, rational expectations theory believes that the conclusions of the econometric model[5] contradict the fact that the global financial crisis has become more frequent[6] (Knight, 2012). Due to the continued downturn in the global economy brought about by the 2008 subprime mortgage crisis, it has been shown that consumer behaviour and emotions have become a new transmission path for the spread of financial risks (Sum, 2014). If consumers' blind self-confidence will have an adverse impact on the economic and financial system, we will regard consumer confidence as an important factor in financial stability, and strengthening consumers management will help reduce financial risks.

Since emerging markets are easily affected by monetary policies in developed countries, China's financial system is not yet fully developed, therefore, it is vulnerable to external shocks from other countries around the world (Maćkowiak, 2007; Luo *et al.*, 2010). In addition, as the largest developing country, the stability of China's financial market also affects the development of global finance (Schnabl, 2012; Klingelhöfer, 2019). Therefore, when China's financial market is unstable, it is not only going to damage the Chinese economy, but also be detrimental to global economic stability (Borst, 2015). Since the reform and opening up in 1978, the Chinese market has undergone fundamental changes and has shifted from a seller's to a buyer's market, which is a consumer-dominated market (Smith, 1998). With the deepening of structural reforms on the supply side, expanding consumer demand is of great significance for maintaining stable economic and social development (Ludvigson, 2004). In addition, the Chinese economy has not been fully liberalized yet, so the government's intervention in the economy will promote financial stability, and consumers' confidence in the market will also increase, which will form a virtuous circle (Allen *et al.*, 2018; Chen, 2011).

Although we find that consumer confidence has an impact on financial stability, there are still some controversies in the international discussion of the relationship. Borio (2011) points

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[5] *Traditional econometric models mainly include Ordinary Least Squares Method, Simultaneous Equation Model, Klein-Goldberger Model, Value at Risk Model, etc.*

[6] *The major economic crises and financial crises around the world mainly include: banking crises from 1907 to 1908; the Great Depression from 1929 to 1939; the oil crisis triggered the economic crisis from 1973 to 1975; the Latin American debt crisis in the 1980s; Japan's bubble economy in 1990; the Asian financial crisis from 1997 to 1998; from 2000 to 2001, the U.S. Internet industry bubble burst; the financial crisis from 2007 to 2008; and the European debt crisis from 2009 to 2011.*

out that the stability of the financial system is an important manifestation of the stable development of social macroeconomy. Carroll *et al.* (1994) find that consumer confidence has good predictive power for changes in spending and thus leads to financial stability. Acemogd and Scott (1994) analyze the consumer confidence index and financial stability, showing that they have a certain correlation. However, Bryant and Macri (2005) point out that consumer confidence is an only rational response to basic economic information, and will not have a real impact on financial stability.

Due to the causal relationship between time series may change with time throughout the sample interval, it can lead to inaccurate results, therefore, this paper uses bootstrap sub-sample rolling window causality test. The full-sample test assumes that the parameters are stable, but these parameters may not hold in practical applications and result in deviations due to structural changes in the parameters (Balcilar *et al.*, 2010). Conversely, the rolling window can better accommodate the situation in which the causal relationship between consumer confidence and financial stability may change over time (Li *et al.*, 2018). In addition, we can observe that parameters instability caused by structural mutations in different sub-samples, thereby ensuring the accuracy of the results (Shukur and Mantalos, 2000). Through empirical analysis, consumer confidence has a positive and negative impact on financial stability, which means that if consumers have confidence in economic development, it will benefit financial stability (Barsky and Sims, 2012; William, 2012). However, blind self-confidence of consumers leads to cognitive bias and is not conducive to financial stability (Danthine *et al.*, 1998). Financial system volatility model is a demonstration of the causal relationship between them (Matsusaka and Sbordone, 1995). From the opposite perspective, financial stability also has a positive impact on consumer confidence. The government intervention has stabilized the financial market and therefore, people are optimistic about the future economy and further expand current consumption to form a positive interaction (Dailami and Masson, 2009). In addition, the 2008 subprime mortgage crisis has proved that the previous financial risk transmission channels were insufficient to apply the current economic environment. Increasing consumer demand will serve as a new transmission channel to influence the stability of financial markets and reduce the likelihood of financial risks (Earle, 2009).

The rest of the paper is arranged as follows: section 2 presents the relevant literature for this study, followed by section 3 that describes the financial system volatility model and section 4 that presents the methodology. Section 5 describes the data used in this study and section 6 outlines the empirical result, concluding with section 7.

2. Literature Review

Matsusaka and Sbordone (1995) argue that when the consumer factor is added to the macroeconomic model, the financial system will exhibit simultaneous fluctuations. Ivanova and Ivanova and Lahiri (2001) highlight that during the economic and political turmoil, consumer confidence has a good ability to explain economic cycle fluctuations. Haugh (2005) points out that consumer confidence has greater predictive power during the recession. Illing and Liu (2006) prove that the consumer confidence they developed is more useful for financial stability in developed countries. Taylor and McNabb (2007) argue that during the recession, consumer confidence can predict the stability of the financial system. Gadanecz and Jayaram (2008) point out that consumer confidence is a measure of financial stability. Dailami and Masson (2009) prove that the current financial crisis underscores the risk that a decline in confidence may have a self-fulfilling impact on economic activity. Gritten

(2011) concludes that consumer confidence has changed in the context of continued financial instability. Barsky and Sims (2012) use dynamic stochastic general models to find that changes in confidence and economic volatility showed the same direction. Neisingh and Stokman (2013) point out that financial stability is critical to consumer confidence and has both optimistic and pessimistic effects. Hussein (2016) argues that the financial stability of the banking system is usually reflected in risk characteristics such as bank runs or insufficient liquidity, which affect customers and are reflected in the level of confidence. Barbu and Boitan (2018) prove that the increase in the non-performing loan ratio is likely to cause uncertainty in the financial market, which is not conducive to the improvement of consumer confidence. Cerda *et al.* (2018) find that changes in consumer confidence in a small open economy can lead to economic uncertainty, which leads to economic decline and financial instability. Amalia (2018) argues that consumer confidence is one of the determining factors in the stability of the banking industry, which in turn led to the stability of the financial industry.Cong and Chen (2018) find that the increase in confidence has made the banking system more stable, which is conducive to financial stability. Khan *et al.* (2019) point out that consumer confidence can cause changes in household investment, which affects financial stability. Matošec and Obuljen (2019) prove that consumer confidence is interdependent with macroeconomic development and financial stability. Ilesanmi and Tewari (2019) argue that the lack of consumer confidence may lead to financial instability. In contrast, Mehra and Martin (2003) point out that there is no correlation between consumer confidence and financial stability, and these are two separate variables. Berry and Davey (2004) find that consumer confidence cannot explain the average household expenditure, so it is not going to work when assessing the impact on the economy. In the U.S., William (2012) proves that consumers have no significant impact on economic growth and financial stability.

For China, Lim (2010) proves that in the case of China only by maintaining consumer confidence can bank runs be avoided, thus ensuring financial stability. McKibbin and Stoeckel (2010) find that the increase in wealth will help boost Chinese consumer confidence and benefit financial stability. Allen *et al.* (2012) point out that consumer confidence is conducive to maintain China's economic growth and reduce the probability of financial risks. Hsu and Xue (2015) argue that after the financial crisis, significant fluctuations in consumer confidence have caused financial markets to fluctuate with the same frequency. Xin and Zhang (2015) prove that increased consumer confidence will allow companies to increase their investment, therefore, consumers can spend more in the market. This virtuous cycle is more conducive to financial stability. Mo *et al.* (2018) proves that consumers are factors influencing macroeconomic policies and have a related impact on global financial stability in China. Vasilenko (2018) uses Chinese evidence to find that consumer confidence has an impact on both financial and systemic risks.

3. Financial System Volatility Model

The economic globalization has made financial markets of all countries a whole, therefore, the financial instability of a country will lead to global economic turmoil. The 2008 subprime mortgage crisis also indicates that consumers' motivations and emotions are the ways to spread financial risks. In order to better verify whether there is a causal relationship between consumer confidence and financial stability, the research in this paper is based on the model proposed by Matsusaka and Sbordone (1995). We assume that there is a financial asset that consumers can make based on their own needs and characteristics and the product can be sold in the resale market. The $q(n)$ is the labour force and $p(n)$ is the price of financial

assets. Let $l_0 = 1$ represents the unit cost of the financial asset; $l_1 \leq 1$ is the upper limit of the equilibrium price in the resale market. Next proposition shows that consumer behaviour depends on the τ. For any agent n, $g^*(n) = p^*(n) - \frac{1}{2}q^*(n)^2$, where * means equilibrium quantity, *g*(n) denotes* utility. Based on agents are atomistic[7], therefore, $q^*(n)$ and s^* are given variables. The relationship between consumer utility and financial volatility is as follows:

$$g(n) = h(n) - \frac{[h(n) - h^*(n)]}{l_1} - \frac{1}{2}q^*(n)^2$$

$$= h^*(n) - \frac{1}{2}q^*(n) + \left(1 - \frac{1}{l_1}\right)[h(n) - h^*(n)] < g^*(n) \qquad (1)$$

Therefore, changes in consumer expectations can lead to financial volatility. The rational consumer will achieve this equilibrium goal by spending on the market. We can conclude that even if the underlying technology has not changed, the aggregate production can fluctuate with fluctuations in consumer confidence in the market. That is to say, consumer confidence fluctuates in line with the state of financial stability.

4. Methodology

4.1 Bootstrap Full-sample Causality Test

Since the underlying time series is stationary and may not be in accordance with the standard normal distribution, the results of the Granger causality test based on the traditional VAR model will be unreliable (Toda and Phillips, 1994). Shukur and Mantalos (1997) point out that results are more accurate due to the use of the residual-based bootstrap (*RB*) method. Moreover, even if the two variables are not cointegrated, the *RB* method is better than the standard asymptotic test (Balcilar *et al.*, 2010). Shukur and Mantalos (2000) point out that the cointegration of standard tests without the *RB* method is particularly poor under small samples. Therefore, the *RB*-based modified-*LR* statistic can be used to test the causality between financial stability and consumer confidence. The Consumer Confidence Index (CCI) is an indicator that reflects consumer confidence and FS to represent financial stability.

To highlight the results of the causality test, we used the bivariate VAR, *(p)* process is considered to find the results of the causality test, as follows:

$$y_t = \varphi_0 + \varphi_1 y_{t-1} + \ldots + \varphi_p y_{t-p} + \varepsilon_t, \quad t=1,2,\ldots,T \qquad (2)$$

where $\varepsilon_t = (\varepsilon_{1t}, \varepsilon_{2t})'$ is a white noise process with zero mean and covariance matrix. The optimal lag length p is determined by the Schwarz information criteria (SIC). We further divide it into two sub-vectors, y_{CCI} and y_{FS}, and then Equation (6) is represented as:

$$\begin{bmatrix} y_{CCI_t} \\ y_{FS_t} \end{bmatrix} = \begin{bmatrix} \varphi_{10} \\ \varphi_{20} \end{bmatrix} + \begin{bmatrix} \varphi_{11}(K) & \varphi_{12}(K) \\ \varphi_{21}(K) & \varphi_{22}(K) \end{bmatrix} \begin{bmatrix} y_{CCI_t} \\ y_{FS_t} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \qquad (3)$$

where y_{CCI} and y_{FS} indicate consumer confidence and financial stability, respectively. $\varphi_{ij}(K) = \sum_{k=1}^{p+1} \varphi_{ij,k} K^k$i, j=1, 2 and $K^k x_t = x_{t-k}$ is to define *K*.

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[7] *Classical economics inherits the atomic theory in physics, and believes that economic subjects and matter are composed of atoms. Microeconomics is the economics of individual atoms- "economic man"(Marr, 1984).*

From Equation (7), by imposing the restriction $\varphi_{12,k} = 0$ and $\varphi_{21,k} = 0$ for k=1, 2,…, p respectively, it is tested whether the FS and CCI are the null hypotheses of Granger causality. When the null hypothesis is rejected, it proves that there is an important causal relationship.

4.2 Parameter Stability Test

One assumption of the full sample test in the VAR model is that the parameters are constant. However, the causal links become unstable once the potential full sample time series exhibits structural changes (Balcilar and Ozdemir, 2013). Therefore, we consider the rolling-window bootstrap estimation to solve the problem. In addition, we use *Sup-F, Mean-F* and *Exp-F* test to test the short-term stability of the parameters (Andrews, 1993; Andrews and Ploberger, 1994) which required for 15% trimming. Then, we use *Lc* test (Nyblom, 1989; Hansen, 1992) to check the stability of the long-term parameters. These tests are calculated from the *LR* statistic sequence. Moreover, by the parameter bootstrap program, we obtain *p-values* and critical values (Andrews, 1993; Andrews and Ploberger, 1994).

4.3 Sub-sample Rolling-window Causality Test

This paper employs this method, in order to overcome the above problem (Balcilar *et al.*, 2010). Since the rolling-window techniques based on fixed-size sub-samples, we set up a fixed-size rolling window including the observation of *l* based on this, which rolling sequentially from the beginning to the end of the full-sample (Balcilar *et al.*, 2010). And the full-sample is divided into $\tau - l + 1, \tau - l, \dots, T \ for \ \tau = l, l + 1, \dots, T$. Next, the *RB*-based modified-*LR* causality test is performed using the above samples. Then, to observe the possible changes in the causal relationship between CCI and FS, we further calculate the *p-values* by sub-samples. The impact of FS on CCI can be described by $N_b^{-1} \sum_{k=1}^{p} \hat{\varphi}^*_{12,k}$,

where N_b represents the number of bootstrap repetitions; the impact of CCI on FS is similar to the above equation. The 90% confidence intervals are computed where the lower limit equals the 0.05 quantiles of the $\hat{\varphi}^*_{12,k}$ and the upper limit equals the 0.95 quantiles of the $\hat{\varphi}^*_{21,k}$ (Balcilar *et al.*, 2010). The large window size can ensure the accuracy of parameter estimates, but one that is too large may increase the risk of including these multi-shifts in the window sample. Choosing a small window size can lead to inaccuracies and it is difficult to guarantee the credibility of results. Therefore, we should choose the appropriate window based on experience.

5. Data

Considering that the five-category classification of China's loans has been comprehensively promoted since 2004, the non-performing loan ratio before this is not within the statistical scope of the authorities. Besides, after several years of exploration, the interest rate marketization reform has made substantial progress in China. The central bank decided to increase the ceiling from January 1, 2004, on the premise that the floating range of financial institutions' loan interest rates remained unchanged. According to the relevant statement of the central bank, the deposit interest rate will be capped when the conditions are ripe, allowing commercial banks to float down on the deposit interest rate, and the loan interest rate is prepared to gradually implement the lower limit management. Therefore, we select the quarterly data to test the causality between consumer confidence and financial stability from 2004: Q1 to 2018: Q4. We apply CCI published by the National Bureau of Statistics as a measure of consumer confidence (Lim, 2010; Xin and Zhang, 2015). The CCI is calculated

through consumer confidence surveys based on consumer satisfaction with current macroeconomics, household income, employment, optimism about future expectations and the willingness of consumers to purchase goods and services. At the same time, consumer confidence surveys will also understand consumer prices, house prices, and willingness to save and invest. China's CCI is obtained by a weighted average of the Consumer Satisfaction Index and the Consumer Expectation Index (Dong and Bollen, 2015), which are between "0-200". When the CCI is greater than 100, it indicates that consumers tend to be optimistic (Li, 2011). Financial stability is the key to sustainable economic and social development. European Central Bank (ECB) defines the financial stability as a condition which the financial system is capable of withstanding shocks and the unravelling of financial imbalances (Fell and Schinasi, 2005; Matthews and Booth, 2015). In addition, Mishkin (1999) and Allen and Wood (2006) define financial instability in terms of causes, types, consequences and so on. If financial stability is represented by only one indicator, Akram and Eitrheim (2008) choose a series of indicators reflect financial stability (Morales and Estrada, 2010). Based on China's current stage of development, we use the Entropy Weight Method (EWM) and selects 9 indicators[8] to measure FS (Brave and Butters, 2011; Arzamasov and Penikas, 2014; Liu *et al.*, 2017). Table 1 presents descriptive statistics. The means of CCI and FS denote that their time series are at the levels of 323.173 and 0.490, respectively. The skewness of CCI is 0.851, which means right-skewed, while FS is left-skewed because its skewness is -0.014. The kurtosis of CCI and FS are 3.476 and 1.591 which demonstrate leptokurtic and platykurtic distribution. Moreover, the Jarque-Bera test proves that CCI and FS are significantly non-normally distributed at 5% and 10% level. Since the underlying variables are not in accordance with the standard normal distribution, the traditional VAR models for Granger causality test is inappropriate. In order to ensure the reliability and accuracy of the results, we perform the bootstrap sub-sample rolling-window causality test and analyze the interaction between these two variables.

Table 1

Descriptive statistics for CCI and FS

	CCI	FS
Observations	60	60
Mean	323.173	0.490
Median	321.550	0.484
Maximum	368.600	0.673
Minimum	294.800	0.300
Standard Deviation	17.441	0.108
Skewness	0.851	-0.014
Kurtosis	3.476	1.591
Jarque-Bera	7.814**	5.135*

*Notes: *, ** denote significance at the 10% and 5% level, respectively.*

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[8] *The interest rate difference between deposits and loans, the ratio of deposits and loans, non-performing loan ratio of commercial banks, P/E ratio, the ratio of the total market value of stocks to GDP, exchange rate index, the ratio of domestic credit to GDP, commercial housing sales price and inflation rate.*

6. Empirical Results

We test first the full-sample causality through the VAR model of the two variables, and then we get an optimal lag period of 2 based on the Schwarz information criterion (SIC). Based on the *RB*-based modified-*LR*. Table 1 evidence that there is no causal relationship between CCI and FS, but most of the existing literature proves that there is a positive or negative impact between them (Hussein, 2016; Ilesanmi and Tewari, 2019). On this basis, we further verify the accuracy of the results.

Table 2

Full-sample Granger-causality Tests

Tests	H0: CCI does not Granger cause FS		H0: FS does not Granger cause CCI	
	Statistics	*p*-value	Statistics	*p*-value
Bootstrap *LR* test	0.079	0.92	1.441	0.36

Notes：*** denotes significance at the 5%. These tests are used by Eviews software.*

In the presence of structural changes, the relationship between CCI and FS is unstable, therefore a full-sample causality test using the parameter constant hypothesis makes the single causal relationship throughout the period no longer reliable (Neisingh and Stokman, 2013). Then we consider the bootstrap rolling causality to ensure the reliability of the result. We perform the parameter stability test and the results are shown in Table 2.

Table 3

Parameter Stability Tests

	CCI		FS		VAR System	
	Statistics	*p*-value	Statistics	*p*-value	Statistics	*p*-value
Sup-F	272.614***	0.000	170.264***	0.000	33.076**	0.035
Mean-F	19.576***	0.000	47.266***	0.000	21.656**	0.043
Exp-F	132.593***	0.000	81.421***	0.000	14.073**	0.024
L_c^b					4.493***	0.005

*Notes: **and *** denote significance at the 5% and 1% level, respectively. We calculate p-value using 10,000 bootstrap repetitions.*

However, we find that by using full-sample data to estimate the VAR model is unstable when there is a structural change. This means that the consequences of no causal relationship between CCI and FS are not accurate. Therefore, we apply the *RB*-based modified-*LR* causality test to check the causal relationship. The null assumption of the test is that CCI does not result in FS and vice versa. It is difficult to choose the rolling-window width in this sub-sample test (Balcilar *et al.*, 2010), and the selection criteria depend on persistence and size of the interrupt (Pesaran and Timmerman, 2005). Based on Monte Carlo simulations, it is found that when there are frequent interruptions, the deviation of the auto-regressive (*AR*) parameters is minimized. We balance two conflicting goals when choosing the window size. The rolling estimates of the data are from 2004: Q1 to 2018: Q4, and 20-quarters[9] of the full

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[9] *When we choose the window size, one considers that the large window size may bring more precision; the other is that the small window size will eliminate the risk of interruption. Based on this,*

sample are used as observations.

Figure 1 highlights that the null hypothesis: CCI does not have Granger cause FS is rejected at the 10% significance level during several sub-sample periods, including 2009: Q1-2012: Q3 and 2015: Q4-2016: Q2.

Figure 1

Bootstrap *p*-value of the Statistic Testing the Null Hypothrsis that CCI Has no Influnence on FS


As can be seen from Figure 2, during the first period, the direction of the influence of the CCI on the FS is negative. As the Chinese economy is affected by the global financial crisis of 2008 (Yuan, 2010), the government announced a stimulus plan of a 4 trillion Yuan in November. Modestly loose monetary policies and proactive fiscal policies have strengthened financial support for economic growth and have led to a significant increase in consumer demand (Issing, 2009). Moreover, income is the basis and premise of consumption. Under the premise that other conditions remain unchanged, consumers who have more disposable income will make more consumption of various goods and services (Campbell and Mankiw, 1990). In 2009, China has set a policy goal of guaranteeing growth and promoting the transformation to stabilize the economy.

Stimulating capital investment into the economy by expanding government construction investment and structural value-added tax transformation is conducive to the formation of consumer confidence in future income growth, and thus promote economic growth (Cai *et al.*, 2010). Changes in consumer confidence will trigger market interest rate volatility in the short term. When it is consistent with market expected interest rate fluctuations, consumers' market behaviour will be more in line with expectations, thus making financial market transactions more active and the financial system more stable (Dees and Brinca, 2013). Since 2011, although the entire international financial crisis has deepened, the sovereign

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we choose a small window size of 20 quarters. We also selected 24 quarters and 30 quarters of window size for empirical analysis. The results proved very similar to the results of 20 quarter window size. Therefore, the windows size of 20 quarters is appropriate.

debt problem in Europe has continued to deteriorate, and the banking system in developed countries has been seriously threatened, which has had a certain impact on China's domestic economy (Lane, 2012).

Figure 2

Bootstrap Estimates of the Sum of the Coefficients for the Effect of CCI on FS
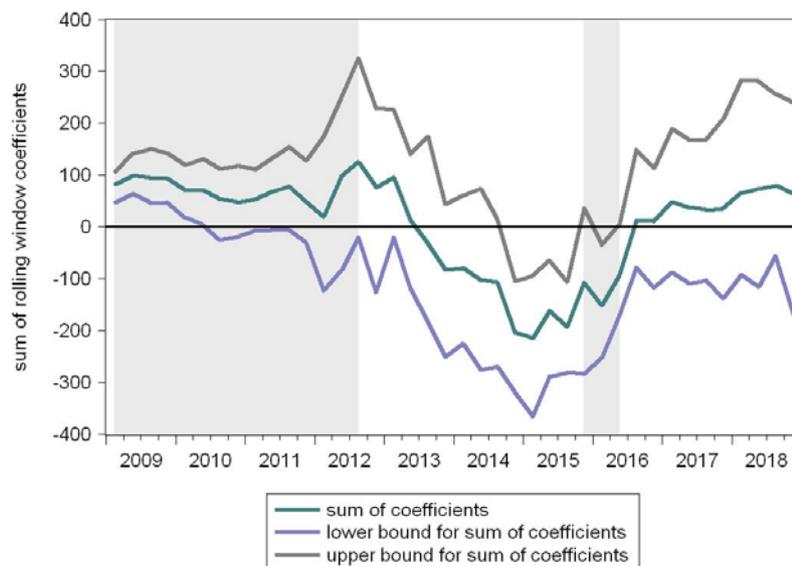

However, with China's own economic growth from policy stimulus to independent growth, financial market has gradually stabilized in 2012 (Xie and Zhou, 2014). The government has put forward the goal of "steady progress", which is the general tone of China's work in 2012. The price protection system based on pork prices is used to ensure people's livelihood, regulate consumer prices, and make consumers full of confidence in the overall economic development (Gale, 2013). The active participation of consumers has enabled financial institutions such as commercial banks to accelerate financial innovation and expand intermediary business. The overall financial market activity continues to increase, which is conducive to financial stability (Avgouleas, 2014). In 2012, China's economic exchanges with countries around the world have been basically in balance, and overall economic development is relatively stable (Aizenman, 2015). This is not only conducive to improve the effectiveness of macroeconomic regulation and control, but also help with solving the problem of renminbi (RMB) appreciation, which is beneficial to financial stability (Stein, 2012). Therefore, the increase of consumer confidence is conducive to financial stability, and the causal relationship between them is in line with financial system volatility model (Matsusaka and Sbordone, 1995). However, at the end of 2012, the European debt crisis has recurred, which not only dragged down the economic recession of some developed countries, but also caused the economic growth of emerging countries to slow down markedly (Mao, 2014), and the Chinese economy has also been affected (Xiao and Cheng, 2010). Until the end of 2015, changes in China's economic structure and the rise of e-commerce have increased consumer confidence and are willing to pay for products and services that enhance quality of life (Zhang, 2018). However, after June 2015, the Chinese

stock market experienced a crisis that resulted in a fall of 45% in two months (Sornette, 2015). Although Chinese consumers are optimistic about the economy, they are numerous and the level of investment is not uniform. Therefore, most people invest in stocks solely according to national policies, leading to chaos in the entire financial market, which has ultimately led to stock markets' crash and financial markets' instability. Therefore, consumer confidence has a negative impact on financial stability (Guo, 2017).

Figure 3 indicates that financial stability has an impact on consumer confidence during 2015: Q4-2016: Q2. Further, Figure 4 reveals that there is a negative correlation between them. In 2015, China's financial market experienced a roller coaster-style violent shock. China's stock market has also started from the bull market to its formation, and then its collapse led to the loss of liquidity of individual stocks (Jin *et al.*, 2016). The Shanghai Composite Index fell by 45% from June to August 2015. Therefore, in order to maintain the stability of the financial market, the Chinese government has adopted various measures to cope with the deterioration of the external environment (Zhang, 2016). In 2015, the People's Bank of China carried out 10 reductions in benchmark rate and reserve ratio (RR), releasing the trillions of liquidities (Tan *et al.*, 2016). For decades, China's GDP growth rate has been gradually at around 7 percent. In this case, stimulating investment and consumption and changing public expectations are top priorities.

Figure 3

Bootstrap *p*-value of the Statistic Testing the Null Hypothrsis that FS Has no Influence on CCI
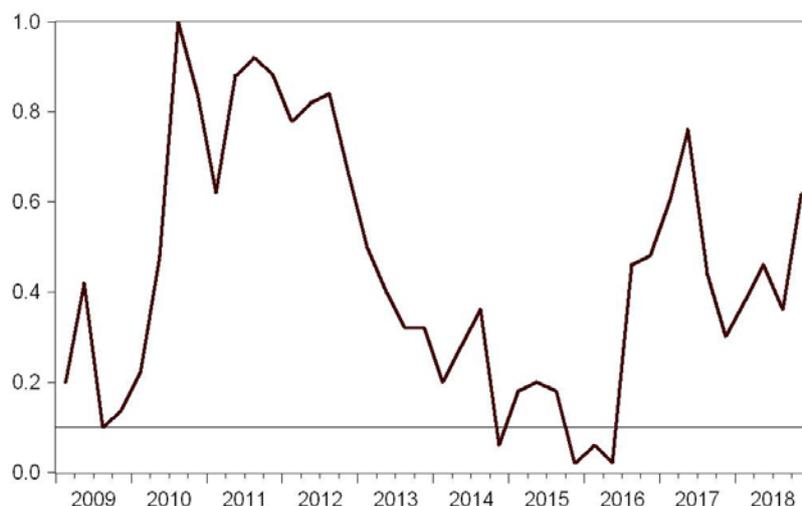
At the international level, the International Monetary Fund (IMF) announced the addition of RMB to the Special Drawing Rights (SDR) currency basket (Ito, 2017). This does not only represent the official endorsement of the RMB as a freely usable currency, but it also represents the international recognition of China's increasingly important role in the international financial market, which is conducive to the reconstruction of domestic consumer confidence (Zheng, 2017). In addition, although the U.S. interest rate hike will cause the return of overseas dollars to a certain extent, there is no substantial recession in China during the period of monetary easing (D'Amico *et al.*, 2017). And China has more foreign

exchange reserves and foreign debts. Therefore, China's financial market is relatively stable (Ahmed *et al.*, 2017). At the domestic level, the Chinese government and the central bank have also formulated the following policies in response to related issues. The reform of initial public offering (IPO) registration system has greatly shortened the time-to-market for enterprises, and the backdoor listing and junk stocks will be effectively avoided, thus making consumers' market valuation gradually return to rationality and full confidence in the market (Wang, 2018). In addition, Chinese financial institutions have invested in the construction of mobile terminals, innovated financial products and services, and vigorously developed inclusive finance. Therefore, the relative stability of the financial environment and the support of the state's policies have made consumers confident in the entire market (Pan, 2016). Therefore, financial stability has a positive impact on consumer confidence.

In the first half of 2016, the liquidity of the banking system has been reasonably abundant, the scale of credit and social financing growing steadily, and the interest rate level remained stable so that the entire financial market operated smoothly (Tan, 2016). By the end of June 2016, the broad money (M2) supply balance increased by 11.8% year-on-year, and the RMB loan balance increased by 14.3% year-on-year, an increase of 7.53 trillion yuan over the beginning of the year. The stock of social financing scale increased by 12.3%, mainly due to the significant increase in RMB loans issued to the real economy and direct financing, especially corporate bonds (Mikołajczak, 2017). This has maintained a stable financial market, and people are also optimistic about the future. In addition, since 2016, relevant institutions[10] have been introducing measures to strengthen supervision over many aspects such as backdoor, restructuring, product structure, and confidence disclosure (Klingelhöfer and Sun, 2019). The upgrading of credit risk in the bond market, the clean-up of Internet finance and the "deleveraging" of asset securitization products in the financial market all contributed to the steady development of the entire financial market and the consumption (Buchanan, 2017). They are also full of confidence in the entire market, thereby increasing investment and consumption. Therefore, financial stability during this period has a positive impact on consumer confidence.

Through the above analysis, we find a two-way causal relationship between consumer confidence and financial stability. On the one hand, the incentives for policies have increased consumer confidence, which has a positive impact on economic growth and is conducive to financial stability. The blind self-confidence of consumers will have an adverse impact on the economic and financial system, and the correlation between them is in line with financial system volatility model. On the other hand, from the perspective of opposition, we find that the entire financial market is relatively stable due to the government's intervention in the economy. Therefore, consumers are confident in the market, which in turn leads to economic growth and financial stability. In addition, this study identifies consumer confidence as a transmission channel of financial stability, and strengthening its management is conducive to reduce the probability of financial risks.

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[10] *Relevant institutions include People's Bank of China, China Banking Regulatory Commission, China Securities Regulatory Commission and China Insurance Regulatory Commission.*

Figure 4
Bootstrap Estimates of the Sum of the Coefficients for the Effect of FS on CCI
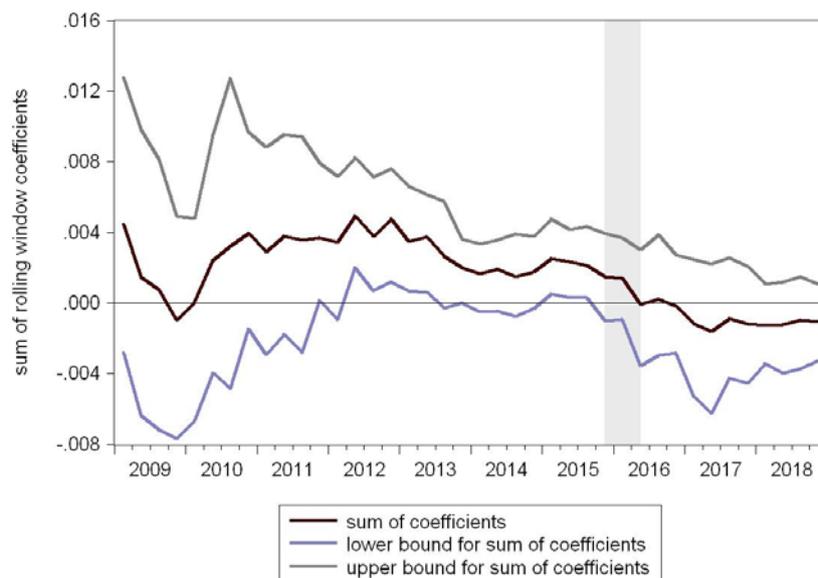
7. Conclusions

The bootstrap full-sample causality test proves that there is no causal relationship between consumer confidence and financial stability. However, the study with the sub-sample causality test has shown a two-way causal relationship between them. Consumer confidence has a positive impact on financial stability, but it also has a negative impact in the short term. As an important force for economic growth, consumers' constant consumption in the market promote the continuous circulation of funds in the market and make the financial market develop stably (Ilesanmi and Tewari, 2019). However, external shocks and lags in consumer decision-making have frequently caused problems, resulting in a chaotic market and in the financial system becoming increasingly unstable (Shambaugh, 2016), and this causal relationship between consumer confidence and financial stability proves financial system volatility model. From another perspective, financial stability has a positive impact on consumers. Due to the government's intervention in the economy, the financial market is relatively stable, thus consumers are full of confidence in the market (Lardy, 2016; Creel *et al.*, 2015). In general, exploring consumer confidence and financial stability helps prevent the occurrence of financial risks and makes the financial market develop stably (Battiston and Martine, 2018). We can also see that the risks posed by consumer confidence and the pessimism about the stock market are inherent factors of instability in the financial system (Castiglionesi *et al.*, 2017). Therefore, it is necessary for monetary authorities to strengthen consumer confidence management, increase the availability of economic and financial information, and make the most effective decisions based on economic trends. In addition, the central bank should innovate the use of monetary policy tools to convey the government's willingness to maintain financial market stability, thereby reducing the likelihood of risk and maintaining financial stability.

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