Statistical Research on the Interaction between China's Financial Cycle and Economic Cycle

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Abstract: With the deepening of economic globalization, cross-border activities in the financial sector have developed rapidly, and monetary policies and financial transactions in various countries have continued to penetrate and expand, and financial globalization has gradually taken shape. Financial globalization has brought financial development to countries, but the financial risks associated with it have spread rapidly. Under the background of currency globalization, China's financial industry is facing increasing risks. Under the condition of information asymmetry, the role of financial accelerators will expand the role of financial factors in the entire economy. Therefore, considering the actual economic cycle (RBC) theory of production and employment, it has not been able to solve the deep structural problems that China faces. The Chinese central bank first proposed the term “financial cycle” in the monetary policy implementation report for the third quarter of 2017, prompting the international community to pay more attention to changes in the financial cycle and to adopt a macro-prudential policy response. Sexual exploration and research provide new ideas for the sustainable development of China's economy.

Based on the analysis of the theoretical basis of the financial cycle, combined with the existing literature, the financial institution's loan index, the National Real Estate Prosperity Index and the Shanghai Composite Index were selected as factors representing a variable financial cycle in China, and the money supply is based on this. Added. The amount and the actual effective exchange rate index constitute a financial condition index that comprehensively explains the changes in China's business cycle. GDP is a powerful indicator of national economic development. Secondly, the volatility characteristics are characterized by BB method, filtering method and spectral analysis method in time domain and frequency domain respectively. The volatility characteristics are used to compare the similarities and differences between the financial cycle and the economic cycle. Finally, the relationship between the financial cycle and the economic cycle is empirically analyzed from the time domain and the frequency domain.

1. Introduction

As a country with an emerging economy, China has developed rapidly in financial markets in recent years, but at the same time, the drawbacks of exposure have become increasingly prominent. In 2015, the stock market fluctuated drastically, which led to major changes in the stock market, which also affected the stability of the real economy and lost many investors. This also shows that China's financial system is still not perfect, and there are still many problems in financial supervision. For the first time in the monetary policy implementation report for the third quarter of 2017, the People's Bank of China included the term “financial cycle” into the monetary policy implementation report. The international financial crisis has prompted the international community to pay more attention to changes in the financial cycle. Macroprudential policies require central banks to identify and prevent risks in the financial system in order to maintain financial market stability. Therefore, studying the relationship between the cyclical characteristics of the financial system and the operation of the economic cycle has strong theoretical support for preventing future financial risks and promoting “financial liberalization”.

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2. Definition of financial cycle and economic cycle concept

2.1. Financial cycle

In the 1980s, the credit cycle theory proposed by Kiyotaki and Moore (1997) and the financial accelerator theory put forward by Bernanke, Gertler and Gilchrist in 1999 laid the foundation for the theory of financial cycle[1]. However, the financial cycle still belongs to a relatively new concept, and its definition has not been clearly defined at home and abroad. Abstract (2001) argues that the financial cycle is caused by financial factors such as continued interest rate, exchange rate, credit, real estate prices or the continuous changes in macroeconomic conditions caused by financial markets. Borio (2014) has a more comprehensive definition of the concept of economic cycle. The concept of economic cycle refers to the interaction between value and risk perception, risk attitude and financing constraints. At the same time, five characteristics of the financial cycle are proposed: the financial cycle is the simplest explanation for credit and real estate; the financial cycle is longer than the traditional economic cycle; the financial cycle may have a financial crisis; the financial cycle can be monitored in real time. Financial risk; the length and extent of the financial cycle vary by government system.

From a new perspective, the impact of the financial cycle on macroeconomic changes is analyzed, especially after the financial crisis. The economic cycle theory has been transformed into the theory of finance and economic cycles, laying the foundation for the development of the financial cycle. The financial cycle can be seen as a continuous cyclical change caused by changes in the financial variables themselves, but the financial cycle is not independent in the general sense, but is related to the economic cycle. Changes in the financial variables themselves, as well as links at specific stages. In summary, we define the financial cycle as a continuous and cyclical change in macroeconomics caused by various financial variables and their interaction in macroeconomics. The financial cycle is not only caused by changes in various financial variables, but the combined effects of financial variables also increase or decrease the changes in financial conditions. The financial cycle and the economic cycle are not isolated, and there is a high degree of correlation between them at some stages.

2.2. Economic cycle

Different economists in the West have different definitions of different economic cycles, but their essence is the statistical regularity reflected by the changes in macroeconomic variables in economic activities. Burns and Mitchell (1946) [2]. have a basic definition of the economic cycle in the book Economic Cycle Measurement: the economic cycle is a wave of comprehensive activities in these countries, mainly organizing their activities in the form of commercial activities. . According to its definition, the economic cycle is generally divided into four phases. Prosperity, recession, recession and recovery. Generally speaking, the economic cycle refers to the process of economic expansion and contraction in economic activities. At a certain stage, the rapid development of the economy may promote the rapid development of the economy, and the adverse effects of the economy will lead to a decline in the economic level. The economy is characterized by cyclical fluctuations. During the economic boom period, the total production of enterprises increased, the employment rate of the society increased, the income of the people increased, the investment of households and enterprises increased, and the total demand expanded. The trend is that the economy is in a prosperous stage, but when it reaches its peak, due to limited resources, the economy begins to shrink, the production costs of enterprises will rise, and production and profits will fall. When the economic contraction exceeds a certain level, the unemployment rate rises rapidly, the unemployment rate rises, the economy tends to be stable, the prices of raw materials fall, the demand for enterprises expands, and the economy declines. The economy began to improve and a new cycle began. The economic cycle was formed under the influence of various economic factors. The economic cycle is divided into a kechinocycle cycle (short cycle 2-4 years), a jugler cycle (7-11 medium wave cycles), a Kuznets cycle (15-25 cycle) and a convertible. Compared with the financial cycle theory, the business cycle is mature, based on the definition of the business cycle and the stage division of the yev cycle (40-60 years of long-wave cycle)[3].

3. Melt Cycle and Economic Cycle

3.1. Financial cycle

On the surface, since the financial cycle is a cyclical fluctuation caused by changes in various financial variables and their joint effects, it is necessary to consider the causes of the financial cycle first, and then consider the financial factors based on various financial variables. There are many reasons for cyclical changes. There are also many variables in the financial market that lead to the formation of financial cycles, but only some typical variables are analyzed here.

Credit: Since the direct trigger of the global financial crisis in 2008 was the excessive issuance of subprime mortgages in the United States, credit from countries and regions played an important role in the stable development of financial markets. As a financial intermediary, banks play a vital role in the expansion and contraction of credit. During the economic boom, companies are optimistic about the future economic situation, increasing loans to maximize profits, and more companies will be able to increase loans. As the profit increases, the loan amount increases and the loan amount of the entire market increases. As the economy grows to a certain extent, the company's profit margin declines as the market becomes saturated, commercial banks are also worried about rising interest rates, loan interest rates rise, and the number of loans begins to decrease, which will lead to a credit cycle. In the case of asymmetric information fluctuations and volatility fluctuations, there are certain differences between internal financing costs and external financing costs. These differences will accelerate the trend of credit, thus laying the foundation for the formation of the financial cycle.

Money supply: The central bank can adjust the money supply through reserves and open market operations to accelerate or slow the trend of economic fluctuations. The size of money supply indirectly affects the size of interest rates, which affects the expansion or contraction of financial markets. The 2008 financial crisis has had a major impact on the Chinese economy. In order to restore the economy, the Chinese government implemented a 4 trillion yuan investment plan and continuously invested 4 trillion yuan in the real economy to achieve rapid economic development and played a continuous role in the steady and rapid economic development. This role has not only caused China's deep structural problems to a certain extent [4]. Money supply is a variable mainly regulated by the government. The size of this variable directly affects the volatility of macroeconomic and financial markets. Money supply is also an important factor in the formation of the financial cycle.

3.2. Economic cycle

Aggregate demand: Total demand refers to the total demand for final products and services at the overall price level and the overall level of the economy, including consumer demand, investment demand, government demand and external demand. The first two needs have a great impact on economic development. Here, the principle of multiplier acceleration can be used to explain the formation of the business cycle, which consists of consumer demand and investment demand. In economic life, investment, consumption, and income interfere with each other. As the economy prospers, the increase in income and consumption levels accelerates investment levels by increasing the number of investors, and investment is affected by investment. Therefore, the economic cycle is a phase wave process formed by the effects of multipliers and acceleration[5]. Investment affects consumption and income, and consumption and income affect investment levels, thus forming a process of economic expansion and contraction.

Inflation: Inflation refers to the rising price level of goods and services. There are many reasons for the formation of inflation, but the reason is that inflation is divided into inflation. Inflation is caused by the expansion of demand levels and the expansion of monetary and monetary policies and the rise in the prices of production factors. Type inflation and structural inflation are affected by economic structural factors [6]. According to the degree of inflation, it can be divided into moderate inflation, rapid inflation and inflation.

Inflation is usually at a low level and the unemployment rate is relatively stable. Strive to control its own inflation rate within a certain range to promote economic development and social stability. When the price level of the economy continues to rise, it is expected that the price level will rise further. On the other hand, rising raw materials and labor wages have increased production costs, reduced production, and reduced the overall level of economic development [7]. When the economy develops into hyperinflation, the purchasing power of money will suddenly drop, leading to the collapse of the entire economic system, and the economy may begin to enter a recession. Therefore, the business cycle is formed after inflation continues to deteriorate and the cyclical effects improve.

External shocks: The factors that make up the business cycle can be broadly divided into endogenous and exogenous factors. Endogenous factors refer to factors that cause changes in economic structure, such as the improvement of human capital levels and technological advancement. External factors are factors outside the economic system, such as a good international environment and political environment, which can actively promote economic growth. Previous studies tend to influence the impact of endogenous impacts on the economy. As the economy develops, the impact of external shocks, especially financial conditions, plays an important role in the economic development of countries and regions [8]. External shocks are divided into positive shocks and negative shocks. Positive external shocks contribute to the economy. For example, if a country implements a progressive fiscal or monetary policy, the economy is in a period of rapid development because low interest rates in the economy help to promote investment and consumption. Or, if the economy is in a relatively stable international or political situation, promoting economic development is even more encouraging. Negative external shocks often do not contribute to economic development. For example, if the economy is in a chaotic period and the international economic situation is serious, the country's overall economic level will decline due to the acceleration of globalization, which is closely related to economic development, not individuals. Or, if the government implements strict fiscal and monetary policies, interest rates rise, credit contracts, investment and consumption levels fall, and economic development slows [9]. The economic cycle is the process of expansion and contraction of the economy under positive and negative external influences.

4. Measurement of the Financial Cycle

4.1. Select variables that measure the financial period

From January 1999 to June 2016, monthly data of various financial variables such as money market, capital market, stock market, real estate market, credit market and foreign exchange market were selected. Market changes: The table below shows the selection, insights and sources of specific financial variables.

Table 1 Financial variables

Financial variable	Variable representation	Data Sources
Financial institutions' RMB loans	Loan	China Statistical Data Application Support System
Actual effective exchange rate indicator	REER	International financial statistics website
Shanghai Composite Index	SZ	Yahoo Finance website
M2 year-on-year growth rate	M2	China Economic Network
National Housing Climate Index	EP	China Statistical Data Application Support System
Bank spread	IR	People's Bank of China
CPI monthly	CPI	China Net

4.2. Description of the variable

The size of RMB loans of financial institutions was selected as an indicator of credit expansion in the financial system. Funds borrowed by renminbi banks and non-bank financial institutions of financial institutions can be used as proxy indicators to reflect the credit expansion of the financial system.

The real exchange rate index is used as the RMB exchange rate index. The central bank maintains the balance of payments by adjusting the exchange rate of the foreign exchange market, thus maintaining the balance of the Chinese foreign exchange market. Therefore, limiting the exchange rate is an important indicator of China's macro economy.

The monthly growth rate of the Shanghai Composite Index is selected as an indicator of China's stock market. The Shanghai and Shenzhen 300 Index can better reflect stock market volatility, but the data was released in 2005. In order to obtain long-term data, this paper selects the Shanghai Composite Index as an index reflecting the stock price.

The monthly rate of change in CPI was chosen as an indicator of changes in China's inflation level. CPI is an indicator reflecting the changes in consumer prices in China. It plays an important role in the entire national economic system and can be used as a proxy variable to characterize the degree of inflation or deflation in China.

4.3. FCI index construction method

Using the Goodhart and Hofmann (2001) [3] method, the weighted combination of the FCI index can be obtained as:

$$FCI_t = \sum_{i=1}^{n} wi(qit-\overline{qit}), \sum_{i=1}^{6} wi=1, wi=|Zi| / \sum_{i=1}^{6}|Zi| \tag{1}$$

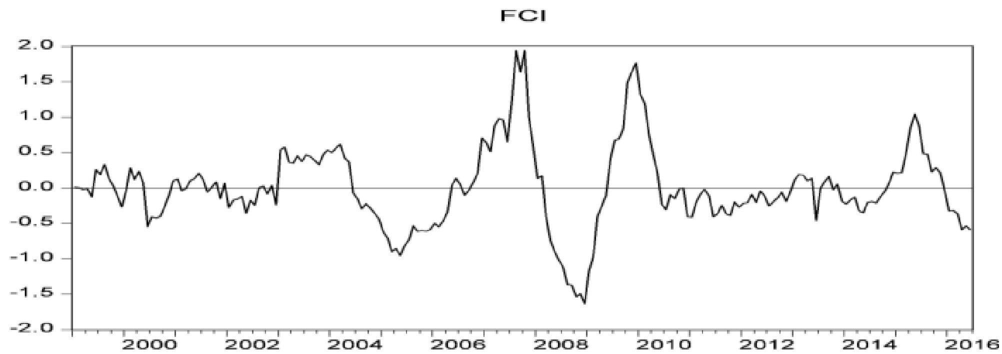

Fig.1. FCI Index

5. Conclusion and Suggestion

This paper builds China's FCI index based on VAR model and finds that the index can better describe the fluctuation of China's financial situation. Therefore, Beijing should pay attention to the chronological changes of FCI index and observe the abnormal changes in financial markets. Take policy measures to stabilize the role of financial factors in the economy. Secondly, using the frequency domain Granger causality test, it is found that there is a causal relationship between the financial cycle of different frequency bands and the macroeconomic consensus index and GDP.

This paper uses the weighted combination of multiple financial variables to form China's financial weight rating, financial institution loan scale and Shanghai Composite Index. The state index has a larger weight in the FCI index. The Shanghai Composite Index also plays an important role in the FCI index, indicating that the stock market has a great impact on the entire financial market, and the decline in the stock market in 2015 indicates that the Chinese stock market is still unhealthy. Achieve stable development of the financial market. In recent years, with the expansion of credit scale, the scale of lending by financial institutions has played an important role in China's financial market. The emergence of the US subprime mortgage crisis has had a major impact on the credit economy.

The business cycle provides predictive information for short-term macroeconomic conditions, while the macro consistency index does not provide predictive information for the business cycle. In addition, GDP growth provides predictive information for the business cycle. This result shows that there are still many problems in the development of China's real economy, while Beijing shows that Beijing should accelerate the financial environment and institutional reforms to stimulate the development of China's economy. Reform state-owned enterprises and promote the supporting role of the real economy in finance. In short, the Chinese government should pay attention to the development of the real economy and the rapid development of the real economy and financial markets. Pay attention to the acceleration and delay effects of financial factors to prevent financial risks. Considering the availability of data, this paper only selects some financial variables to reflect the changes in the entire financial market, and studies the rapid development of financial markets and the rapid evolution of derivatives futures, options and warrants. The FCI system can contain more financial indicators to better reflect changes in the financial market; since the Granger causality test in the frequency domain does not reflect the strength and direction of the financial cycle in macroeconomics, this issue should be compared with other methods. Combine and further deepen and explore.

References

[1] Bernanke B, Gertler M, Gilchrist S. The financial accelerator in a quantitative business cycle framework. NBER Working Papers, 1998.

[2] Kiyotaki N, Moore J."Credit Cycles."Journal of Political Economy 105:211. Journal of the Japanese ＆International Eco-nomics.1997, 7(1):65-79.

[3] Goodhart C, Hofmann B.Asset Prices, Financial Conditions, and the Transmission of Monetary Policy. Paper prepared for the conference on'Asset Prices, Exchange Rates, and Monetary Policy', Stanford University, 2001, 114(2):198-220.

[4] Higgins P, Zha T, Zhong W. Forecasting China's economic growth and inflation*. Federal Reserve Bank of Atlanta work-ing papers, 2016, 41:46-61.

[5] Christiano L, Motto R, Rostagno M. Financial Factors in Economic Fluctuations. ECB Working Papers, 2010.

[6] Claessens S, Kose M A, Terrones M E. How do business and financial cycles interact. Journal of International Economics, 2012, 11(88):178-190

[7] Borio C, Disyatat P, Juselius M. Rethinking potential output: embedding information about the financial cycle. Bis Work-ing Papers, 2013.

[8] Akar C. Analyzing the Synchronization between the Financial and Business Cycles in Turkey. Journal of Reviews on Glob-al Economics, 2016, (05):25-35

[9] Breitung J, Candelon B. Testing for short- and long-run causality: A frequency domain approach. Journal of Economet-rics, 2006, (02):363-378.