

Research Article

Cycle Relationship between China's Monetary Policy and Economic Growth Based on the View of FCI

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Abstract: On the issue of correlativity between monetary policy and economic growth, this study firstly concludes the study results done by foreign and domestic scholars; then, based on the latest economic data like interest rate, exchange rate, bank credit and asset price, this study constructs China's real Financial Condition Index by using VAR model; further, this study uses spectrum analysis to study the relationship between FCI and economic growth and reaches the conclusion that monetary policy changes in consistent with and goes ahead of economic growth; lastly, this study raised some policy suggestions based on history of China's monetary policy.

Keywords: Financial condition index, spectrum analysis, transmission mechanism, value added

INTRODUCTION

Purposes of study: As one of the key points of Macroeconomics study, the cycle relationship between monetary policy and economic growth ought to be regard as a top-concern in academic and practical world. Recently, as China's economy increasingly becomes uncertain and is being profoundly affected by global economy, studying on the relationship between monetary policy and economic growth is vital to making monetary policy appropriate and effective.

Monetary policy, in generalized sense, means all actions relates to monetary affairs, like reform to financial system, which are taken by government, central bank and other departments to affect financial variables. Its effectiveness largely depends on the choice of intermediate objectives, policy instruments and financial variables and the transmission mechanism monetary policy takes effects on economic growth (Dai, 2008). As China's economic condition becomes more complex, factors in monetary policy's transmission mechanism will interact. For example, one factor's economic effect will be strengthen or weakened by others'. Therefore, in the practice of monetary policy, we need to consider each factor to analysis the policy's condition (Tan, 2008), thus to promote economic growth through properly adjusting economic variables and to insure the credibility and transparency of central bank's monetary policy.

THEORETICAL BASIS AND LITERATURE REVIEW

According to the earliest Monetary Neutrality Theory, or, the viewpoint of Classical Economic School, money has no substantial effect on real economy; money is just the intermediary of commodity exchange; changes of money supply will only result in changes of price level, in other words, money supply only takes effects on price level (David and Chen, 1984). Traditional Economy School represented by Keynesian School and Monetarist School thinks that monetary policy is transmitted through the channel of money. However, the difference of the two is that the former thinks that changes of money is effective to one country's macro-economy (Keynes and Chen, 1993), whereas the latter thinks that increase in exogenous money supply will generate purchasing power that exceeds demand, affecting one country's macro-economy. In short term increase in money supply boosts nominal income and lowers unemployment; in long term increase in exogenous money supply will only boosts price level (Friedman, 1956).

The earliest scholars who described the relationship between money and output level systematically are Friedman and Schwartz (1963). They concluded that during economy expansion there would be positive disturbance component in currency stock which is higher than trend level, while that there would be negative one which is lower than trend level.

Conclusions made by foreign scholars are as follows:

- In short term monetary policy takes effects on economic growth. Through empirical studies, Friedman and Schwartz (1963) and Tobin (1970) found that in short term money supply do have effect on output's fluctuation. The effect is called "Tobin Effect". Stock and Watson (1989) and Cover (1992) also got similar conclusions.
- In long term monetary policy does not take effects on economic growth. McCandless and Weber (1995) conducted empirical studies to 100 countries' growth rate of output, average inflation rate and money supply ranging over 30 years and concluded that in the long run, growth rate of output has no correlation with that of money supply. Besides, Sims (1980) concluded that after nominal variables like interest rate and price level were added into the model in their empirical study, money supply's effects on real output decrease as time goes by.

Recently, China's scholars also conducted researches into monetary policy and economic growth's relation by analyzing different economic variables of different time ranges and using different methods and reached these three kinds of conclusions:

- There is significant linear relationship between monetary policy and economic growth. Through empirical studies in relations between growth rate of China's nominal economic growth and that of money supply, Zeng (2000) concluded that the former has significant linear relationship with and increases with the latter. By using Vector Quantity's Error Correction Model with Markov Regime Switching, Guo *et al.* (2005) described the relationship between China's monthly growth rate of GDP and that of M1 ranging from January 1990 to March 2004 and concluded that China's output level has a long term equilibrium relation with money supply and that each growth series has its own significant state of Three-Regime-Switching, whose relational schema is different from each other's. Recently, VAR Model was also widely adopted in empirical studies. By using VAR Model, Guo (2001) concluded that M2 is the main reason of GDP and price level's changes.
- Monetary policy has different effects on economic growth in different time spans. By using VAR Model, Liu *et al.* (2001) concluded that monetary policy affects real economic sections in short term within 40 months, while that in long term it has no effects. Yang (2003) used co-integration test and error correction model to check the relations among money supply, inflation rate and economic growth rate ranging from the 2nd quarter of 1986 to the 3rd quarter of 2001 and concluded that only among broad money, inflation rate and economic

growth rate does long-term equilibrium exists, while that in short term the relations of them are unstable and that broad money is not the Granger Cause of growth rate of GDP.

- Monetary policy has different effects on economic growth in different areas. By using Granger Causality Tests to China's seasonal GDP, M0 and M2 ranging from the 1st quarter of 1992 to the 3rd quarter of 2000, Liu and Liu (2002) concluded that GDP has the reaction to M2 only, while that no interaction between real output and growth rate of money variables exists and that if business cycle is taken into consideration, the relationship between money supply and output is asymmetrical. Based on annual data from 1990 to 2003, Yu (2006) used auto-regression model to test broad money's impacts on GDP of the eastern, middle, western of China and Beijing-Tianjin-Hebei and Northeastern Regions under China's corresponding macroeconomic background and concluded that economic growth of different regions reacts differently to monetary policy. Additionally, Liu *et al.* (2001)'s conclusion is that in relative long term expansionary monetary policy has a significant positive effect on economic growth and inflation, but that M1's effect is stable while M2's is fluctuate.

Improvements done by this study: Based on the former listed research results, we can conclude that the correlativity of monetary policy and economic growth is deeply studied both in the domestic and around the world. However, these studies are confined to the former's effects on the latter while ignored their specific cycle relations. What's more, the economic variable used to represent monetary policy is merely a single one such as broad money supply (M2), which lacks system aticness and comprehensiveness as China's economy becomes more open and complex. So it is necessary to construct a new economic variable to represent monetary policy and thus to precisely reflect the relationship between monetary and economic growth. Here this study will construct China's Financial Condition Index and then study its cycle relation with China's economic growth by using spectrum analysis.

METHODOLOGY

Construction of financial condition index: As to the quantization index of monetary policy, the most representative study result is Financial Condition Index, which is also an index this study tries to construct. The notion of FCI derives from Monetary Condition Index (MCI), a lately established and applied index. In 1990s, Freedman firstly introduced MCI's notion, theoretical basis and calculation in one of IMF's research reports. The basis of Monetary Condition Index is the linear combination of several economic and financial variables relating to monetary policy (interest rate and exchange rate mainly). Its fundamental form is

$MCI_t = W_r(r_t - r_0) + W_e(e_t - e_0)$, where t and 0 represents base period and report period respectively; r represents short term interest rate; e represents logarithm of exchange rate index (the rise of e means appreciation); W_r, W_e represents the weight of interest rate and exchange rate respectively. Compared with base period, the higher are interest rate and exchange rate, the larger is MCI and the stricter is the monetary policy; otherwise it is looser.

Recently, as the effect of fluctuation in asset price to monetary policy is being paid more attention in academic communities, some scholars took asset price into consideration and expanded MCI into Financial Condition Index (FCI). FCI was firstly raised by Goodhart and Hofmann (2001). They asserted that asset price plays an important role in monetary policy's transmission. Given that MCI contains short term interest rate and real effective exchange rate, they inserted real estate stock price into it and calculated each variable's weight by using the compressed type of aggregated demand equation and VAR pulse response method, thus constructed G7's FCI. Considering this study is to construct FCI pertaining to economic growth, we need to construct the real one.

Selection of variables: Generally, central bank uses universal and selective monetary policy tool to affect the real economy through intermediate variables' transmission. Therefore, to construct financial condition index, firstly we need to analysis the channels of China's monetary policy's transmission. On the whole, the channels are bank credit, asset price, interest rate and money supply (Ma, 2011). But because China's economy is becoming more open, we need to take more factors and their interactions into consideration. Here, the following transmission mechanisms are considered.

Bank credit: As the creditor, commercial banks reacts to interest rates changes and alters their own actions. Central Bank's adjustment to reserves will affect commercial banks' liquidity, thus affects their credits and overall output level. The transmission can be expressed as: $R \uparrow \rightarrow r \downarrow \rightarrow L \uparrow \rightarrow A \uparrow \rightarrow Y \uparrow$, where R is commercial bank's reserves against deposit; r is interest rate; L is commercial banks' liquidity; A is credit supply; Y is output level.

Asset price: Recently, the booming capital market increasingly plays an important role in monetary policy's operation. Take stock market as an example, monetary policies aiming to regulate the economy will affect stock price, creating its wealth effect, thus affecting cooperation's and individual's consumption and investment and aggregated output level. The transmission can be expressed as: $R \uparrow \rightarrow M \uparrow \rightarrow i \downarrow \rightarrow P \uparrow \rightarrow W \uparrow \rightarrow C \uparrow \rightarrow Y \uparrow$, where R is financial assets; M is money supply; i is interest rate; P is stock price; W is financial assets' nominal value; C is consumption expenditure; Y is output.

Exchange rate: In opening economy, changes in exchange rate affect international trade and capital flow, making exchange rate an important transmission mechanism. If foreign currency becomes a kind of asset to cooperation and individuals, changes in real effective exchange rate will affect nominal asset value. When money supply increases, real exchange rate will decrease, causing nominal asset value to increase. Then net export and aggregated output increases. The transmission can be expressed as: $M \uparrow \rightarrow r \downarrow \rightarrow E \downarrow \rightarrow NX \uparrow \rightarrow Y \uparrow$, where M is money supply; r is real interest rate; E is exchange rate; NX is net export; Y is aggregated output.

Interest rate: In this mechanism, one of the most important mechanisms, central bank firstly adjusts benchmark interest rate, affecting asset price on capital market, then realizing regulation to economy. Interest rates function is represented by asset price's influence on price level and on investment value of a country's financial assets. If the financial assets appreciate, foreign capital will be attracted and boosts exchange rate.

Money supply: In this mechanism, money supply is the money issued by central bank and then released by commercial banks and other financial institutions as loans. Central bank regulates money supply according to monetary market's demand, thus insuring a certain output goal under equilibrium of demand and supply on monetary market. Here the money supply is not nominal but effective. The demand is determined by the level and scale of a country or region's economic development, which is the goal of central bank's money supply. Through this equilibrium, central bank could insure steady and rapid economic development under normal price level.

To sum up, this study chooses growth rate of value added as economic growth. This is because it has an ideal stationary. For the price factor has been excluded from the data of growth rate of value added published by statistical bureau, we only need to standardize VA into VAS. Then we choose new credit published by People's Bank of China as bank credit, real estate climate index as development of real estate, RMB actual rate index published by Bank of International Settlements as real effective exchange rate, weighted inter-bank borrowing interest rate published by Bank of China as real short term interest rate, Shanghai Composite Index as real stock right price index. Each ranges from January 1996 to August 2012 and was standardized. Trend term was eliminated by using Hodrick- Prescott filtering. Finally we got economy growth VAS, bank credit RCGGAP, real estate index RECIGAP, real effective exchange rate REERGAP, real short term interest rate RIRGAP, real stock price index RSPGAP, amongst price factor was excluded from RCGGAP, REERGAP, RIRGAP and RSPGAP.

Table 1: Unit root tests

Variable	ADF test				PP test			
	(C, t, n)	t statistics	Prob	Stability	(C, t)	t statistics	Prob	Stability
VAS	(0, 0, 1)	-3.338097**	0.0145	Stable	(0, 0)	-8.572775*	0.0000	Stable
RCGGAP	(0, 0, 1)	-4.433294*	0.0004	Stable	(0, 0)	-11.875340*	0.0000	Stable
RECIGAP	(0, 0, 1)	-5.512647*	0.0000	Stable	(0, 0)	-3.599451*	0.0066	Stable
REERGAP	(0, 0, 1)	-4.807931*	0.0001	Stable	(0, 0)	-4.028504*	0.0016	Stable
RIRGAP	(0, 0, 1)	-3.235537**	0.0194	Stable	(0, 0)	-3.329098**	0.0149	Stable
RSPGAP	(0, 0, 1)	-5.462964*	0.0000	Stable	(0, 0)	-3.623771*	0.0061	Stable

* and **: Stable under 1 and 5% significant level respectively

Table 2: Values of impulse response function

Period	VAS	RCGGAP	RECIGAP	REERGAP	RIRGAP	RSPGAP
1	0.767481	0	0	0	0	0
2	0.260731	0.108024	0.113584	-0.032900	0.019828	0.015452
3	0.337674	0.060680	0.098834	-0.045240	0.025851	0.032920
4	0.224792	0.071424	0.094767	-0.035140	0.023130	0.021159
5	0.206235	0.057847	0.071086	-0.020580	0.028025	0.011431
6	0.161433	0.051691	0.051063	-0.005030	0.028695	-0.001750
7	0.134632	0.041651	0.030206	0.007630	0.028032	-0.014290
8	0.106510	0.032782	0.012397	0.016736	0.025364	-0.026430
9	0.083908	0.023624	-0.002930	0.022202	0.021669	-0.037060
10	0.063631	0.015264	-0.015140	0.024588	0.017278	-0.045890
11	0.046607	0.007665	-0.024360	0.024526	0.012680	-0.052600
12	0.032169	0.001114	-0.030690	0.022676	0.008166	-0.057120
Accumulative response = $\sum_{t=1}^n \Phi_{it}$		0.471766	0.398817	-0.020520	0.238717	-0.154190
Weight $\frac{ \sum_{t=1}^n \Phi_{it} }{\sum_i \sum_{t=1}^n \Phi_{it} }$		0.367417	0.310604	0.015981	0.185916	0.120083

Tests of data: Constructing index by using model requires every variable to be stable, thus insuring the stability of the whole test system. Here we adopt ADF and PP unit root tests, whose results show that all the variables are stable (Table 1).

Calculation of the index: VAR impulse response method uses impulse response function of VAR Model to estimate each variable's weight in FCI and thus to illustrate the significance of each variable's effect on output. For VAR model considers interactions among variables and thus has an ideal function to predict, given that VAS, RCGS, RECIS, REERS, RIRS and RSPS are all stable under 1 and 5% significant level, we choose it to estimate the weights.

In VAR model, though the change of variable's sequence will cause the parameters estimated by orthogonalization impulse response function to change, those estimated by generalized impulse response function will not, for the parameters are unique. Therefore, this study regards the cumulative effects of RCGS, RECIS, REERS, RIRS and RSPS's a unit standard deviation to VAS from 1 to 12 month as the weights. Referring to Christophe and Grégory (2008)'s way of calculation of G7's MCI, we set the weight w_i formula as:

$$w_i = \frac{|\sum_{t=1}^n \Phi_{it}|}{\sum_i |\sum_{t=1}^n \Phi_{it}|}, i = 1, 2, 3$$

where, Φ_{it} is VAS's response to one unit standard deviation's impact at time t .

The concrete form of FCI's calculation is:

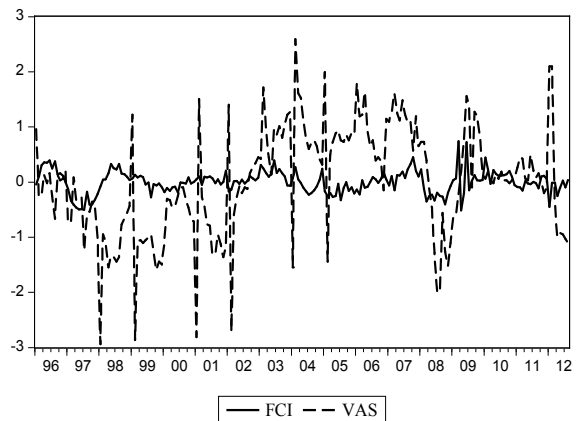


Fig. 1: Financial condition index and standardized growth rate of value added

$$FCI = w_1rcggap_t + w_2recigap_t + w_3reergap_t + w_4rirgap_t + w_5rspgap_t$$

$$\sum_{i=1}^5 w_i = 1$$

Considering the time range of the study to the responses is one year, we set the lag phase of impulse response function to be 12, namely, period = 12. Table 2 concludes the process of response.

Through calculation, $\sum_i |\sum_{t=1}^n \Phi_{it}| = 1.284006$. According to the weight's formula, we get that each weight is 0.367417, 0.310604, 0.015981, 0.185916 and 0.120083. Then, as the definition of monetary condition index formerly stated, we get China's real FCI ranging from January 1996 to August 2012, whose comparative statistics is VAS (Fig. 1).

As we can see in the figure, the financial condition index made up of standardized economic variables is stable, ranging from -0.6 to +0.6. It also has a similar trend as VAS's and goes ahead of VAS, indicating that monetary policy takes effect on economic growth after its execution. These results match our expectations.

CYCLE RELATIONSHIP BETWEEN FCI AND VAS BY SPECTRUM ANALYSIS

In order to study the cycle relationship between the constructed real FCI and VAS in further, this study introduces spectrum analysis in.

Spectrum analysis, or, frequency domain analysis, is to regard time series as the sum of regular waves (sine wave or cosine wave) with different frequencies and to compare different frequency waves' variances. Through compare each component's cyclical change, we can know about the time series' frequency structure and the main feature of its fluctuation, thus find out the main period of waves. This method is widely used to measure a certain economic variable's fixed-length cycle (Yang, 1988).

Up to now there are mainly two methods to analysis and study time series: one is directly analyzing the structural feature of data when changing with time, or, the time domain analysis. Whose tools are autocorrelation (or auto-covariance) function and difference equation; the other one is previously introduced spectrum analysis whose tool is Fourier Transform and spectrum density function. Compared with the former, spectrum analysis has the following advantages:

- Resolving economic fluctuation variables into periodic functions with different cycle length will help to study each economic cycle's special pattern.
- The process of calculation and analysis has certain criterions, thus avoiding subjectivity.
- Sample point will not be lost since all data is taken into calculation (Bu, 2006).

Therefore spectrum analysis makes up the shortcoming of time domain analysis for the latter regard time series as a whole thus confusing different periodic component's function and provides the basis for analyzing economic fluctuation's reasons and inherent mechanism and for planning the related countermeasure. These are the reasons why this study chooses it (James, 1999).

Spectrum analysis to single time series: This means spectrum estimation to a certain economic time series whose trend and seasonal factors were excluded. Then the main frequency components were found according to the estimated spectrum density function.

To use this method, firstly, we need to assume that the series is covariance stable (Granger and Hantanaka,

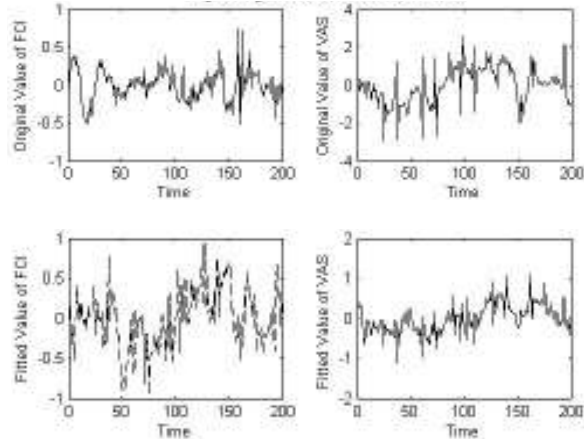


Fig. 2: Original values and fitted values

1964). According to the former tests, FCI and VAS are both stable under 5% significance level. And the sample size is also required to be large enough, exactly, no less than 200. So the data collected can be adopted in spectrum analysis. Generally a time series with random covariance stationary stochastic process $y_t(t = 1, 2, \dots, N)$ can be fitted with Fourier Series:

$$y_t = A_0 + \sum_{m=1}^n \left(A_m \cos 2\pi \frac{mt}{N} + B_m \sin 2\pi \frac{mt}{N} \right) + \varepsilon_t$$

where, $t = 1, 2, \dots, N$ is time; N is totality and $N = 2n, m = 1, 2, \dots, n$; frequency m/N is the m^{th} harmonic when $1/N$ is the fundamental wave; ε_t is random error.

The coefficients A_m, B_m of Fourier Series' fitting function and y_t 's spectrum density can be expressed as:

$$A_m = \frac{1}{N} \sum_{t=1}^N X_t \cos 2\pi \frac{mt}{N} \quad (m = 1, 2, \dots, n)$$

$$B_m = \frac{1}{N} \sum_{t=1}^N X_t \sin 2\pi \frac{mt}{N} \quad (m = 1, 2, \dots, n)$$

$$I(fm) = N(A_m^2 + B_m^2) \quad (m = 1, 2, \dots, n)$$

Cycle length is:

$$\max \left\{ N[A_m^2 + B_m^2] > N, N[A_m^2 + B_m^2] > N2, \dots, Am2+Bm2 > Nn \right\}$$

The fitting results are shown in Fig. 2, in which the fitted FIC and VAS has the same tendency as the original data. So spectrum analysis can be used to study the original data's periodic components.

Cross spectrum analysis: This is a method to study the correlativity of two or more stable economic time series' frequency domains. As to one series or two series, spectral technique is to resolve one series into a series of frequencies representing a fixed-length cycle. Spectrum analysis is used to estimate the degree of

correlativity of a couple of economic variable's wavelength. It provides cross spectrum analysis tools to study the periodic fluctuation relationship of two economic time series' frequency spectrum components. Specifically, this method provides two statistics-consistency and phase-to analysis the lead and lag relation between economic variables.

Suppose two time series are x and y , the formulas of cross covariance C_{xy} and C_{yx} can be expressed as:

$$C_{xy} = \frac{1}{n} \sum_{t=1}^{n-k} (x_t - \bar{x})(y_{t+k} - \bar{y})$$

$$C_{yx} = \frac{1}{n} \sum_{t=1}^{n-k} (x_{t+k} - \bar{x})(y_t - \bar{y})$$

where,

$$\bar{x} = \frac{1}{n} \sum_{t=1}^n x_t, \quad \bar{y} = \frac{1}{n} \sum_{t=1}^n y_t$$

The formulas of same spectrum (noted as P) and cross spectrum (noted as Q) are as follows:

$$P_j = \left(\frac{1}{2}\right) \sum_{k=1}^m \lambda_k [C_{xy}(k) + C_{yx}(k)] \cos(\pi jk/m)$$

$m, (m=1,2,\dots,n)$

$$Q_j = (1/2) \sum_{k=1}^m \lambda_k [C_{xy}(k) - C_{yx}(k)] \sin(\pi jk/m)$$

$m, (m=1,2,\dots,n)$

In order to smoothing data, we choose weight factor, or, in other words, Palmer Weight, which can be defined as:

$$\lambda_k = \begin{cases} 1 - \left(\frac{6k^2}{m^2}\right) \left(1 - \frac{k}{m}\right), & 0 < k < (m/2) \\ 2[1 - (k/m)]^3, & (m/2) < k < m \end{cases}$$

Here m is the intercept point.

The formulas of amplitude (noted as A), phase (noted as H), consistency (noted as C) and lead or lag relation (noted as $L(T)$) are as follows:

$$A_j = (P_j^2 + Q_j^2)^{1/2}$$

$$H_j = \arctan\left(-\frac{Q_j}{P_j}\right)$$

$$C_j = \frac{A_j^2}{s_{x_j} \times s_{y_j}}$$

$$L(T_j) = H_j \left(\frac{T_j}{2\pi}\right)$$

where, T_j is the cycle length.

Single variable's periodic change: According to the formula of spectrum density, the results are shown in Fig. 3.

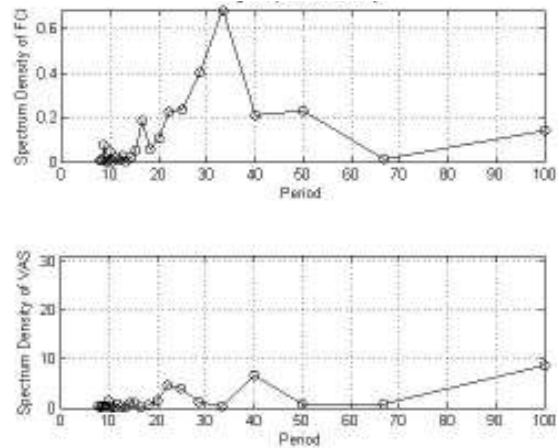


Fig. 3: Spectrum density

Comparing these two spectrum densities, we know that FCI and VAS each turns out a similar trend. In detail, in short term, their spectrum densities are small. But as time goes by, both firstly increase and then decrease. This reflects the features of monetary policy and economic growth's periodic fluctuations. In practical sense this means adjustments in China's economic development, whose effects decline as time goes by.

FCI's spectrum density peaks at around 2 years and 3 quarters (33.333 month) with a value up to 0.6835, indicating that China's monetary policy has a main cycle lasts for 2 and half years. Likewise, VAS peaks at around 3 years and 1 quarters (40 month), indicating that China's economic growth has a main cycle almost as long as monetary policies.

Cycle relationship between FCI and VAS: Suppose FCI's spectrum is X , VAS's spectrum is Y , this study calculates several important statistics of their cross spectrum: phase, consistency, lead/lag relation, etc. Positive value of lead/lag means FCI goes head of VAS; negative value means lag.

According to the former formulas, the outcomes are gathered in Table 3.

Specifically, as it is shown in Fig. 4, in short term, the value of lead/lag is positive, indicating that in this period FCI goes ahead of VAS. This is also the case in current situation, in which changes of macro economy lags behind of monetary policy's execution. But from 30 month on, the value turns to negative, indicating that in long term monetary policy lags behind of economic growth.

However this does not mean that economic growth goes ahead of monetary policy in the long run. As we can see from the figure of consistency, in short term, consistency between FCI and VAS is high, indicating that in short term economic growth reacts obviously to monetary policy, namely that monetary policy has a

Table 3: Outcomes of cross spectrum analysis

Cycle length (month)	Spectrum (X)	Spectrum (Y)	Consistency	Phase		
				Angle	Lead/lag	Amplitude
50	0.2322	0.7762	0.0066	-0.6670	-5.3082	0.0345
40	0.2086	6.5726	0.0008	-0.4275	-2.7213	0.0334
33.3333	0.6835	0.3929	0.0039	-0.0920	-0.4883	0.0322
28.5714	0.4044	1.1655	0.0023	0.2691	1.2237	0.0327
25	0.2373	4.0643	0.0012	0.5607	2.2310	0.0342
22.2222	0.2269	4.6379	0.0011	0.7468	2.6413	0.0341
20	0.1078	1.5661	0.0055	0.8252	2.6266	0.0305
18.1818	0.0573	0.6290	0.0153	0.7577	2.1927	0.0235
16.6667	0.1848	0.0228	0.0615	0.3732	0.9899	0.0161
10	0.0474	1.5569	0.0151	0.4275	0.6803	0.0334
9.5238	0.0038	0.3011	1.0538	0.6670	1.0111	0.0345
9.0909	0.0044	0.2679	0.9191	0.8002	1.1577	0.0328
8.6957	0.0785	0.4226	0.0226	0.8157	1.1289	0.0274
8	0.0063	0.3948	0.0865	0	0	0.0147

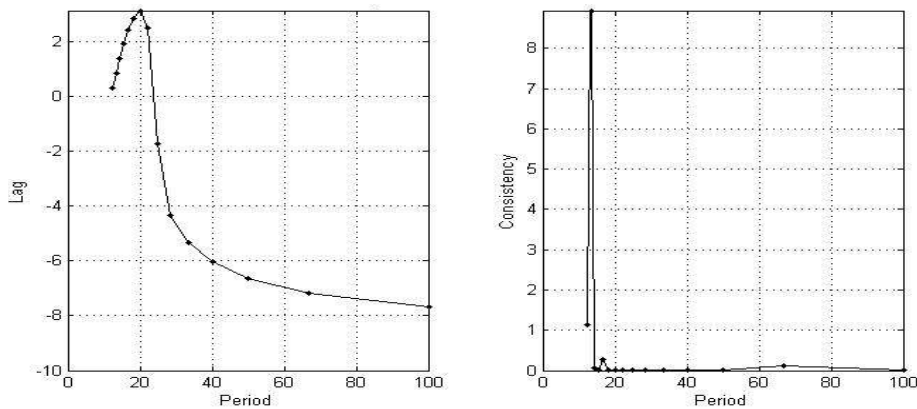


Fig. 4: Phase and consistency

significant effect on economic growth. In long term, the consistency plummets sharply but remains positive, indicating that in the long run they keep a similar trend but monetary policy’s effect declines as the time goes by.

This feature can also be read in Fig. 3, in which the changes of FCI and VAS’s spectrum densities’ trends are similar. But FCI’s spectrum density is much larger than VAS’s. As the time goes by, both of them decline gradually. This feature also goes with that of consistency. Because monetary policy increasingly lags behind of economic growth as the time goes by, the former’s effects on the latter also fades gradually, making the consistency decrease. But the trends of their changes remain unaltered.

CONCLUSION AND RECOMMENDATIONS

This study chooses China’s growth rate of Value Added, Real New Credit, Real Estate Climate Index, RMB exchange rate index, Bank of China’s weighted inter-bank borrowing interest rate and Shanghai Composite Index ranging from Jan, 1996 to Aug, 2012 and constructs China’s real Financial Condition Index (FCI) to represent China’s financial condition of monetary policy’ execution. Then this study studies the

cycle relationship between FCI and China’s economic growth. Through the single spectrum analyses to each variable, we find that they have a same cycle length. The cross spectrum analysis further suggests that in the short term the monetary policy runs slightly ahead of the economic growth, whereas from 30 month to the long term the monetary policy will lag behind the economic growth as its effects on the latter declines gradually.

According to the study results, we put forward the following suggestions.

On the aspect of monetary policy’s transmission mechanism:

- Positively and properly advance the process of interest rate liberalization, thus create conditions for interest rates transmission mechanism to take the leading effect. Liberalization is the prerequisite for interest rates transmission mechanism to take effect. As China’s Financial Market gradually grows up and matures, interest rates transmission mechanism will be the main and leading one in monetary policy’.
- **Concentrate on regulating and controlling M2, at the same time care the management of M1:** In the long run, based on closely concerning price

changes, the central bank should be cautious in using price type interest rate instruments. On the perspective of its role as the intermediate target in economic regulation, money supply should be more concerned. For broad money supply (M2) contains M1, M2's impacts on investment and consumption are the most obvious. The study results also indicate that money supply has a stable relation with economic variables like economic growth, interest rate.

- **Strengthen the flexibility of RMB exchange rate to give play to the market's fundamental role in the forming process of RMB exchange rate:** Currently the way RMB exchange rate is formed is inflexible; the role of relation of market supply and demand in pricing process is insignificant; the fluctuation range of RMB exchange rate in foreign currency transaction is closely restrained. Because the form of China's exchange rate is in the transitory stage towards a more "proper and flexible" exchange rate forming mechanism, the central bank's intervention on foreign currency will cause the expansion or shrinking of base currency, thus affecting money supply and output level. Therefore, as now the pressure of inflation rises and uncertain factors increases in international world, flexible exchange rate forming mechanism will help RMB reach the equilibrium level, eliminating hot money's expectation on RMB's appreciation, reducing the external overlarge demand and inflation pressure, thus making China's economy withstand international economic, commercial, invest and political change, insuring the steady and rapid economic development.
- **Reinforce the management to credit and financial risks:** Because credit channel plays an important role in monetary policy's transmission mechanism and the movement of credit fund is the core of financial activities, in executing monetary policy, the central bank must reinforce the management to credit market and scale, pay more attention to credit market's risks and carry out the related monetary policy. To sum up, the central bank should reinforce the supervisor over financial market, improve financial service, manage financial risks, punish illegal behavior and improve asset's quality.

On the aspect of monetary policy's execution:

Set FCI as monetary policy goal: Although the financial condition index may not necessary accurate, it is a quantitative index comprehensively reflects the degree of tension of financial condition when monetary policy is carried out. Additionally, financial condition index, as the goal monetary policy's execution, must be maintained at a flexible range to be rationally chosen. What should be cared is that in short term, the central bank need not only to go after the expected FCI, but

also to deal with the market confusion. Therefore, taking the real FCI into consideration will help the central bank know about the overall monetary condition. It is also the central bank's duty to estimate and publish China's real FCI as an important index for the government's effective regulation to the economy, thus avoiding mistakes in monetary policy's execution.

Associate monetary policy with fiscal policy: In China's economy, monetary policy is formulated and adjusted according to the real economic condition. Monetary policy is carried out to insure steady and rapid economic development and price stabilization, but because its effect is unpredictable, associating it with fiscal policy is a wise choice.

Since August, 1998, monetary policy closely combined with fiscal policy has been widely adopted to create multiplier effect. At present, China's economic growth rate is slowing down. It is urgent to stop the economy from declining by some policies aiming at boost effective demand. But considering the more complex monetary policy's transmission mechanism, the government needs also to care about fiscal matters. The execution of fiscal policy should concentrate on the expenditure on people's livelihood by continuing improving living environment, increasing transfer payment to individuals especially those in low-income level, allowing the market mechanism to adjust the industrial structure to improve fiscal efficiency rather than merely subsidizing cooperation with financial funds.

From the third quarter of 2012, China's economy turned out to be positive as it was stabilizing. This is largely because People Bank of China insists on the principle of "make progress while ensuring stability", properly deals with the relationship of economic growth, economic structure and inflation expectation and regard economic growth as the priority.

Next, People Bank of China will continue the prudent monetary policy, improve the foresight, pertinence and flexibility of regulatory, hold the balance of economic growth, economic structure and inflation expectation, concentrate on stabilizing the financial condition and make it possible for the market mechanism to adjust and stabilize the economy (Monetary Policy Analysis Group of People's Bank of China, 2012).

In conclusion, as the article stated in former parts, advancing interest rate liberalization, improving formation mechanism of RMB exchange rate, reinforcing management to credit and integrating various monetary policy instrument have become the tendency of China's present monetary policy aiming to insuring steady and rapid economic development. So the real FCI could be one important index in China's monetary policy's practice.

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