Financial Conditions Index’s Construction and Its Application on Financial Monitoring and Economic Forecasting

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Outline

• Overview
• Introduction of the FCI construction method
• Calculate China’s FCI
• FCI can reflect the situation of financial operation in China
• FCI can predict the economic trends better
• Conclusion
1. Overview (1)

• Definition of Financial Conditions Index (FCI) :
  – a comprehensive index which is constructed based on the combination of variables, such as currency price (For example, money, exchange rate), and asset price (For example, stock index and house price).

• FCI can make up the shortage of using the conventional indexes, such as money supply and interest rate, in measuring the financial conditions and forecasting the economic trend.
1. Overview (2)

- In 1990s, Central Bank of Canada developed the Monetary Conditions Index (MCI).
- MCI has been widely applied in many central banks and international institutions.
- With the development of economy and finance, the information of asset price has been paid more and more attention to evaluate financial situation.
- Some researchers developed FCI that adding some asset price variables into the combination of index.
2. Introduction of FCI construction method

Constructing FCI

- Selection of the Indicators
- The Construction Model
- Calculate the weights
### 2.1 Indicator selection

<table>
<thead>
<tr>
<th>Type</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money Supply</td>
<td>narrow money supply (M1), broad money supply (M2)</td>
</tr>
<tr>
<td>Exchange Rate</td>
<td>bilateral exchange rate</td>
</tr>
<tr>
<td></td>
<td>exchange rate index, such as efficient exchange rate from BIS</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>market interest rate: short term interest rate, bond interest rate, bond interest margin</td>
</tr>
<tr>
<td></td>
<td>policy interest rate: deposit or loan benchmark interest rate</td>
</tr>
<tr>
<td>Capital Market</td>
<td>market value/GDP, price earnings ratio, stock wealth owned by household, stock price</td>
</tr>
<tr>
<td>Real Estate Price</td>
<td>house average price, real estate climate indices</td>
</tr>
</tbody>
</table>
The FCI’s estimation equation is:

$$FCI_t = \sum_i w_i (q_{it} - \bar{q}_{it})$$

Where $q_{it}$ is indicator $i$’s value at time $t$, $\bar{q}_{it}$ is indicator $i$’s long-term trends or equilibrium values at time $t$, $w_i$ is indicator $i$’s weight.

In addition, the FCI’s form by principal component analysis method is:

$$FCI_t = \sum_i w_i F_{it}$$

Where $F_{it}$ is principal component $i$’s value at time $t$, $w_i$ is principal component $i$’s weight.
2.3 Classification of the methods building the FCI

- **Reduced Aggregate Demand Equation model**
  - Calculate the weights in FCI based on the coefficients of equation.

- **The VAR model**
  - Calculate the weights based on the impact level.

- **Weighted principal components**
  - Take the significance probability of the principal component as the weights.
The shortage of existing methods

• One problem is about the estimation models. Deviation from equilibrium of each variable need to be estimated in the common measuring form of the FCI, which may cause large error.

• Another one is about the determination of the weights, whose estimation models will differ depending on the purpose of FCI.
The innovation of this paper (1)

- we select the percent change rate of the variable as indicators to construct the FCI, which not only effectively describe the indicators, but also avoid errors arising from gap measuring.

\[
F_{CI_t} = \sum_{i} w_i \frac{q_{i,t} - q_{i,t-12}}{q_{i,t-12}}
\]

Where \( q_{it} \) is indicator \( i \)'s value at time \( t \), \( q_{i,t-12} \) is indicator \( i \)'s value at the same period of last year, \( \frac{q_{i,t}-q_{i,t-12}}{q_{i,t-12}} \) is indicator \( i \)'s growth rate at time \( t \), \( w_i \) is indicator \( i \)'s weight.
Second, the Principal Component Analysis and Dynamic Factor methods are both introduced to build FCI.

Dynamic Factor method can directly extract factor sequences which depict the characterized fluctuation of variables, without determining weights.
## 3. Calculate China’s FCI

<table>
<thead>
<tr>
<th>Type</th>
<th>Indicators</th>
<th>Sign</th>
<th>Data resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money supply</td>
<td>M2, the current growth rate of balance at period-end</td>
<td>M2</td>
<td>People’s Bank of China</td>
</tr>
<tr>
<td>Interest rate</td>
<td>7 days interbank funding weighted average nominal interest rates</td>
<td>in</td>
<td>The national interbank funding center</td>
</tr>
<tr>
<td>Exchang e rate</td>
<td>RMB’s nominal effective exchange rate index, the current growth rate</td>
<td>ex</td>
<td>Bank for International Settlements</td>
</tr>
<tr>
<td>Stock index</td>
<td>Shanghai securities composite index, the current growth rate</td>
<td>stock</td>
<td>Shanghai Stock Exchange</td>
</tr>
<tr>
<td>House price</td>
<td>Commercial housing sales price (Commercial housing sales divided by the number of commercial housing sales area), the current growth rate</td>
<td>hp</td>
<td>National Bureau of Statistics</td>
</tr>
</tbody>
</table>
FCI and MCI

prudent monetary policies
prudent monetary policies moderately tight
loosely monetary policy
prudent monetary policies
4. FCI can reflect the situation of financial operation in China
5. FCI can predict the economic trends better (1)

- FCI performs better as a leading indicator of CPI

<table>
<thead>
<tr>
<th></th>
<th>coefficient of correlation</th>
<th>leading length(months)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FCI</strong></td>
<td>0.72</td>
<td>10</td>
</tr>
<tr>
<td><strong>M2</strong></td>
<td>0.48</td>
<td>12</td>
</tr>
<tr>
<td>interest rate</td>
<td>-0.41</td>
<td>12</td>
</tr>
<tr>
<td>exchange rate</td>
<td>0.59</td>
<td>11</td>
</tr>
</tbody>
</table>
5. FCI can predict the economic trends better (2)
5. FCI can predict the economic trends better (3)

- FCI performs better as a leading indicator of GDP

<table>
<thead>
<tr>
<th></th>
<th>coefficient of correlation</th>
<th>leading length(quarters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCI</td>
<td>0.82</td>
<td>2</td>
</tr>
<tr>
<td>M2, interest rate and exchange rate</td>
<td>No passing the statistical test, and the anteriority is not significant</td>
<td></td>
</tr>
</tbody>
</table>
5. FCI can predict the economic trends better (4)
6. Conclusion

- FCI can better reflect the situation of China's financial operation, and can better predict the economic trends. Therefore, FCI can serve as an important reference index, whose performance is superior to single financial variables.

- Though the literature found that introducing asset-price variable into MCI to design FCI is an important approach to improve the MCI’s performances in economic forecasting and policy decision-making, but assets price in China's FCI provides limited information. With further developing of the financial market, asset prices information will be more important.
Thank You!