

Research on Real Value-added Measurement of Finance Industry in China

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Real value-added measurement of finance industry is an internationally difficulty recognized by the national accountants. And 1993 SNA also did not give a standard answer to this problem. When computing value-added of finance industry at constant price, national accountants of various countries often use different methods according to different actual situations of their countries. In this article, we will introduce the method used in estimating the real value-added of finance industry in China, the questions in the measurement, and some of our thoughts to improve the present situation.

The classification of finance industry

There are four sub-industries in finance industry in China, bank industry, security industry, insurance industry and other financial activities, which are 2-digit industries in the National Industrial Classification(2002) of China. And the value-added of finance industry is calculated at the level of the four 2-digit industries.

Measurement method of nominal value-added of finance industry

At present, the nominal value-added of finance industry is measured based on the income method in NBS. Compensation of employees, taxes less subsidies on production, consumption of fixed capital and operating surplus are calculated separately from the financial information, and the nominal value-added is the sum of these four items.

Measurement method of real value-added of finance industry

Generally speaking, there are three methods to measure constant-price value-added, including the base year price method, the deflation method and the quantity extrapolation method, where the deflation method can be farther divided into double-deflation and single-deflation. Restricted by the situation of data source, NBS has been using the single-deflation method to calculate real value-added of finance industry. How to determine the deflator is the key to calculate constant-price value-added by single-deflation method. The method to determine the finance industry deflator has experienced two different stages in NBS.

The method used before 2006

The main consumers of finance service output can be divided into two categories, ones are households, and the others are producing units such as enterprises and governments etc. The financial service consumed by households is treated as household final consumption, and the financial service consumed by producing units is treated as intermediate consumption. The financial service consumed by producing units is mainly loan service, and the loan is generally used to construct structures(roads, bridges, workshops and office buildings etc), or to purchase machineries and equipments to expand production. In this sense, the financial output can be regarded as mainly having close relationship with the consumption activities of households and the investment activities of producing units. Considering this point, the deflator of finance industry was determined according to the weighted average of Consumer Price Index (CPI) and Investment Price Index (IPI) before 2006, and the weight is proportion of household final consumption expenditure and gross fixed capital formation in their sum in the expenditure approach GDP. We can express it in the following formula:

$$\text{Deflator of finance industry} = \text{CPI} \times [\text{Household final consumption expenditure} / (\text{Household final consumption expenditure} + \text{Gross fixed capital formation})] + \text{IPI} \times [\text{Gross fixed capital formation} / (\text{Household final consumption expenditure} + \text{Gross fixed capital formation})]$$

All the four sub-industries in finance industry, bank industry, security industry, insurance industry and other financial activities, use the same deflator.

The method used from 2006

From 2006, NBS changed the method in calculating bank industry deflator in finance industry.

For bank industry, the index reflecting the price fluctuation of its output is interest rate. When interest rate is relatively stable, it's feasible to calculate the deflator by the weighted average of CPI and IPI, but when there are large changes in interest rate, the deflator will not fully reflect the price fluctuation of bank service and either no longer be suitable to measure the real value-added of bank industry. From 2006, China has repeatedly raised the benchmark interest rates for deposits and loans, and the growth of interest rates is far higher than CPI and IPI for the same period. In such circumstance, NBS changed the method of determining bank industry deflator from weighted average of CPI and IPI to the growth of interest rate.

First, the nominal output of bank industry is divided into three parts to calculate real terms. The first part is the difference between interest receivable and interest payable, which is double-deflated by the growth of 1-year loans interest rate and the growth of 1-year deposits interest rate. The second part is the difference between inter-bank transaction receivable and inter-bank transaction payable, which is deflated directly by the growth of inter-bank offered rate. The third part is other output of bank industry, which is deflated by service items price index in CPI. Then the real output of bank industry is the sum of these three parts. At last, the bank industry deflator is obtained by dividing the nominal output with the real output.

The process can be expressed in the following formula:

Nominal output of bank industry = (Interest receivable - Interest payable) + Difference between inter-bank transaction receivable and inter-bank transaction payable + Other output

Real output of bank industry = (Interest receivable / Growth of 1-year loans interest rate - Interest payable / Growth of 1-year deposits interest rate) + Difference between inter-bank transaction receivable and inter-bank transaction payable / Growth of inter-bank offered rate + Other output / Service items price index in CPI

Deflator of bank industry = Nominal output of bank industry / Real output of bank industry

In the final estimation of GDP in 2006, if using the old method, the deflator of bank industry

will be 1.015, the growth rate of real value-added of bank industry will be 43.5%. But with the new method, the deflator is 1.038, and the growth rate is 28.6%. Both disparities are quite large.

In other three sub-industries of finance industry, the deflator is still determined by the weighted average of CPI and IPI.

The problems in real value-added measurement of finance industry

Although NBS has made some explorations and improvements in real value-added measurement of finance industry in recent years, but there are still many problems and difficulties. Generally speaking, the problems focus on two aspects.

The problems in nominal estimation

The finance industry uses deflation method to calculate real value-added, thus the current-price value-added estimation is the basic of the constant-price value-added estimation, so the problems existing in nominal estimation will bring into real estimation. For instance the FISIM estimation, NBS does not use the reference interest rate method which is recommended by 1993 SNA, and the FISIM is mainly based on the net interest receivable (interest receivable less interest payable) plus net inter-bank transaction receivable plus return on investment. The result of this method will be inevitably different from the result of the reference interest rate method. Another example is the nominal output estimation of insurance industry, which is mainly based on the difference between insurance premiums and claims. In 2008, there have been many serious natural disaster occurred in China, especially Sichuan Earthquake on May 12, have incurred massive insurance claims. If still calculated with this method, China's insurance output of 2008 will probably be relatively small or even be a negative number.

The problems in deflator estimation

When calculating the deflator of finance industry, the biggest problem is that there is not an appropriate price index to use which can reflect finance service production. At present, China has not established the statistical system for the producers' price index of finance service production, therefore we have to use other price index to substitute for the finance industry deflator. As mentioned above, sometimes the weighted average of CPI and IPI can not reflect the real price

fluctuation of related industries. Now we use the growth of interest rate to calculate the bank industry deflator, but the old method is still used in the three other sub-industries, which may also bring into some problems, for example in the real value-added estimation of the security industry. China's stock market has experienced fierce fluctuation since 2006. In 2006, the growth rate of nominal value-added of China's security industry is 357.6%. For the huge growth rate of nominal value-added, it's not only because that the actual service provided by security institutes has increased, but the more important reason is that the stock prices has got an rapid increase. In this case, the weighted average of CPI and IPI can no longer to reflect the price fluctuation of security industry output, so other method should be researched to construct the deflator of security industry.

Some thoughts to improve the present situation

Against the main problems in the estimation of real value-added estimation of finance industry, NBS prepares to do deeper research and exploration in the following aspects, looking forward to get more improvements.

Improving the nominal estimation of finance industry

We are going to do deeper research in the nominal estimation of finance industry. For the FISIM calculation, research the feasibility of using the reference interest rate method in China so as to according with the international standard, and for the insurance nominal output calculation, research the method of substituting the expected claims for the actual claims, to avoiding the influence of huge claims to the insurance output.

Continuing to improve the estimation of bank industry deflator

Now the bank industry deflator is calculated through the growth of interest rate, where the interest rate is determined by 1-year benchmark interest rates for deposits and loans. If interest rate is adjusted in a year, the annual average interest rate for this year is determined by the simple average of every different rate. There are two problems in this method. The first one is that it can not obtain the annual mean interest rate in the true sense using the method of simple average. The second one is that it does not take the interest rate change for other terms into account. The ideal approach is determining the annual mean interest rate by the weighted average method,

simultaneously considering every kind of interest rates for different terms. Then we can get the comprehensive change of interest rates to construct the deflator of bank industry, which will reflect the price change of bank industry output in a more comprehensive manner.

Improving the real estimation of security industry

For the improvement of real estimation of security industry, we are going to research from two aspects. The first one, continue to use the single-deflation method and improve the estimation of deflator. Considering the situation that nominal output of security is closely related with the stock price, we plan to research the feasible of introducing the stock price change into deflator calculation, so as to eliminate the influence of stock price change to the real output of security industry. We have experimented to calculate the deflator with the change of Shanghai Stock Exchange Composite Index, and with this method the deflator of security industry in 2006 will be 1.413, which is much higher than 1.015, the weighted average of CPI and IPI, and can reflect the price change of security output more fully. The second one, since it's hard to get a very appropriate deflator, we can consider to use the quantity extrapolation method, and the transaction volume can be a possible quantity index. Calculated with the transaction volume, the growth rate of real output of security industry in 2006 is 143.7%, which is much lower than the result with present method, 350.8%.