

# Quarterly GDP Estimation in CHINA

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## 1. Establishment and development

China has started quarterly GDP estimation by industries since 1992. In practice, following the development of SNA of China, quarterly GDP is successively standardized and improved in estimation methodology, accounting procedure, release time and data quality control.

In the aspect of estimation methodology, <*The Method of Quarterly GDP Estimation of China*> was compiled and published in 1997, which provides a detail explanation of quarterly GDP estimation principle and methodology. <*The Manual of Quarterly GDP Estimation*> was compiled in 2000, which focuses on improving the method and increases its maneuverability. <*The Supplementary Regulation for Regional Quarterly GDP*> was compiled in 2004, which makes the regional quarterly GDP standardized and increases the harmoniousness of quarterly GDP between nation and region.

In the aspect of accounting procedure and release time, a series of standardized systems are established. After approved from the State Council in 2003, the three steps of accounting procedure in sequence are settled up, which are preliminary accounting, preliminary verification and final verification. The three steps results are released in 20 days after accounting quarter, 45 days after accounting quarter and the end of December next year when the annual final data confirmed, respectively. In addition, in order to realize the harmoniousness of quarterly GDP between nation and region, quarterly data has been benchmarked base on annual final verification data since the fourth quarter of 2003.

In the aspect of data quality control, establish the data quality evaluation system, and set up the “Experts Consultation Group of National Accounts” and the “Leading Group of GDP Accounting Coordination” in 2004. Experts from the relative departments of government, universities and economic research institutions are invited to be members of those two groups. Those experts from the two groups should evaluate the quarterly GDP before it is released. Regional GDP co-evaluation system has also been established since the third quarter of 2004. The national accountants from every provincial statistical bureau should work together with NBS to evaluate and harmonize regional quarterly GDP before it is released to public.

Quarterly GDP estimation of China is accumulated quarterly accounting, that is, calculate the data only for first quarter, half year, first to third quarter and the whole year. Separate quarterly data is not available now.

Ratio method is used for quarterly GDP benchmarking. Ratio method is the method that each quarter data is adjusted by the same ratio, in which the difference between annual data and the sum of four quarters data.

Quarterly GDP at expenditure approach in China is being on trail.

## **2. Methodology of Quarterly GDP Estimation**

There are eight industries in quarterly GDP estimation, which are Farming, Forestry, Animal Husbandry and Fishery; Industry; Construction; Transport Post and Telecommunication Service; Wholesale, Retail, Trade and Catering Service; Real Estate; Finance and Other Services. Depending on resources of basic data, different methods are used in different industries. (1) Some industries use Production Approach, i.e. value-added = gross output - intermediate input; (2) Some industries use value-added ratio method, i.e. value-added = gross output  $\times$  value-added ratio; (3) Some industries use extrapolation method, i.e. value-added = value-added of previous period  $\times$  extrapolative indicator. For the calculation sequence, some industries calculate current price value firstly, and then get constant price value; some estimate vice versa.

The methods of value-added estimation by industries are showed as follows.

### **2.1 Farming, Forestry, Animal Husbandry and Fishery**

Calculating current value-added first, and then constant value-added.

#### **2.1.1 Value-added at current price**

Value-added of Farming, Forestry, Animal Husbandry, Fishery and Agriculture Service are separately calculated. Of which, Farming, Forestry, Animal Husbandry, Fishery use production approach and Agriculture Service uses extrapolation method, which uses the growth rate of compensation of employees as the extrapolative indicator.

#### **2.1.2 Value-added at constant price**

Value-added at constant price is calculated by single deflation method, that is, value-added at constant price = value-added at current price  $\div$  deflator. The deflators for Farming, Forestry, Animal Husbandry, and Fishery are the indices of producer's price for their respective agriculture products; the deflator for agriculture service is the service item price index in CPI.

Value-added of the above industry at current and constant price are obtained from the sum of survey data from bottom to top organized by Department of Agriculture of NBS.

### **2.2 Industry**

Value-added at current price is derived from value-added at constant price, which is calculated from the growth rate of constant price.

#### **2.2.1 value-added at constant price**

Industry is divided into two parts that industrial enterprises above the cutoff (all state-owned

enterprises and non-state-owned enterprises that annual sale are above 5 million RMB) and industrial enterprises under the cutoff.

Value-added at current price of industrial enterprises above the cutoff is calculated by value-added ratio method. Of which, gross output is collected by summing the survey data from bottom to top organized by the Department of Industry and Transportation of NBS, and value-added ratio is usually determined by the annual result of last year. Value-added and growth rate, which are based on last year's price, are calculated by deflation method. Ex-factory price index of industrial products is used as the deflator.

Value-added at current price of industrial enterprises under the cutoff is also calculated by value-added ratio method. Gross output is collected by sample survey organized by the Department of Industry and Transportation of NBS. Value-added ratio is determined from the information of sample survey and input-output investigation both for enterprises under cutoff and individual units. Value-added and growth rate at last year's price is calculated by deflation method. Ex-factory price index of industrial products is used as the deflator.

Because the statistical scopes between industrial enterprises above and under cutoff don't link up in practice, furthermore, value-added and growth rate at last year's price are different from that fixed year price value in 2000. Therefore, value-added of industrial enterprises above and under cutoff from the survey cannot be adopted directly. Value-added at constant price of whole industry is derived from growth rate of value-added of whole industry ( $V_i$ ), which is the weighted average of growth rate for industrial enterprises above and under cutoff.

$$V_i = v_1 w_1 + v_2 w_2$$

$V_i$ 、 $v_1$ 、 $v_2$  refer to the growth rates of industry, industrial enterprises above and under cutoff, respectively.  $w_1$ 、 $w_2$  refer to the ratio of value-added at constant price of industrial enterprises above and under cutoff, respectively.

Value-added at constant price ( $VA1k$ ) is calculated by last period's constant value ( $VA0k$ ) and the above growth rate.

$$VA1k = VA0k (1 + v_i)$$

### 2.2.2 Value-added at current price

Value-added at current price ( $VA1c$ ) equals to constant value calculated above multiplied by deflator ( $pi$ ) that is ex-factory price index of industrial products.

$$VA1c = VA1k pi$$

## 2.3 Construction

Calculate value-added at constant price, and then value-added at current price.

#### 2.3.1 Value-added at constant price

Value-added at constant price is estimated by the extrapolation method. The extrapolator ( $E_c$ ) is derived from the growth rate of construction and installation investment at the current period, and adjusted coefficient ( $r_c$ ) which is the ratio of growth rate of value-added compared to growth rate of construction and installation investment last year. That is  $E_c = v_e r_c$ .

#### 2.3.2 Value-added at current price

Value-added at current price ( $VA1c$ ) equals to constant value calculated above multiplied by deflator ( $pf$ ) that is price index of investment in fixed assets.

$$VA1c = VA1k \cdot pf$$

### **2.4 Transport Post and Telecommunication Service**

Calculate value-added at constant price, and then value-added at current price.

#### 2.4.1 Value-added at constant price

Value-added at constant price is estimated by the extrapolation method. The extrapolator ( $E_p$ ) is derived from the growth rate of passenger and freight turnover and business volume of post and telecommunication at the current period, and adjusted coefficient ( $r_p$ ) which is the ratio of growth rate of value-added compared to growth rate of the weighted average growth rate last year. That is  $E_p = v_w r_p$ .

When calculating the weighted average growth rate, the weight of growth rate of passenger and freight turnover and business volume is the ratio of value-added for the transportation. The same is for the post industry.

#### 2.4.2 Value-added at current price

Value-added at current price equals to constant value calculated above multiplied by deflator that is price index of traffic fare in CPI.

### **2.5 Wholesale, Retail, Trade and Catering Service**

Calculate value-added at current price, and then value-added at constant price.

#### 2.5.1 Value-added at current price

Value-added at current price is estimated by the extrapolation method. The extrapolator ( $E_t$ ) is derived from the growth rate of total retail sale of consumer goods at the current period, and adjusted coefficient ( $r_t$ ) which is the ratio of growth rate of value-added compared to growth rate of total retail sale

of consumer goods last year. That is  $E_t = v_{trt}$ .

### 2.5.2. Value-added at constant price

Value-added at constant price (VA1k) is calculated by single deflation method. The deflator (pt) is retail price index.

$$VA1k = VA1c / pt$$

## 2.6 Finance

Calculate value-added at current price, and then value-added at constant price.

### 2.6.1 Value-added at current price

Value-added at current price is estimated by the extrapolation method. The extrapolator ( $E_f$ ) is derived from the growth rate of deposits and loans at the current period, and adjusted coefficient (rf) which is the ratio of growth rate of value-added compared to growth rate of deposits and loans last year. That is  $E_f = v_{dlrf}$ .

### 2.6.2 Value-added at constant price

Value-added at constant price (VA1k) is calculated by single deflation method. The deflator (pf) is the weighted average price index that weighting price index of investment in fixed assets and CPI.

$$VA1k = VA1c / pf$$

## 2.7 Real Estate

Calculate value-added at constant price, and then value-added at current price.

### 2.7.1 Value-added at constant price

Value-added at constant price is estimated by the extrapolation method. The extrapolator ( $E_r$ ) is derived from the weighted average growth rate of the growth rate of floor space of commercial house sold, compensation of employees and owner-occupied dwelling at the current period, and adjusted coefficient (rr) which is the ratio of growth rate of value-added compared to growth rate of the weighted average growth rate last year. That is  $E_r = v_{rrr}$ .

When calculating the weighted average growth rate, the weight of growth rate of floor space of commercial house sold is the ratio of value-added for the real estate. The weight of growth rate of compensation of employees is the ratio of value-added of real estate management to value-added of real estate. The weight of growth rate of owner-occupied dwelling is the ratio of imputed depreciation of owner-occupied dwelling to value-added of real estate.

## 2.7.2 Value-added at current price

Value-added at current price (VA1c) equals to constant value calculated above multiplied by deflator (pr) that is the average price index of selling price index, houses transactions price index, landing and renting price index of houses.

$$VA1c = VA1k \cdot pr$$

## 2.8 Other Service

Other Service refers to all industries except industries mentioned above. Calculate value-added at current price, and then value-added at constant price.

### 2.8.1 Value-added at current price

Value-added at current price is estimated by the extrapolation method. The extrapolator (Eo) is derived from the weighted average growth rate of operating tax of other service, administrative management expenditure and compensation of employees at the current period, and adjusted coefficient (ro) which is the ratio of growth rate of value-added compared to growth rate of the weighted average growth rate last year. That is  $Eo = v_o \cdot r_o$ .

When calculating the weighted average growth rate, the weight of growth rate of operating taxes is the ratio of value-added at current price of profitable activities in other services. The weight of growth rate of administrative management expense is the ratio of value-added at current price of administrative units and social organizations. The weight of growth rate of compensation of employees is the ratio of value-added at current price other than above two parts.

### 2.8.2 Value-added at constant price

Value-added at constant price (VA1k) is calculated by single deflation method. The deflator (po) is the average price index of retail price index and price index of service items in CPI.

$$VA1k = VA1c / po$$

## 3. Some suggestions for future work

Along with the development of SNA of China and improvement in statistical system, quarterly GDP estimation should be developed and improved. There are some issues shown as follows.

3.1 Delineate the industry classification into detail. According to the latest Chinese Industry Classification (GB/T 4754—2002), there will be 19 industries in Quarterly GDP estimation. They are Farming, Forestry, Animal Husbandry and Fishery; Mining and Quarrying; Manufacturing; Production and Supply of Electricity, Gas and Water; Construction; Transport, Storage and Post; Information Transfer,

Computer Hardware and Software Services; Wholesale and Retail Trade; Hotels and Restaurants; Finance and Insurance; Real Estate; Renting and Business Services; Scientific Research, Technological Services and Geological Surveying; Management of Water Conservancy, Environmental Resource and Public Infrastructure; Resident Services and Other Services; Education; Health, Social Security and Welfare; Culture, Sports and Recreation; and Public Administration and Social Organizations.

3.2 Based on the economic census data, new statistical data source and the requirement from the new industry classification improve and perfect in the methodology of quarterly GDP estimation.

3.3 Study on methodology of GDP estimation quarter by quarter and establish quarterly GDP estimation from expenditure approach.

(Translated by DONG Lihua)