

## STUDY ON SOME PROBLEMS IN ESTIMATING CHINA'S GROSS DOMESTIC PRODUCT

BY XU XIANCHUN

*Department of National Accounts, National Bureau of Statistics, Beijing*

This paper discusses the five main problems with current price estimates of China's Gross Domestic Product (GDP). These are the measurement of housing services, fiscal subsidies, welfare services provided within enterprises, rural industry and livestock products. The paper gives the possible ranges of error arising from problems in these areas and shows their quantitative impact on GDP estimates. The paper concludes that these problems have some impact on the structure of China's GDP, but limited impact on the total size of China's GDP. The official estimates, therefore, provide a reasonably accurate measure of the size of China's current price GDP.

### 1. INTRODUCTION

In recent years the official estimates of China's national accounts have been criticized by the World Bank<sup>1</sup> as well as by the well-known economist, Professor Angus Maddison.<sup>2</sup> Most recently the OECD has published a report on the sources and methods of China's national accounts<sup>3</sup> which identifies several areas where the official estimates appear weak. The staffs of the National Bureau of Statistics responsible for the national accounts are well aware of the weaknesses in the basic source data, some of which were detected through the recent censuses of industry and agriculture. Considering these various criticisms and on the basis of our own experience of national accounting in China, we think that there are five main problems in China's GDP estimates. These are: (1) the measurement of housing services; (2) fiscal subsidies; (3) welfare services provided within enterprises; (4) rural industrial statistics, and (5) livestock products. This paper will look into those problems and estimate their impact on GDP in quantitative terms.

Until 1985, national accounts for China were compiled according to the Material Product System (MPS), which had been developed in the Soviet Union and which was widely used by countries with centrally planned economies. From 1985 to 1992 accounts were compiled according to both the MPS and the 1968 version of the System of National Accounts (SNA). Since 1992, the accounts have been compiled only according to the SNA. The national accounts of China which are the subject of this paper largely follow the 1993 SNA. In practice, there are still many "central planning" features of the Chinese economy and this sometimes makes it difficult to apply strictly the 1993 SNA which is designed for countries

*Note:* The author wishes to thank Derek Blades and two anonymous referees for their helpful comments on an earlier draft of this paper.

<sup>1</sup>World Bank (1994), *China GNP per capita*, World Bank document number 13580-CHA, Washington D.C.

<sup>2</sup>Maddison, A. (1998), *Chinese Economic Performance in the Long-Run*, OECD, Paris.

<sup>3</sup>Organization for Economic Cooperation and Development (2000), *National Accounts for China. Sources and Methods*, Paris.

with market economies. The problem of “fiscal subsidies” illustrates one area where it is difficult to apply the SNA to the objective situation of the Chinese economy.

It should be noted that this study deals only with estimates at current prices. There are additional problems in the official estimates of GDP at constant prices. For example, industrial production is reported to the NBS using an official list of “comparable prices.” Because these do not adequately reflect changes in quality, NBS takes steps to correct these but is aware that its existing procedures need improvement. NBS staff are currently exploring alternative methods of estimating industrial production in constant prices. However, these issues are not discussed here because this study deals only with the estimates at current prices. It is essential to get the current price estimates right in order to have confidence in the constant price figures.

## 2. HOUSING SERVICES

The share of value added by housing services in China’s GDP is not only far lower than that of the developed countries but also lower than that of other developing countries. This is due both to the lack of basic statistics covering all housing services and because of the difficulty of properly measuring highly subsidized housing services. The failure to properly account for housing services is the most important cause of the underestimation of China’s GDP.

Housing services in China can be broken down as follows:

- Profit-making services, consisting of leasing of accommodation by real estate enterprises, by urban and rural households and by other types of units.
- Non-market services, consisting of housing services provided by the urban real estate management departments to urban households and housing services provided by enterprises and government units to their employees.
- Owner-occupied housing services, which refer to the housing services for owner-occupied dwellings by urban and rural households.<sup>4</sup>

In China’s national accounts, only parts of these housing services are covered at present. These are the profit-making housing services provided by real estate enterprises, non-market housing services provided by urban real estate management departments, and owner-occupied housing services of urban and rural households. Profit-making services provided by households and other units and, most important, non-market housing services provided by enterprises and government units to their employees are presently missed out of the accounts. In 1996, the people living in dwellings provided by the enterprises and government units where they work were 58 percent of the total urban population.

In addition to the problems of coverage, which are due to lack of data sources, there are also some methodological problems with the measurement of housing services in the national accounts.

<sup>4</sup>See Xu Xianchun and Li Wenzheng, Current Situation, *Problems and Proposed Methods for Real Estate Accounting of China*, Research References, 55, 1998.

- As part of the government's welfare policy, dwellings provided by the urban real estate management departments are subsidized by the state and the rentals paid are well below market prices. In practice, the actual operating income (rentals, heating income, etc.) is treated as the gross output of the real estate management departments, resulting in underestimation of output and value added. In addition, the coverage of these activities is also believed to be incomplete, thus further reducing gross output and value added.
- A second problem is that the value added of owner-occupied housing is taken as the estimated depreciation of the stock of owner-occupied housing. Developed countries usually base their estimates for owner-occupied dwelling services using market prices for comparable dwellings so that an operating surplus as well as depreciation is included in value added. In China the dwellings that are comparable to owner occupied dwellings are almost all publicly owned and are rented at below-market rents, so this approach cannot be used.
- According to the principles of national accounts, the depreciation of fixed assets should be measured based on the value of fixed assets revalued to current market prices. However, the depreciation of fixed assets at present are all estimated based on their historical costs. This also contributes to the underestimation of value added in respect of owner-occupied dwellings.

To correct for these problems in the accounting of housing services into consideration, we try to use two methods to revalue the value added of urban housing services using the information available. One approach is a market rental method and the other is a method based on costs.

The basic idea of the *market rental method* is as follows. First, the rental income of urban dwellings at market price is calculated by multiplying the total habitable areas of urban dwellings by the average rentals per square meter for urban dwellings rented on a market basis. This is assumed to give the gross output of housing services of urban households. Next, the value added of housing services of urban households is calculated by using the ratio of value added to gross output for real estate enterprises. In 1996, the proportion of value added of total housing services was 4.7 percent higher as a share of GDP than that estimated using the method of estimating the value added of urban households.

The *cost method* is to estimate the value added of housing services of urban households by reference to construction costs. First, the total value of the stock of urban dwellings is calculated by multiplying the total habitable areas of urban household dwellings by the average construction costs per square meter. Next, the imputed depreciation of fixed assets is obtained by multiplying the value of the total stock by the depreciation rate of 4 percent. The result is taken as the value added of housing services of urban households. In 1996, the proportion of value added of total housing services was 1.8 percent higher as a share of GDP than that estimated using the method of estimating the value added of urban households.

The first method has some theoretical advantages over the second. Because it uses market rentals for all types of urban dwellings, the estimated value added

includes a net operating surplus as well as depreciation. It also corrects for the limited coverage of housing services using the present method. However, the method also has its disadvantages. Until now, very few urban dwellings are available for renting in China and market rentals are generally high. If we use the higher rentals to estimate all urban housing services, the value added of urban housing services will be overestimated. Therefore, the proportion of value added of all housing services to GDP estimated by this method to estimate the value added of urban housing services is certainly too high and some downward adjustment is needed.

The cost method also covers all the urban housing services and so corrects for the under-coverage of housing services in the present method. However, it gives a conservative estimate. It neglects all other components of value added except depreciation. So the value added of urban housing services is underestimated.

Considering the advantages and drawbacks of the two approaches, it seems advisable to combine them by taking the *average* of the two methods as the value added of housing services. In 1996, for example, the average proportion of value added of housing services to GDP estimated by the two methods would be 3.3 percent higher than that of the current method. Looking at the proportion of value added of housing services to GDP in other countries at different stages of economic development and considering the development status of China's economy and its housing services, we think that the average proportion is reasonable.<sup>5</sup>

### 3. FISCAL SUBSIDIES

Since the reform and opening-up to the outside world which started in 1978, the Chinese government has been providing substantial annual subsidies to state-owned enterprises. Two kinds of subsidies can be distinguished—those designed to lower prices of outputs (price subsidies) and those that compensate enterprises for operating losses (loss subsidies). Table 1 shows the amounts of subsidies from 1991 to 1997.

From the table, we can see that the average proportion of fiscal subsidies to fiscal revenues and to GDP were 15.3 and 1.9 percent respectively from 1991 to 1997, with the highest proportions being 26.7 and 3.9 percent respectively. The correct measure of GDP depends on the correct treatment of these subsidies. In the present GDP estimates, all subsidies to enterprises are treated as negative production taxes, which means that the higher the subsidies, the larger the reduction in GDP. This is in line with the treatment recommended in the 1993 SNA.

In a pure market economy, subsidies to enterprises are also treated as negative production taxes. However, the subsidies are usually calculated as percentages of the prices of output sold on the market and the receiving enterprises are the direct beneficiaries. Therefore, they play a direct role in the survival and growth of enterprises. But it is not the same in China's case. In China, subsidies

<sup>5</sup>See Xu Xianchun and Li Wenzheng, Current Situation, *Problems and Proposed Methods for Real Estate Accounting of China*, Research References, 55, 1998.

TABLE 1  
SUBSIDIES BY THE CHINESE GOVERNMENT TO STATE-ENTERPRISES

| Year<br>(1) | Price Subsidies<br>(100 million<br>yuan)<br>(2) | Loss Subsidies<br>(100 million<br>yuan)<br>(3) | Total Fiscal<br>Subsidies<br>(100 million<br>yuan)<br>(4) | Proportion of<br>Fiscal Subsidies<br>to Fiscal Revenues<br>(%)<br>(5) | Proportion of<br>Fiscal Subsidies<br>to GDP<br>(%)<br>(6) |
|-------------|---|--|---|---|---|
| 1992        | 331.3   | 510.2  | 841.5   | 26.7  | 3.9   |
| 1992        | 283.1   | 445.0  | 728.1   | 20.9  | 2.7   |
| 1993        | 269.4   | 411.3  | 680.7   | 15.7  | 2.0   |
| 1994        | 289.1   | 366.2  | 655.3   | 12.6  | 1.4   |
| 1995        | 340.7   | 327.8  | 668.5   | 10.7  | 1.1   |
| 1996        | 426.5   | 337.4  | 763.9   | 10.3  | 1.1   |
| 1997        | 523.7   | 368.5  | 892.2   | 10.3  | 1.2   |
| Average     |   |  | 747.2   | 15.3  | 1.9   |

*Notes:*

The data in column 2 are from the table of "Government Expenditure for Price Subsidies" in *Chinese Statistical Yearbook, 1998* (meat price subsidies are excluded, since the subsidies are provided to individuals).

The data in column 3 are from the table of "Government Revenue by Source" in *Chinese Statistical Yearbook, 1998*.

The data in column 4 are the sum of the data in column 2 and column 3.

Fiscal revenues are from the table of "Total Government Revenue and Expenditures and their Growth Rates" in *Chinese Statistical Yearbook, 1998*.

Data of GDP are from the table of "Gross Domestic Product" in *Chinese Statistical Yearbook, 1998*.

to enterprises, including both price subsidies and loss subsidies, are often a direct result of the price control policies enacted by the government. In other words, enterprises are required by government legislation to sell their output at low prices and receive subsidies in compensation. Therefore, the beneficiaries are usually not the enterprises which received the subsidies, but the enterprises and consumers who purchase their products.

If the beneficiaries are enterprises which purchase the products from the subsidized enterprises, then they will earn higher profits and more value added, resulting in a transfer of value added from the subsidized enterprises to the enterprises that benefit from the lower prices. Hence, this part of subsidies only affects the pattern of value added among industries but not the total size of GDP.

However, if the beneficiaries are consumers, they will enjoy the advantage of the subsidies but there is no off-set to the reduced value added recorded for the subsidized enterprises. In consequence, this part of the subsidies will reduce total GDP directly. As already noted, the SNA is designed for countries with market economies in which governments do not intervene in the markets to the same extent as the Chinese government in order to keep prices low for the benefit of consumers. We therefore, propose to adapt the SNA in order to neutralize the effect of government price policies. Subsidies that directly benefit consumers will be treated as government final consumption expenditure and as a transfer payment to the consumers.

In practice, it is not easy to classify the subsidies into the above-mentioned two parts, as it is difficult to identify the actual amounts of the subsidies that benefit enterprises vs. consumers. For the sake of simplicity, we assume that half

of the subsidies benefit enterprises and half benefit consumers. Based on this assumption, we add half of the fiscal subsidies to GDP. Using the data in Table 1, the adjusted GDP estimates from 1991 to 1997 are as shown in Table 2.

Table 2 shows that total GDP will increase by 1.0 percent on average from 1991 to 1997 if we treat half of the fiscal subsidies to enterprises as government final consumption expenditure. During the period covered, the biggest increase is 2.0 percent in 1992 and the smallest is 0.6 percent from 1995 to 1997.

TABLE 2  
IMPACTS OF CHANGES IN TREATING THE FISCAL  
SUBSIDIES ON GDP

| Year<br>(1) | Adjustment of GDP<br>(100 million yuan)<br>(2) | Adjustment of<br>GDP (%)<br>(3) |
|-------------|--|---------------------------------|
| 1991        | 420.8  | 2.0                             |
| 1992        | 364.1  | 1.4                             |
| 1993        | 340.4  | 1.0                             |
| 1994        | 327.7  | 0.7                             |
| 1995        | 334.3  | 0.6                             |
| 1996        | 382.0  | 0.6                             |
| 1997        | 446.1  | 0.6                             |
| Average     | 373.6  | 1.0                             |

*Notes:*

Figures in column 2 equal half the corresponding figures in column 4 in Table 1.

Figures in column 3 equal the figures in column 2 divided by GDP in the same years.

Figures of GDP are from the *Chinese Statistical Yearbook, 1998*.

#### 4. WELFARE SERVICES WITHIN ENTERPRISES

In China the state-owned and collective-owned enterprises provide quite a wide range of welfare services to their employees and their family members. These include: medical care, nurseries, education, haircutting, communal baths, and so on. Compared with similar market services these welfare services are provided at very low prices, or even free. This leads to underestimation of the values added of these services. At the same time, most of the cost of these welfare services is treated as intermediate consumption and is deducted from the gross output of the principal activities of the enterprises, which also contributes to the underestimation of value added of the enterprises providing these services.

Due to the restriction of data sources, we can only estimate the impact of the underestimation of the welfare services on GDP by resorting to the method used by the World Bank in its report on "China GDP per capita."<sup>6</sup> In this report, the World Bank assumes that 10 percent of employees in Chinese state-owned and collective-owned enterprise work in the production of welfare services. Based on this assumption, the value added of the welfare services can be estimated with

<sup>6</sup>World Bank (1994), *China GNP per capita*, World Bank document number 13580-CHA, Washington D.C.

the help of input–output tables. The World Bank calculations suggest that GDP will increase by 1.6 percent if the welfare services provided by enterprises are correctly accounted for.

We believe the assumption that 10 percent of employees in state-owned and collective-owned enterprises work in welfare services is too high. Since the state-owned and collective-owned enterprises began to reform in the early 1990s, the welfare services formerly provided at very low prices or free within enterprises are being increasingly provided on a market basis. Thus, the number of employees working in free or highly subsidized welfare services is decreasing. Consequently, we assume that only 5 percent of employees in state-owned and collective-owned enterprises work in welfare services. Based on this assumption, GDP will increase by 0.8 percent if the welfare services are correctly accounted for in the GDP.

## 5. RURAL INDUSTRY

Some information on gross output of rural industry is available annually from the Bureau of Villages and Towns Enterprises, Ministry of Agriculture. This information was used for rural industry in the national accounts. However, the third national industrial census (reference year 1995) shows that rural industrial gross output from this source was overestimated by 1800 billion yuan in 1995, which amounts to 40 percent of rural industrial gross output. The National Bureau of Statistics has therefore adjusted industrial outputs downward from 1991 to 1994. The proportions of the downward adjustments are shown in Table 3.

TABLE 3  
DOWNWARD ADJUSTMENTS TO TOTAL INDUSTRIAL GROSS  
OUTPUT

| Year           | 1991 | 1992 | 1993 | 1994 |
|----------------|------|------|------|------|
| Adjustment (%) | 5.7  | 6.7  | 8.1  | 8.8  |

*Note:* Data used in this calculation are from “Enterprises and gross output value of industry by ownership” in the *Chinese Statistical Yearbooks for 1996 and 1995*.

Rural industry consists of four types of industrial enterprises: township enterprises, village enterprises, rural cooperative enterprises and rural individual industrial enterprises. The ratios of rural industrial gross output to total industrial gross output from 1991 to 1997 has been calculated from the corresponding data in the *Chinese Statistical Yearbook*, industrial statistical yearly reports and the third industrial census. The results are shown in Table 4.

In Table 4, the ratio shown for 1995 is based on the third industrial census and is regarded as being the most accurate estimate. The figures for the years before and after 1995 have been calculated using the regular industrial statistical data which NBS believes to be biased upwards. For the period as a whole, the ratio in 1995 is the lowest. The most important reason for relatively higher ratios in non-census years is that the overestimation of rural industrial gross output has

TABLE 4  
THE RATIOS OF RURAL INDUSTRIAL GROSS OUTPUT TO TOTAL INDUSTRIAL GROSS OUTPUT

| Year       | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
|------------|------|------|------|------|------|------|------|
| Ratios (%) | 28.0 | 32.5 | 36.3 | 43.8 | 33.7 | 44.2 | 45.8 |

*Notes:*

Data from 1991 to 1994 are from the *Chinese Statistical Yearbook, 1995*.

Data for 1995 are from the third national industrial census (reference year 1995).

Data in 1996 and 1997 are calculated based on the data from the *Chinese Statistical Yearbook, 1996* and *Industrial Statistical Yearly Reports, 1997*.

not been removed fully.<sup>7</sup> It is clear that rural industry has been growing at a steady pace and the sharp year-to-year changes shown in Table 4 are not plausible. We have, therefore, assumed that the proportions of overestimation to rural industrial gross output in 1996 and 1997 were the same as in 1994, and we have adjusted total industrial gross output in 1996 and 1997 downward by the same percentage as in 1994—i.e. by 8.8 percent as shown in Table 3. Table 5 gives the full set of downward adjustments made to total industrial gross output from 1991 to 1997.

TABLE 5  
ADJUSTMENT OF TOTAL INDUSTRIAL GROSS OUTPUT

| Year           | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
|----------------|------|------|------|------|------|------|------|
| Adjustment (%) | 5.7  | 6.7  | 8.1  | 8.8  | 0.0  | 8.8  | 8.8  |

For the sake of simplification, we assume that the ratios of value added to gross output remained constant during the period. Value added has therefore been adjusted downwards by the same proportions as gross output. The effects of these adjustments on industrial value added and on GDP are shown in Table 6.

TABLE 6  
IMPACTS OF ADJUSTMENT TO INDUSTRIAL VALUE ADDED ON GDP

| Year   | 1991  | 1992  | 1993   | 1994   | 1995 | 1996   | 1997   |
|--|-------|-------|--------|--------|------|--------|--------|
| Adjustment of industrial value added (%)                 | 5.7   | 6.7   | 8.1    | 8.8    | 0.0  | 8.8    | 8.8    |
| Adjustment of industrial value added in 100 million yuan | 461.0 | 689.1 | 1145.6 | 1703.6 | 0.0  | 2559.3 | 2794.2 |
| Adjustment of GDP (%)                                    | 2.1   | 2.6   | 3.3    | 3.6    | 0.0  | 3.8    | 3.7    |

*Notes:*

Data in row 2 are taken from Table 5.

Data in row 3 equal data in row 2 multiplied by industrial value added in the same years.

Data in row 4 equal data in row 3 divided by GDP in the same years.

Data of GDP are from the *Chinese Statistical Yearbook, 1998*.

<sup>8</sup>Even before the industrial census the National Bureau of Statistics of China had been adjusting downwards the rural industrial gross output reported by the Bureau of Village and Town Enterprises, Minister of Agriculture.



The results show that total GDP will decrease by 2.7 percent on average from 1991 to 1997, if the overestimation of industrial value added is removed. During this period, the largest downward adjustment (3.8 percent) occurred in 1996. In census year, 1995, no adjustment is made.

## 6. LIVESTOCK PRODUCTS

The national agricultural census (reference year 1996) showed that the regular annual statistics overestimated the production of meat by 22.0 percent and the stocks of pigs, cattle and sheep by 20.7, 21.1, and 21.8 percent respectively.<sup>8</sup> This leads to overestimation of the output of pigs, cattle and sheep by around 20 percent. Generally, the output of pigs, cattle and sheep accounts for about 70% of the gross output of the activity *animal husbandry*. We assume that the degrees of overestimation for meat production and for stocks of pigs, cattle and sheep are the same, and that the ratios of output of pigs, cattle and sheep to gross

TABLE 7  
IMPACT OF THE OVERESTIMATION OF OUTPUT OF PIGS, CATTLE AND SHEEP ON THE GROSS OUTPUT OF ANIMAL HUSBANDRY AND AGRICULTURE, ON VALUE ADDED IN AGRICULTURE AND ON GDP

| Year<br>(1) | Adjustment to<br>Output of Pigs,<br>Cattle and Sheep<br>(%)<br>(2) | Adjustment to<br>Output of<br>Animal<br>Husbandry<br>(%)<br>(3) | Adjustment to<br>Output of<br>Agriculture<br>(%)<br>(4) | Adjustment to<br>Value Added<br>of Agriculture<br>(%)<br>(5) | Adjustment to<br>GDP<br>(%)<br>(6) |
|-------------|--|---|---|--|------------------------------------|
| 1991        | 20   | 14  | 3.7   | 3.7  | 0.9                                |
| 1992        | 20   | 14  | 3.8   | 3.8  | 0.8                                |
| 1993        | 20   | 14  | 3.8   | 3.8  | 0.8                                |
| 1994        | 20   | 14  | 4.2   | 4.2  | 0.8                                |
| 1995        | 20   | 14  | 4.2   | 4.2  | 0.9                                |
| 1996        | 20   | 14  | 4.2   | 4.2  | 0.9                                |
| 1997        | 20   | 14  | 4.3   | 4.3  | 0.8                                |
| Average     | 20   | 14  | 4.0   | 4.0  | 0.8                                |

*Notes:*

The adjustment ratios in column 2 are based on the agricultural census.

Data in column 3 equal data in column 2 multiplied by 70 percent.

Data in column 4 equal data in column 3 multiplied by the ratios of corresponding gross output of animal husbandry to total agricultural gross output.

Data in column 5 are based on the assumption that value added of agriculture remained a constant proportion of agriculture gross output.

Data in column 6 equal data in column 5 multiplied by the ratios of agricultural value added to GDP.

Data on GDP and shares of the various activities are from the *Chinese Statistical Yearbook, 1998*.

output of animal husbandry remained constant from 1991 to 1997. We have also assumed that the ratio of value added to gross output of agriculture remained

<sup>9</sup>These estimates are based on the *Number of Livestock and Livestock Production, Chinese Statistical Yearbook, 1997 and 1998*.

constant over the period. Based on these assumptions, Table 7 shows the downward adjustments that need to be made to gross output of animal husbandry and agriculture, value added of agriculture and GDP.

## 7. OVERALL IMPACT ON GDP

Table 8 brings together the various upward and downward adjustments that have been described above to see their overall impact on GDP.

Table 8 shows that overall effect of the five adjustments considered here increase total GDP only by an average of 1.5 percent from 1991 to 1997. The largest change was an increase of 3.8 percent in 1995 while there was no change at all in 1996 and insignificant changes in 1994 and 1997. These modest upward adjustments compare with an increase of over 34 percent suggested by the World Bank for 1992,<sup>9</sup> and a decrease of over 10 percent calculated by Professor Maddison for 1995.<sup>10</sup> Our results suggest that the official estimates of China's GDP provide a reasonably accurate picture of China's economic size. The adjusted and official GDP estimates are shown in Figure 1.

TABLE 8  
ADJUSTMENT TO GDP

| Year<br>(1) | GDP at<br>Current<br>Price (100<br>million<br>yuan)<br>(2) | Adjust-<br>ment of<br>Housing<br>Services<br>(%)<br>(3) | Adjust-<br>ment of<br>Fiscal<br>Subsidies<br>(%)<br>(4) | Adjustment<br>of Welfare<br>Services<br>within<br>Enterprises<br>(%)<br>(5) | Adjust-<br>ment of<br>Rural<br>Industry<br>(%)<br>(6) | Adjust-<br>ment of<br>Agriculture<br>(%)<br>(7) | Total<br>Adjust-<br>ment<br>(%)<br>(8) | Total<br>Adjustment<br>(100<br>million<br>yuan)<br>(9) | Adjusted<br>GDP at<br>Current<br>Price (100<br>million<br>yuan)<br>(10) |
|-------------|--|---|---|---|---|---|--|--|---|
| 1991        | 21,617.8   | 3.3   | 2.0   | 0.8   | -2.1  | -0.9  | 3.1                                    | 670.2  | 22,288.0  |
| 1992        | 26,638.1   | 3.3   | 1.4   | 0.8   | -2.6  | -0.8  | 2.1                                    | 559.4  | 27,197.5  |
| 1993        | 34,634.4   | 3.3   | 1.0   | 0.8   | -3.3  | -0.8  | 1.0                                    | 346.3  | 34,980.7  |
| 1994        | 46,759.4   | 3.3   | 0.7   | 0.8   | -3.6  | -0.8  | 0.4                                    | 187.0  | 46,946.4  |
| 1995        | 58,478.1   | 3.3   | 0.6   | 0.8   | -0.0  | -0.9  | 3.8                                    | 2,222.2  | 60,700.3  |
| 1996        | 67,884.6   | 3.3   | 0.6   | 0.8   | -3.8  | -0.9  | 0.0                                    | 0.0  | 67,884.6  |
| 1997        | 74,772.4   | 3.3   | 0.6   | 0.8   | -3.7  | -0.8  | 0.2                                    | 149.5  | 74,921.9  |
| Average     |  | 3.3   | 1.0   | 0.8   | -2.7  | -0.8  | 1.5                                    | 590.7  |   |

*Notes:*

Data in column 2 are from the *Chinese Statistical Yearbook, 1998*.

Data in column 3 are derived from the second part of this paper.

Data in column 4 are taken from column 3 of Table 2.

Data in column 5 are derived from the fourth part of this paper.

Data in column 6 are taken from row 4 of Table 6.

Data in column 7 are from column 6 of Table 7.

Data in column 8 are the sum of data from column 3 to column 7.

Data in column 9 are the multiplication of data in column 2 and column 8.

Data in column 10 are the sum of data in column 2 and column 9.

At present, reforms are underway affecting the provision of housing services, welfare and health services provided by enterprises and grain subsidies. It is likely that these will gradually lessen the importance of the factors leading to underestimation of GDP. At the same time, the gradual reform and improvement of the

<sup>10</sup>See *Overestimation of China's GDP by the World Bank*, by Xu Xianchun, China National Conditions and Strength, 1, 1999.

<sup>11</sup>See *How Fast Does Chinese National Economy Develop?—Comments by Prof. Angus Maddison*, by Xu Xianxun, China National Conditions and Strength, 2, 1999. Note that Angus Maddison compared GDP at constant prices whereas the present study refers only to current price estimates.

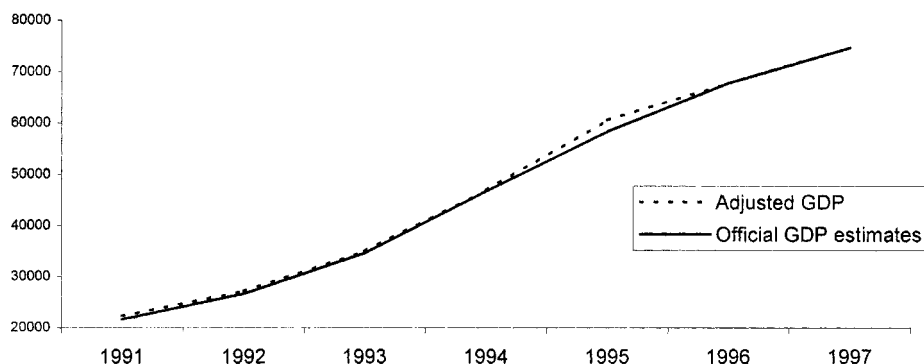


Figure 1. Adjusted and Official GDP Estimates (100 million yuan in current prices)

Chinese statistical system will eradicate the factors leading to an overestimation of GDP. In the near future, the aggregates of GDP in China will be able to reflect the true size of China's economy in a more accurate way.

As the study on which this paper is based is only preliminary, the conclusions drawn from it are not yet considered sufficiently firm so that they can be used to adjust the official GDP estimates. The purpose of this paper is to bring the problems we face to the attention of other statisticians who have theoretical or practical knowledge in national accounts. Our aim is to improve China's GDP accounting so as to make GDP estimates better reflect the true size of China's economy and to provide more accurate data for macroeconomic analysis and management.

#### REFERENCES

- Maddison, A., *Chinese Economic Performance in the Long Run*, OECD, 1998.
- National Bureau of Statistics of China, *Chinese Statistical Yearbook*, 1995, 1996, 1997 and 1998.
- , *Industrial Statistical Yearly Reports*, 1996 and 1997.
- The Office of the Third National Industrial Census, *Data of the Third National Industrial Census of China, 1995*.
- World Bank, *China GNP per Capita*, Document of the World Bank, Report No. 13580-CHA, December 15, 1994.
- , *China: Statistical System in Transition*, Document of the World Bank, No. 9557CHA.
- Xu, X. *Reform and Development of System of Chinese National Accounts*, Economic Science Publishing House, 1997.
- Xu, X. and Li, W., *Current Situation, Problems and Proposed Methods for Real Estate Accounting of China*, Research References, 55, 1998.