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Changes in Consumption Inequality in China

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I. Introduction

The two decades after the beginning of the 1980s witnessed dramatic changes in the Chinese economy. At the same time, economic inequality increased substantially, as confirmed by many studies (e.g., Griffin and Zhao 1993; Riskin, Zhao, and Li 2001; Gustafsson, Li, and Secular 2008). Most studies of poverty and inequality are based on income measurements because income data have some advantages, such as easily accessible, comparable over time, and of high quality. But income is often underreported in surveys, especially for high-income groups. And because income varies over the life cycle of households, an estimate of income inequality at any time point may be an overestimate of longer-term income inequality. Blundell and Preston (1998) point out that measured income can be considered to be composed of both permanent and transitory income; thus households in a cross-section may appear to be income-poor only temporarily. Unlike expenditures, income is subject to short-term fluctuations because households can smooth away the latter by adjusting savings. Income inequality also increases within cohorts over time. Therefore, aggregate inequality will depend, in part, on the age structure of the national population and also on the pattern of intergenerational transfers.

Because of the limitations of income as a resource to measure well-being and inequality, many studies, such as McGregor and Barooah (1992), Slesnick (1994), Johnson and Shipp (1999), among others, argue that consumption may be a more appropriate indicator to measure economic well-being. Utility is derived from the consumption of goods and services rather than from the receipt of income. Also,

consumption is a better measure of permanent income, which conceptually is closer than income to a measure of well-being. There are, however, problems with the use of expenditures as well, including problems due to differences over time in measurement methods and problems of the definitions.

In this chapter, we use household consumption data from four waves of the China Household Income Project (CHIP) surveys in 1988, 1995, 2002, and 2007 to investigate the changes in consumption inequality in China. The chapter begins with a brief discussion of the datasets and how to adjust household consumption so that it better represents well-being. Using disaggregated data, the chapter shows how to accurately measure consumption according to international standards and how the various parts of household consumption change over time. It then presents consumption inequality for both urban and rural areas and for China as a whole in 1988, 1995, 2002, and 2007. Next, the chapter illustrates how trends in consumption inequality differ depending on the adjustment methods and decomposes the inequality by source. Finally, the chapter estimates nationwide inequality and decomposes the total (and consumption I) inequality.

II. Data Description and Adjustments

A. Brief Description

The household consumption data are from the 1988, 1995, 2002, and 2007 waves of the CHIP survey. Based on the sampling frame used by the National Bureau of Statistics of China (NBS), each of the four CHIP surveys covers both urban and rural

areas in selected provinces and follows the actual distribution of the population across these provinces (see Démurger, Fournier, and Li 2006). The surveys collected detailed household and individual information, such as income and expenditures, demographic characteristics, and work and employment. The CHIP is well known as one of the most representative household-level datasets in China. Detailed descriptions of the surveys and datasets can be found in Eichen and Zhang (1993), Li et al. (2008), and Appendix I by Luo, Li, and Yue in this volume.

B. Data Adjustments

The measurement of inequality is, of course, sensitive to the resource measured, the data source, the sample weighting, and the unit of analysis. Before measuring consumption inequalities, we adopted the following procedures to adjust the data.

1. Sample Weights

The goal of sample weights is to make the CHIP sample representative of China's total population. Weights can be used to adjust the sample shares so that they equal the population shares. Song, Sicular, and Yue in Appendix II of this volume recommend that the sample weights should not only reflect the shares of the rural and urban populations, but also the shares of the population of the major regions and even the provinces of China. Thus, they calculate the weights using data provided by the NBS from the 2000 census and the 2005 1 percent population sample survey. In the analysis below, we will use the sample weights that they recommend to adjust the original data to make it more representative of the actual population in the rural and

urban areas, and across regions and provinces.

2. Household Size and Structure

Inequality calculations require the use of "equivalence scales" to derive the equivalent income or expenditures for households of different sizes or composition. The CHIP survey collects data for households as consumer units. The household, defined based on common residence and budget sharing, is close to the definition used in most cross-national studies. But a shortcoming of a household or consumer unit of measurement is that it does not take into account differences in household size. Using individuals as the unit of analysis is consistent with welfare theory underlying inequality and poverty measures.

As there is no existing standard equivalence scale for Chinese households, most previous studies simply use the household size to arrive at the well-being at the individual level, and they do not consider differences in household composition. In this chapter, to simplify the calculation procedure and to allow our results to be comparable, we employ the conventional scales, namely, the Organisation for Economic Co-operation and Development (OECD) scales, for our measurement and analysis (see the equivalence scales in the OECD countries in Table 3.1). Adjusting consumption in this manner yields "equivalent consumption per person," and provides us with a population of individuals whose consumption is given by the equivalent consumption of their household. To obtain a measure of well-being for individuals, we divide the consumption expenditure of the household consumption by an equivalence scale based on the household size and composition. The average

equivalence scales used for households in the CHIP data are given in Table 2. It is clear that the equivalence scales for rural households are greater than those for their urban counterparts due to their large size. It should also be noted household size in both urban and rural areas has become smaller over time, resulting at the same time in a decline in the equivalence scales.

Table 3.1 about here

Table 3.2 about here

3. Time and Spatial Price Differences

Due to differences in living costs between urban and rural areas and across provinces as well as to changes in prices over time, consumption expenditures in current prices must be deflated by the price indices and the cost of living indices (regional purchasing power parity [PPP]). Like most other chapters in this volume, to deal with the regional differences in living costs, we adopt the regional PPP indices compiled by Brandt and Holz (2006). To make household consumption expenditures comparable over time, we use 2007 prices to inflate household consumption during the three previous survey years. When inflating household consumption in 1988, 1995, and 2002, the consumer price indices (CPI) are employed separately for the urban and rural areas.

III. Methods

A. Gini Index Decomposition

The Gini coefficient is widely used to measure inequality in the distribution of income,

consumption, and other welfare indicators. Decomposing the Gini index will help us understand the relative contribution of each consumption item to the consumption inequality. Following the method developed by Shorrocks (1982) and Lerman and Yitzhak (1985), we decompose the Gini coefficient by consumption item and calculate the marginal effect of each consumption item on the total consumption inequality.

By extending Shorrocks (1982), and Lerman and Yitzhaki (1985), López-Feldman (2006) shows that the Gini coefficient for total inequality, G, can be represented as

$$G = \sum_{k=1}^{K} S_k G_k R_k = \sum_{k=1}^{K} S_k G_k \{Cov\{y_k, F(y)\}/Cov\{y_k, F(y_k)\}\} \qquad (1)$$

where S_k represents the share of source k in the total income (consumption), showing how important source k is with respect to the total income (consumption); G_k is the source Gini corresponding to the distribution of source k, illustrating how equally or unequally the source is distributed; and R_k is the correlation of the distribution of the source k with the distribution of the total income (consumption), showing how the source and the distribution of the total income are correlated, where F(y) and $F(y_k)$ are the cumulative distributions of the total income and source k respectively.

By using formula (1), we can estimate the marginal effect of each of the consumption items on the total consumption inequality. The marginal effect of each consumption item can be expressed by formula (2), which indicates that a change in the percentage of the total consumption inequality resulting from a 1 percent change in consumption item k equals the original contribution of item k to the total

consumption inequality minus the share of item k in the total consumption.

$$\frac{\partial G/\partial e}{G} = \frac{S_k G_k R_k}{G} - S_k \qquad (2)$$

where G is the Gini coefficient of the total consumption inequality prior to the change.

B. Theil Index Decomposition

To decompose total consumption inequality into between-group inequality and within-group inequality, we utilize the Theil index, which can be expressed as:

$$Y = \frac{1}{n}\sum_{i=1}^{n} \frac{y_i}{y} \ln\left(\frac{y_i}{y}\right) \qquad (3)$$

where n is the number of individuals in the population, y_i is the consumption of the individual indexed by i, and Y represents total consumption.

The Theil index can also be expressed as the sum of the between-group inequality and the within-group inequality. The formula is as follows.

$$T = T_B + T_W = \left[\sum_j \frac{Y_j}{Y} \ln\left(\frac{Y_j/Y}{n_j/N}\right)\right] + \left[\sum_j \left(\frac{Y_j}{Y}\right) T_j\right] \qquad (4)$$

where $Y_j = \sum_i Y_{ij}$ is the total consumption of the j[th] group, $n_j = \sum_i n_{ij}$ is the share of population in the j[th] group, and $T_j = \sum_i \left(\frac{Y_{ij}}{Y_j}\right) \ln\left(\frac{Y_{ij}/Y_j}{n_{ij}/n_j}\right)$ is the Theil index for the j[th] group.

IV. Changes in Consumption Level

To construct consumption aggregates from the CHIP household data, our definition of household consumption follows the guidelines provided by Deaton and Zaidi (2002).

Household overall consumption = Cash expenditures (without durable goods) + In-kind payments + Subsidies (Medical + Education + Housing) + Imputed rent of owned dwelling[1]+ Use-value of durables

= Consumption I + Subsidies + Imputed rent of owned dwelling + Use-value of durables

= Consumption II + Imputed rent of owned dwelling + Use-value of durables

= Consumption III + Imputed rent of owned dwelling

Consumption I = Cash expenditures (without durable goods) + In-kind Payments

Consumption II = Consumption I + Subsidies

Consumption III = Consumption II + Use-value of Durables

The following are excluded from the total expenditure: taxes paid, purchase of assets, repayments of loans, and lumpy expenditures. If durables are included with their purchase value and/or taxes paid, purchase of assets, repayments of loans, and lumpy expenditures, the concept refers to expenditures.

We distinguish the sampled households living in rural areas from those living in urban areas. In the 1988 and 2007 surveys, some consumption items, such as expenditures on clothing in 1988 and on medical subsidies in 2007 in urban China, are unavailable, making a comparison of total consumption across years difficult.[2] Therefore, in most case, growth of total consumption is analyzed using Consumption I, which is more comparable for the survey years.

B. Changes in the Consumption Level in Urban China

1. Basic Description

In Table 3.3, we report the means, at the baseline, of total household consumption per capita in urban China adjusted by the CPI, and the share of consumption items in the total consumption. The consumption items in urban China are aggregated into six categories: (i) food, (ii) non-food, (iii) housing, (iv) subsidies, (v) use-value of durables, and (vi) miscellaneous goods and services. The table indicates the changes in the magnitude and relative importance of the categories over time. Table 3.4 illustrates the contribution of each of the categories to the changes in overall household consumption in urban China.

During the 1988-2007 periods, the share of cash consumption expenditures increased dramatically, from about 29 percent to about 83 percent of the total consumption. Food items accounted for the highest share of total household consumption expenditures before 1995, but in 2002 and 2007 food items became less important than non-food items in terms of total consumption, reflecting the increased standard of living in China. In 1988, in-kind food consumption, on average, accounted for more than one-third of food consumption, making it the most important part of food consumption. However, since 1995 in-kind food consumption decreased sharply, with more than 90 percent of food consumption purchased on the market.

Table 3.3 about here

Table 3.4 about here

Some non-food items, such as transportation and communications, show a

dramatic increase during the sample years. Given the development of compulsory education, the level and proportion of expenditures on education, culture, and recreational services increased steadily during the period under study. The escalating costs of medical care also have attracted increasing attention. As indicated in Table 3.3, there was a rapid increase in the proportion of expenditures on health care and medical services, from less than 2 percent in 1988 to about 6 percent in 2007. However, its share of total consumption in 2007 was still lower than that of clothing or transportation and communications.

Subsidies, which are associated with the residence registration (*hukou*) system and the state-owned enterprises, are an important type of welfare for urban Chinese. During the two decades under study, the provision urban housing was radically transformed. In 1988, housing subsidies accounted for about 32 percent of family consumption, whereas in 1995, their proportion decreased to only 10 percent, and by 2007 they decreased further to less than 1 percent. But the share of medical subsidies in total consumption remained relatively constant, at, about 7 percent in each year.

In Table 3.3 and Table 3.4, the ratio in the first column for each year illustrates the contribution of the consumption items to the changes in overall household consumption in urban China; the signs indicate either a change or no change in the shares of total consumption. The growth rate of urban household consumption slowed abruptly after 1995. In the seven years between 1988 and 1995, household consumption grew 10.72 percent per year. But in subsequent years, it grew only about 5 percent per year (see Table 3.4). Most of the growth was due to the rapid increase in

cash expenditures. Actually, during most of the period under study, the growth rate of cash expenditures per household was higher than that of overall consumption, especially during the 1988-1995 period.

2. Consumption with Adjustments

After aggregating the consumption components, two important adjustments are required: 1) an adjustment for household size; and 2) an adjustment for time and regional price differences. Table 3.5 compares two types of adjusted measurements of per capita household consumption in urban China, i.e., adjusted by household size and CPI (in 2007 prices), and adjusted by household size, CPI, sample weights, OECD equivalence scale, and regional PPP.

Each adjustment method makes changes not only to the value of household consumption per capita, but also to the inequality as measured by the Gini index (Table 3.9). The sample weights based on provincial population do not show significant changes in either the consumption level or the Gini index; using the equivalence scale increases the consumption level and decreases the Gini index; adjusting household consumption with the PPP decreases both the consumption level and the Gini index with respect to distribution of consumption. The effects of adjustments in urban China, provide useful information when comparing the calculation results from various other studies. Both the absolute value and the inequality estimates are quite sensitive to the equivalence scales and to the regional PPP, which will decrease the Gini index by about 10 percent. Thus, a comparison of

different studies based on different datasets, or even the same dataset may be misleading if we ignore their respective data adjustments.

Table 3.5 about here

B. Changes in the Consumption Level in Rural China

1. Basic Description

In Table 3.6, we report the means of total consumption and the share of the consumption items in the rural household datasets. The components of consumption in rural China, unlike those in urban areas where subsidies and services are more prevalent, are aggregated into four categories: (i) food, (ii) non-food items, (iii) housing, and (iv) use-value of durables. Similar to the analysis of urban households, Table 3.7 illustrates the contribution of the consumption items to changes in the overall consumption of rural households.

The consumption level of rural households is much lower than that of urban households. Food purchased on the market by rural households is only about one-fifth that of urban households and non-food items of rural households constitute only about one-fourth that of urban households. Furthermore, there are almost no subsidies in the rural areas. The level of cash expenditures increased from about 32.59 percent of the total consumption in 1988 to about 50 percent in 2002,[3] representing a relatively slower increase than that in the urban areas.

Food consumption accounts for a large share of total consumption. It is particularly high in rural areas, reaching 77 percent of total consumption in 1988.

But by 2007 it had declined sharply to 39 percent. Although starting from 1995 food consumption in rural areas declined compared to that in urban areas, most of the difference was due to food purchased on the market. In 1988, self-produced food on average accounted for more than two-thirds of the food consumption of rural households. However, this figure declined sharply thereafter. By 2002 the shares of self-produced food and of food purchased on the market were quite similar.

The non-food items, primarily expenditures on health care and medical services, education and training, and transportation and communications, generally exhibited a rising share of total consumption in the rural areas. The greatest increase occurred in transportation and communications, from 0.56 percent in 1988 to 9.26 percent in 2007. Expenditures on education, culture, and recreational services as well as on health care and medical services also increased substantially. However, compared to urban households, rural households seem to have spent much less on these items, both in terms of absolute value and in terms of share of total consumption.

In Table 3.7, the signs of the numbers indicate whether there was a change in the direction in terms of total consumption. As in the urban areas, in most survey years the growth rate of cash expenditures was higher than that of overall consumption.

Table 3.6 about here

Table 3.7 about here

2. Adjusted Measurements

Table 3.8 illustrates the adjusted measurements of per capita household consumption

in rural China, i.e., adjusted by household size, sample weights, the OECD equivalence scale, the CPI (2007 prices), and the regional PPP.

The major changes in the level of household consumption based on the various adjustments are as follows. The sample weights based on provincial population decrease both household consumption per capita and the Gini index, implying a greater impact on rural household consumption than on urban household consumption, (Table 3.11) in rural China in most survey years. Using the equivalence scale to adjust household consumption will increase the consumption level, but will decrease the Gini index, implying inequality for both rural and urban households. Adjustments by regional PPP will significantly reduce the Gini index for both rural and urban households, but it will increase the absolute value of the items in the rural areas. In sum, the net effect of all the adjustments might increase the absolute value of household consumption, but they will decrease the inequality as measured by the Gini index.

Table 3.8 about here

Ⅴ. Changes in Consumption Inequality

A. Urban China

1. Basic Description

In Table 3.9, the adjusted measurements of consumption inequality differ from the unadjusted measurements. Generally, the Gini index of total consumption, which is

adjusted by the sample weights, equivalence scales, and regional PPP, is significantly smaller than otherwise. During the 1988-2002 periods, inequality increased in urban China, regardless of the definition of consumption. However, in 2007 the Gini index showed a small decrease. But taking into account the absence of medical subsidies and the use-value of durable goods, for comparative purposes it seems more reasonable to use the Consumption I definition which includes only cash and in-kind payments. Consumption I shows a steady increase during the survey years. In 1988 cash expenditures showed the highest level of inequality, but in 1995 they decreased sharply, and thereafter they experienced a gradual increase.

With respect to consumption items, inequality in food consumption experienced a small variation over the years. Inequality in subsidies in 1988 was very small, but after 1995 it increased, mainly due to the housing reforms that resulted in a decline in the proportion of housing subsidies. Specifically, inequality increased due to the reduction in subsidies as part of the housing reforms to stimulate the construction industry. However, there was a gradual decrease in inequality during the formulation of housing transaction rules as part of the housing reforms. Because of the absence of use-value of durables in the 1988 and 2007 surveys, this research only reports the results for 1995 and 2002. Compared with 1995, in 2002 the inequality of the use-value of durables increased enormously.

Table 3.9 about here

2. Decomposition of Inequality by Source

How have the changes in the distribution of the consumption items contributed to

inequality of total consumption in the urban areas? To answer this question, we decompose the Gini coefficient of total consumption into the contributions of the consumption items. Table 3.10 reports the results of our analysis. The results indicate that in almost all the survey years, cash expenditures, Consumption I, and food had an equalizing effect on the distribution of total consumption, whereas subsidies had a dis-equalizing effect.

Although the Gini correlation between cash expenditures and total consumption rose over time (from 0.667 in 1988 to 0.964 in 2007), cash expenditures were not very unequally distributed (less than 0.35 in most years). The concentration index (CI) of cash expenditures was relatively low, thereby having an equalizing effect and indicating that cash expenditures did not favor the rich. The results show that a 1 percent increase in cash expenditures, would decrease the Gini coefficient for total consumption by 0.025 percent in 1988, 0.15 percent in 1995, 0.103 percent in 2002, and 0.038 percent in 2007.

Because food is a basic and necessary household expenditure, and because consumption of certain basic expenditures does not vary significantly regardless of the amount of income, it is not surprising that food items have a relatively low Gini index and in all years show an equalizing effect. In contrast, non-food items, which are generally discretionary outlays and are consumed when people have more discretionary money, in most years display a relatively higher Gini index. In 1988 and 1995, there was more equal distribution in favor of the poor, as non-food items had an equalizing effect on inequality in total consumption and the marginal effect was below

zero. However, since 2002 non-food items have had a dis-equalizing effect on inequality in total expenditures. Subsidies are more unequally distributed in almost all the survey years, with their concentration index almost the highest among all consumption items, indicating that subsidies were distributed in favor of the rich. The imputed rents of privately owned dwellings had an unequal effect on inequality in total consumption in all the survey years except for 2002.

Table 3.10 about here

B. Rural China

1. Basic Description

Table 3.11 illustrates the adjusted measurements of inequality in per capita household consumption and the inequality of each consumption item for rural households. During the 1988-2007 period, inequality generally increased in rural China, except for 2002, regardless of the definition of consumption. Considering the sub-aggregate items, food and non-food items seem not to have changed much from 1988 to 2007, as the Gini index of food was about 0.3 in all years, and that of non-food items was more than 0.5. Comparing the Gini index of certain items in the rural areas with those in the urban areas, we find a large difference in rural and urban consumption behavior.

Housing inequality, including imputed rents of owned dwellings and expenditures on utilities (such as water, etc.), not only shows relatively higher inequality than other consumption items, but also a steadily increasing trend. Use-value of durables declined during the survey years, with a sharp decrease in 2007. Unlike urban households where consumption of durables was more diverse, rural

households seem to have much interest in the consumption of housing items and, as they become richer, they paid less attention to durables, as revealed in the decline in inequality in the use-value of durables and the increase in inequality in housing over time.

Table 3.11 about here

2. Decomposition of Inequality by Source

Table 3.12 reports changes in the distribution of the main consumption items and their contributions to inequality in household consumption in rural China. The results show that in all survey years except for 2007 cash expenditures had a dis-equalizing effect on the distribution of inequality of total consumption; a 1 percent increase in cash expenditures, all else being equal, would lead to an increase in the Gini coefficient for total consumption by 0.035 percent in 1988, 0.087 percent in 1995, and 0.096 percent in 2002. During the sample years, food consumption shows an increasing equalizing effect. Non-food items have a dis-equalizing effect in all survey years except for 1988. Non-food items, housing, and the use-value of durables are distributed more unequally than other items, indicating that these consumption items are distributed in favor of the richer households.

Table 3.12 about here

C. Nationwide

We now turn to report the results of the estimation of consumption inequality in China as a whole. We estimate the nationwide inequality and decompose the total consumption (and Consumption I) inequality into within-urban inequality,

within-rural inequality, and between-rural-urban inequality using the Theil index. The decomposition results are presented in Table 3.13 and Table 3.14. It is apparent that adjustments for the equivalence scale and spatial price differences substantially reduce the level of overall inequality both for total consumption and Consumption I. The results reflect that the equivalence scale and PPP are positively correlated with the levels of consumption.

Furthermore, nationwide inequality is larger than either that in the rural areas or that in the urban areas. For total consumption (Table 3.13), overall inequality measured by the Theil index shows a significant increase from 1988 to 2002, especially from 1995 to 2002, and then a moderate decrease from 2002 to 2007. In contrast, for Consumption I, inequality rose steadily throughout during the sample years.

Comparing the results of Table 3.3 with those of Table 3.14, we see that the inequality of Consumption I is less than that of the total consumption for all subgroups, indicating that consumption items that are not covered by Consumption I, such as subsidies, account for a large part of the rural-urban consumption gap and are a major contributor to national inequality. Fortunately, the reforms have decreased the contribution of these items to national inequality.

For total consumption adjusted only for sample weights, between-urban-rural inequality contributed 37.51 percent of the total inequality in 1988, increased to 55.29 percent in 2002, and then decreased to 50.49 percent in 2007. These numbers suggest that the urban-rural gap is an increasingly important source of the inequality in total

consumption. If consumption is defined as only cash and in-kind payments, we find similar results in terms of the contribution to between-urban-rural inequality. However, consumption adjusted by the equivalence scale and spatial price differences contributes much less to between-urban-rural inequality, indicating that a large part of the total inequality is due to the differences in living costs between the urban and rural areas.

Table 3.13 about here

Table 3.14 about here

V. Conclusions

This chapter takes household consumption data from four waves of the CHIP surveys in 1988, 1995, 2002 and 2007 to investigate changes in consumption inequality in China. The basic conclusions include the following:

First, inequality estimates are quite sensitive to the equivalence scales and to the regional PPP. In order to sufficiently reflect household well-being, in this chapter household consumption is derived based on considerations of sample weights, household size, CPI, equivalence scale, and regional PPP. Adjusting household consumption by equivalence scale and regional PPP may decrease the Gini index by about 10 percent in the urban areas, but will have a relatively smaller effect in the rural areas.

Second, changes in consumption inequality exhibit differing patterns in the urban and rural areas. Consumption inequality of urban households steadily increased during the twenty years covered by the four waves of the CHIP surveys, regardless of

what definitions of consumption are adopted. However, consumption inequality in the rural areas did not reveal a similar obviously increasing trend.

Finally, nationwide inequality is greater than that either in the rural areas or that in the urban areas. Around the nation consumption inequality rose from the first year of the survey in 1988, and it became more significant during the 1988-1995 period. Like the results from the income inequality analysis, the between urban-rural inequality contributed a great deal to the total consumption inequality in China as a whole. Therefore, in the future Chinese public policy should place priority on attempting to bridge the urban-rural consumption (income) gap.

Appendix

Imputed Rents of Dwellings

According to Sato, Sicular, and Yue in this volume, calculation of imputed rents on owner-occupied housing usually takes one of two approaches, the "rate of return" (or "opportunity cost") approach or the "market rent" approach.

The following is the rate of return:

$$R = i(V - M) - C - D - I,$$

that is, imputed rental income R equals a rate of return i times the household's equity in the dwelling, minus the costs of ownership C (maintenance and repairs, property taxes, property insurance, etc.), depreciation D, and interest costs I associated with any mortgage or loans on the property.

The "market rent" approach considers imputed rent to be the net income that would have been earned if the dwelling had been rented out on the rental market:

$$R = Rm - C - I ,$$

with imputed rental income R equal to the estimated market rent on dwelling Rm, minus the cost of ownership C and interest costs I associated with any mortgage or debt on the property. Previous studies using the CHIP data, such as Khan and Riskin (2008), use this method.

Here we use the "market rent" to calculate the imputed rent of owned dwellings in urban China, which is different from the calculation method used by Sato, Sicular, and Yue in this volume. We believe that as we consume the utility of the house and the

market rent should be more reasonable with respect to consumption than the “rate of return.” In addition, our calculation method is still different from the “market rent” method here, as we do not subtract the housing debt for the same reason that we emphasize the concept of utility and not investment. Even though in the rural areas there is no information about the market rent for farmers, we still use the “rate of return” method.

Table 3A.1 presents a comparison of the results for the urban areas using the different calculation approaches for the urban area.

Table 3A.1 about here

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Table 3.1. *Equivalence scales of the OECD countries*

Adults	1	1	1	1	2	2	2	2	2	2	3	4	5
Children 0-25	0	1	2	3	0	1	2	3	2	1	0	0	0
Equivalence scale	1	1.5	2	2.5	1.7	2.2	2.7	3.2	2.7	3.7	2.4	3.1	3.8
Household members	1	2	3	4	2	3	4	5	4	5	3	4	5

Source: http://www.oecd.org/dataoecd/61/52/35411111.pdf, accessed October 3, 2011.

Table 3.2. *Equivalence scales for households in the CHIP data, adjusted by the method adopted for the OECD countries*

	1988		1995		2002		2007	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Household average size	3.533	5.5	3.130	4.343	3.019	4.127	2.964	3.988
Average equivalent scale	2.491	3.253	2.291	2.930	2.251	2.848	2.231	2.798

Sources: Calculations by the authors.

Table 3.3. *Trends in household overall consumption in urban Chin*a
Unit: Yuan (Adjusted CPI: Base Year 2007=100)

	1988		1995		2002		2007	
Items	Quantity	Share	Quantity	Share	Quantity	Share	Quantity	Share
Overall	10595.82	100	21615.81	100	30396.44	100.00	38347.72	100.00
Including:								
Cash Expenditures	3043.03	28.72	14570.15	67.41	21195.08	69.73	31798.30	82.92
Consumption I	4640.98	43.80	14793.14	68.44	21957.75	72.24	32401.84	84.49
Consumption II	8856.03	83.58	18067.55	83.58	24687.39	81.22	/	/
ConsumptionIII	/	/	19069.45	88.22	25721.11	84.62	/	/
Sub-aggregate:								
Food Items	3632.34	34.28	8059	37.28	8116.53	26.70	12181.23	31.77
Purchases	2145.92	20.25	7904.55	36.57	7837.02	25.78	11839.20	30.87
In-kind Payments	1486.42	14.03	154.45	0.71	279.51	0.92	342.03	0.89
Non-food Items	498.09	4.70	5390.50	24.94	10718.81	35.26	16681.26	43.50
Household Facilities, Articles, and Services	233.50	2.20	1573.87	7.28	1660.20	5.46	1965.44	5.13
Clothing	/	/	2072.58	9.59	2329.82	7.66	3205.56	8.36
Health Care and Medical Services	142.65	1.35	583.42	2.70	1448.32	4.76	2328.65	6.07
Education, Culture, and Recreational Services	/	/	820.74	3.80	3200.07	10.53	4590.22	11.97

Transportation and Communications	121.94	1.15	339.89	1.57	2080.41	6.84	3162.15	8.25
Including: In-kind Payments	111.53	1.05	68.54	0.32	483.16	1.59	261.52	0.68
Housing	2250.34	21.24	3360.17	15.54	7100.87	23.36	9746.74	25.42
Rents	114.07	1.08	228.83	1.06	1192.17	3.92	1718.80	4.48
Imputed Rent of Owned Dwellings	1739.79	16.42	2546.36	11.78	4675.32	15.38	5945.87	15.51
Utilities (Water, etc.)	396.48	3.74	584.97	2.71	1233.37	4.06	2082.06	5.43
Subsidies	4215.05	39.78	3274.41	15.15	2729.64	8.98	/	/
Housing	3405.79	32.14	2196.40	10.16	413.13	1.36	348.94	0.91
Medical	809.26	7.64	1078.01	4.99	2316.51	7.62	/	/
Use-value of Durables	/	/	1001.90	4.64	1033.72	3.40	/	/
Miscellaneous Goods and Services	/	/	529.84	2.45	696.87	2.29	1167.73	3.05

Table 3.4. *Contribution of consumption items to the changes in overall household consumption in urban China* (share of the increase of consumption and the growth rate per year) (Adjusted by CPI: Base Year 2007=100)

	1988~1995		1995~2002		2002~2007		1988~2007		1995~2007	
	Share	Rate	Share	Rate	Share	Rate	Share	Rate	Share	Rate
Overall	100	10.72	100	4.99	100	4.76	100	7.00	100	4.89
Sub-aggregate:										
Food Items	40.17	12.06	0.66	0.10	51.12	8.46	30.80	6.58	24.64	3.50
Purchases	52.26	20.47	-0.77	-0.12	50.33	8.60	34.93	9.41	23.52	3.42
In-kind Payments	-12.09	-27.64	1.42	8.84	0.79	4.12	-4.12	-7.44	1.12	6.85
Non-food items	44.40	40.53	60.68	10.32	74.99	9.25	58.31	20.30	67.48	9.87
Household Facilities, Articles, and Services	12.16	31.34	0.98	0.77	3.84	3.43	6.24	11.86	2.34	1.87
Clothing	/	/	2.93	1.69	11.01	6.59	/	/	6.77	3.70
Health and Medical Services	4.00	22.29	9.85	13.87	11.07	9.96	7.88	15.83	10.43	12.23
Education, Culture, and Recreational Services	/	/	27.10	21.46	17.48	7.48	/	/	22.53	15.43
Transportation and Communications	1.98	15.77	19.82	29.54	13.60	8.73	10.95	18.69	16.87	20.43
Including: In-kind	-0.39	-6.72	4.72	32.18	-2.79	-11.55	0.54	4.59	1.15	11.81

Payments										
Housing	10.07	5.89	42.60	11.28	33.28	6.54	27.01	8.02	38.17	9.28
Rents Paid	1.04	10.46	10.97	26.59	6.62	7.59	5.78	15.35	8.90	18.30
Imputed Rents of Owned Dwellings	7.32	5.59	24.25	9.07	15.98	4.93	15.16	6.68	20.32	7.32
Utilities (Water, etc.)	1.71	5.71	7.38	11.24	10.67	11.04	6.07	9.12	8.95	11.16
Subsidies	-8.54	-3.54	-6.20	-2.57	/	/	/	/	/	/
Housing	-10.97	-6.07	-20.31	-21.23	-0.81	-3.32	-11.01	-11.30	-11.04	-14.21
Medical	2.44	4.18	14.10	11.55	/	/	/	/	/	/
Use-value of Durables	/	/	0.36	0.45	/	/	/	/	/	/
Miscellaneous Goods and Services	/	/	1.90	3.99	5.92	10.88	/	/	3.81	6.81

Table 3.5. *Adjusted measurements of household consumption per capita in urban areas* (Unit: Yuan)

	1988		1995		2002		2007	
Items	①	②	①	②	①	②	①	②
Overall	3155.08	3183.97	7190.98	7115.46	10515.86	10413.00	13876.83	13828.28
Cash Expenditures	903.76	926.28	4851.34	4786.05	7307.01	7307.08	11466.43	11331.33
Consumption I	1379.98	1400.32	4923.86	4858.51	7578.38	7591.30	11686.68	11567.47
Consumption II	2639.91	2660.32	6055.91	5934.10	8524.09	8450.59	/	/
Consumption Ⅲ	/	/	6393.39	6261.07	8883.93	8810.78	/	/
Food Items	1077.49	1091.27	2698.34	2642.68	2799.11	2830.67	4401.12	4300.35
Non-food Items	148.63	155.46	1770.95	1770.81	3689.36	3641.50	5993.77	6013.40
Subsidies	1259.93	1260.00	1132.05	1075.58	945.71	859.30	/	/
Imputed Rents of Owned Dwellings	515.17	523.65	797.59	854.39	1631.93	1602.23	2190.15	2260.81
Use-value of Durables	/	/	337.48	326.97	359.84	360.18	/	/

Note: ①Consumption per capita adjusted by household size and CPI (in 2007 prices); ② Consumption per capita adjusted by household size, CPI, sample weights, the OECD equivalence scale, and the regional PPP.

Table 3.6. *Trends in overall consumption of rural households*
Unit: Yuan (Adjusted CPI: Base Year 2007=100)

	1988		1995		2002		2007	
	Quantity	Share	Quantity	Share	Quantity	Share	Quantity	Share
Overall consumption	7162.55	100	9417.11	100	8904.66	100	15507.57	100
Including:								
Cash Expenditures	2414.25	33.71	4163.78	44.22	5102.97	57.31	/	/
Consumption I	6110.65	85.31	7804.33	82.87	7566.30	84.97	12748.88	82.21
Consumption II	6113.03	85.35	7814.38	82.98	7569.57	85.01	12940.95	83.45
Consumption Ⅲ	/	/	8370.77	88.89	8112.44	91.10	13625.22	87.86
Sub-aggregate:								
Food Items	5473.38	76.42	5845.64	62.07	4493.66	50.46	6123.63	39.49
Including: Cash	1776.98	24.81	2205.09	23.42	2030.33	22.80	/	/
Household Production	3696.40	51.61	3640.55	38.66	2463.33	27.66	/	/
Non-food Items	516.75	7.21	1757.78	18.67	2638.69	29.63	4675.73	30.15
Household Facilities, Articles, and Services	169.40	2.37	260.51	2.77	205.16	2.30	331.63	2.14
Clothing	/	/	509.14	5.41	531.34	5.97	816.66	5.27
Health Care and Medical Services	185.09	2.58	275.43	2.92	530.71	5.96	785.89	5.07
Including: Medical Subsidies	2.38	0.03	10.05	0.11	3.27	0.04	157.82	1.02
Education and Training	122.37	1.71	510.52	5.42	719.39	8.08	1305.72	8.42
Including: Education	114.74	1.60	382.38	4.06	590.74	6.63	1108.72	7.15

Training	7.64	0.11	128.14	1.36	128.66	1.44	197.00	1.27
Transportation and Communication	39.88	0.56	212.23	2.25	655.35	7.36	1435.82	9.26
Housing	1174.80	16.40	1257.30	13.35	1229.44	13.81	3658.06	23.59
Imputed Rents of Owned Dwellings	1049.53	14.65	1046.34	11.11	792.22	8.90	1882.35	12.14
Utilities (Water, etc.)	125.28	1.75	210.97	2.24	437.22	4.91	1775.71	11.45
Use-value of Durables	/	/	556.38	5.91	542.88	6.10	684.26	4.41

Table 3.7. *Contribution of consumption items to changes in overall household consumption in rural China* (share of the increase of consumption and the growth rate per year) (Adjusted by CPI: Base Year 2007=100)

	1988~1995		1995~2002		2002~2007		1988~2007		1995~2007	
Items	Share	Rate	Share	Rate	Share	Rate	Share	Rate	Share	Rate
Overall	100	3.99	100	-0.80	100	11.73	100	4.15	100	4.24
Sub-aggregate:										
Food Items	16.51	0.94	263.83	-3.69	24.69	6.39	7.79	0.59	4.56	0.39
Including: Cash	18.99	3.13	34.10	-1.17	/	/	/	/	/	/
Household Production	-2.48	-0.22	229.73	-5.43	/	/	/	/	/	/
Non-food items	55.05	19.11	-171.90	5.97	30.85	12.12	49.84	12.29	47.91	8.49
Household Facilities, Articles, and Services	4.04	6.34	10.80	-3.35	1.92	10.08	1.94	3.60	1.17	2.03
Clothing	/	/	-4.33	0.61	4.32	8.98	/	/	5.05	4.02
Health Care and Medical Services	4.01	5.84	-49.82	9.82	3.86	8.17	7.20	7.91	8.38	9.13
Including: Medical Subsidies	0.34	22.85	1.32	-14.83	2.34	117.16	1.86	24.70	2.43	25.79
Education and Training	17.22	22.64	-40.76	5.02	8.88	12.66	14.18	13.27	13.06	8.14
Including: Education	11.87	18.76	-40.66	6.41	7.84	13.42	11.91	12.68	11.93	9.28
Training	5.34	49.61	-0.10	0.06	1.04	8.89	2.27	18.66	1.13	3.65
Transportation and	7.64	26.97	-86.47	17.48	11.82	16.98	16.73	20.76	20.09	17.27

Communications										
Housing	3.66	0.97	5.44	-0.32	36.78	24.37	29.76	6.16	39.42	9.31
Imputed Rents of Owned Dwellings	-0.14	-0.04	49.59	-3.90	16.51	18.90	9.98	3.12	13.73	5.02
Utilities (water, etc.)	3.80	7.73	-44.15	10.97	20.27	32.35	19.78	14.98	25.69	19.43
Use-value of Durables	/	/	2.64	-0.35	2.14	4.74	/	/	2.10	1.74

Table 3.8. *Adjusted measurements of household consumption per capita in rural areas* (Unit: Yuan)

	1988		1995		2002		2007	
Items	①	②	①	②	①	②	①	②
Overall	1492.90	2203.24	2310.25	3197.22	2292.60	3321.51	4171.28	5501.16
Cash Expenditures	513.29	733.30	1027.28	1382.58	1320.02	1896.47	/	/
Consumption I	1266.27	1887.46	1900.73	2666.55	1940.07	2793.63	3407.86	4600.38
Consumption II	1266.99	1888.00	1903.42	2669.64	1940.75	2794.42	3458.53	4670.30
Consumption Ⅲ	/	/	2050.54	2852.43	2083.23	3018.03	3648.97	4910.72
Food Items	1134.03	1689.03	1424.21	2008.48	1153.35	1657.72	1648.28	2240.84
Non-food items	106.99	161.25	428.33	589.13	673.12	978.94	1230.99	1668.26
Housing	252.60	353.51	310.59	416.82	323.65	461.24	1004.38	1218.34
Imputed Rents of Owned Dwellings	225.91	315.24	259.71	344.79	209.38	303.49	522.31	590.44
Use-value of Durables	/	/	147.12	182.79	142.48	223.61	190.44	240.42

Note: ①Consumption per capita adjusted by household size and CPI (in 2007 prices); ② Consumption per capita adjusted by household size, CPI, sample weights, the OECD equivalence scale, and regional PPP.

Table 3.9. *Adjusted measurements of consumption inequality in urban China* (Gini coefficient)

	1988		1995		2002		2007	
	①	②	□	②	①	②	①	②
Overall	0.268	0.220	0.333	0.304	0.358	0.321	0.343	0.316
Cash Expenditures	0.343	0.302	0.283	0.254	0.322	0.297	0.340	0.318
Consumption I	0.261	0.218	0.282	0.253	0.327	0.302	0.341	0.319
Consumption II	0.287	0.242	0.322	0.286	0.372	0.342	/	/
Consumption Ⅲ	/	/	0.312	0.277	0.369	0.338	/	/
Food Items	0.267	0.224	0.262	0.224	0.284	0.258	0.287	0.260
Non-food Items	0.626	0.614	0.422	0.406	0.421	0.406	0.438	0.420
Subsidies	0.422	0.385	0.721	0.692	0.921	0.911	/	/
Imputed Rents of Owned Dwellings	0.463	0.459	0.874	0.879	0.566	0.521	0.599	0.553
Use-value of Durables	/	/	0.266	0.248	0.566	0.549	/	/

Note: ①Consumption per capita adjusted by household size and CPI (in 2007 prices); ② Consumption per capita adjusted based on household size, CPI, sample weights, the OECD equivalence scale, and regional PPP.

Table 3.10. *Decomposition of total consumption inequality by source in urban areas*

	1988				1995			
	Gini	Rk	(%)Change	CI	Gini	Rk	(%)Change	CI
Overall	0.268				0.333			
Cash Expenditures	0.343	0.667	-0.042	0.229	0.283	0.917	-0.150	0.259
Consumption I	0.261	0.805	-0.095	0.210	0.282	0.919	-0.153	0.259
Consumption II	0.287	0.932	-0.001	0.268	0.322	0.962	-0.061	0.309
Consumption Ⅲ	/	/	/	/	0.312	0.963	-0.087	0.301
Food Items	0.267	0.740	-0.090	0.198	0.262	0.800	-0.139	0.209
Non-food Items	0.626	0.374	-0.006	0.234	0.422	0.750	-0.012	0.317
Subsidies	0.422	0.785	0.094	0.331	0.721	0.732	0.092	0.527
Imputed Rents of Owned Dwellings	0.463	0.583	0.001	0.270	0.874	0.680	0.087	0.594
Use-value of Durables	/	/	/	/	0.266	0.559	-0.026	0.149
	2002				2007			
Source	Gini	Rk	(%)Change	CI	Gini	Rk	(%)Change	CI
Overall	0.358				0.343			
Cash Expenditures	0.322	0.939	-0.108	0.302	0.340	0.964	-0.037	0.328
Consumption I	0.327	0.945	-0.098	0.309	0.341	0.967	-0.033	0.330
Consumption II	0.372	0.966	0.004	0.359	/	/	/	/
Consumption Ⅲ	0.369	0.972	0.001	0.358	/	/	/	/
Food Items	0.284	0.798	-0.097	0.227	0.287	0.801	-0.105	0.230
Non-food Items	0.421	0.859	0.004	0.362	0.438	0.889	0.058	0.389

Subsidies	0.921	0.828	0.102	0.763	/	/	/	/
Imputed Rents of Owned Dwellings	0.566	0.628	-0.001	0.355	0.599	0.692	0.033	0.415
Use-value of Durables	0.566	0.586	-0.003	0.332	/	/	/	/

Table 3.11. *Adjusted measurements of consumption inequality in rural China* (Gini coefficient)

	1988		1995		2002		2007	
Items	①	②	①	②	①	②	①	②
Overall	0.279	0.252	0.340	0.304	0.325	0.303	0.366	0.347
Cash Expenditures	0.396	0.370	0.460	0.429	0.411	0.391	/	/
Consumption I	0.283	0.259	0.322	0.292	0.326	0.307	0.371	0.358
Consumption II	0.283	0.259	0.322	0.292	0.326	0.307	0.374	0.362
Consumption Ⅲ	/	/	0.346	0.311	0.327	0.306	0.365	0.353
Food Items	0.285	0.262	0.320	0.293	0.302	0.278	0.303	0.276
Non-food Items	0.598	0.579	0.502	0.477	0.523	0.511	0.544	0.546
Housing	0.459	0.436	0.472	0.452	0.488	0.468	0.555	0.529
Imputed Rents of Owned Dwellings	0.484	0.461	0.476	0.45	0.529	0.502	0.576	0.538
Use-value of Durables	/	/	0.865	0.848	0.655	0.612	0.337	0.319

Note: ①Consumption per capita adjusted by household size and CPI (in 2007 prices); ② Consumption per capita adjusted based on household size, CPI, sample weights, the OECD equivalence scale, and regional PPP.

Table 3.12. *Decomposition of total consumption inequality by source in rural areas*

	1988				1995			
Source	Gini	Rk	(%)Change	CI	Gini	Rk	(%)Change	CI
Overall	0.279				0.34			
Cash Expenditures	0.396	0.777	0.035	0.308	0.460	0.884	0.087	0.406
Consumption I	0.283	0.967	-0.019	0.273	0.322	0.974	-0.065	0.313
Consumption II	0.283	0.967	-0.018	0.273	0.322	0.974	-0.064	0.314
Consumption Ⅲ	/	/	/	/	0.346	0.987	0.003	0.341
Food Items	0.285	0.949	-0.023	0.271	0.320	0.902	-0.093	0.289
Non-food Items	0.598	0.522	0.008	0.312	0.502	0.769	0.025	0.386
Housing	0.459	0.664	0.015	0.305	0.472	0.720	0.000	0.340
Imputed Rents of Owned Dwellings	0.484	0.645	0.018	0.312	0.476	0.695	-0.003	0.331
Use-value of Durables	/	/	/	/	0.865	0.803	0.068	0.694
	2002				2007			
Source	Gini	Rk	(%)Change	CI	Gini	Rk	(%)Change	CI
Overall	0.325				0.366			
Cash Expenditures	0.411	0.923	0.096	0.379	/	/	/	/
Consumption I	0.326	0.977	-0.018	0.319	0.371	0.979	-0.006	0.363
Consumption II	0.326	0.977	-0.017	0.319	0.374	0.981	0.002	0.366
Consumption Ⅲ	0.327	0.990	-0.005	0.324	0.365	0.984	-0.015	0.359
Food Items	0.302	0.824	-0.118	0.249	0.303	0.813	-0.129	0.247
Non-food Items	0.523	0.823	0.095	0.431	0.544	0.852	0.079	0.463

Housing	0.488	0.717	0.011	0.350	0.555	0.824	0.060	0.457
Imputed Rents of Owned Dwellings	0.529	0.646	0.005	0.342	0.576	0.711	0.015	0.410
Use-value of Durables	0.655	0.596	0.012	0.390	0.337	0.667	-0.018	0.224

Table 3.13. *National consumption inequality* (total consumption)

	1988		1995		2002		2007	
	①	②	①	②	①	②	①	②
Theil Index								
National	0.197	0.113	0.447	0.337	0.527	0.363	0.438	0.294
Rural	0.123	0.106	0.330	0.309	0.190	0.168	0.228	0.219
City	0.124	0.084	0.245	0.221	0.268	0.230	0.213	0.171
Within-group	0.123	0.096	0.272	0.258	0.240	0.203	0.217	0.189
Between-group	0.074	0.017	0.175	0.079	0.254	0.160	0.221	0.104
Contributions								
National	100	100	100	100	100	100	100	100
Within-group	62.49	85.16	60.95	76.48	44.70	55.96	49.51	64.45
Between-group	37.51	14.76	39.05	23.52	55.29	44.04	50.49	35.51

Note: ①Consumption per capita adjusted by household size and CPI (in 2007 prices); ② Consumption per capita adjusted based on household size, CPI, sample weights, the OECD equivalence scale, and regional PPP.

Table 3.14. *National consumption inequality* (Consumption I: Cash plus in-kind payments)

	1988		1995		2002		2007	
	①	②	①	②	①	②	②	②
Theil Index								
National	0.123	0.114	0.312	0.224	0.433	0.290	0.443	0.305
Rural	0.128	0.113	0.269	0.254	0.187	0.175	0.242	0.236
City	0.113	0.084	0.142	0.114	0.194	0.161	0.215	0.178
Within-group	0.122	0.104	0.189	0.179	0.191	0.168	0.223	0.200
Between-group	0.001	0.010	0.123	0.045	0.242	0.122	0.220	0.104
Contributions								
National	100	100	100	100	100	100	100	100
Within-group	99.02	91.28	60.51	80.04	44.17	57.87	50.34	65.57
Between-group	0.98	8.72	39.49	19.96	55.83	42.10	49.66	34.10

Note: ①Consumption per capita adjusted by household size and CPI (in 2007 prices); ② Consumption per capita adjusted based on household size, CPI, sample weights, the OECD equivalence scale, and regional PPP.

Table 3A.1. *Different calculation approaches for the urban areas*

Variable	Calculation Approach	Mean (per household) (in 2007 prices)			Gini Coefficient (per capita)		
		1995	2002	2007	1995	2002	2007
Imputed rent A	Rm	2546.36	4675.32	5945.87	0.874	0.566	0.599
Imputed rent B	Rm –I	2507.75	4521.31		0.878	0.573	.
Imputed rent C	iV	1499.98	2489.51	9202.30	0.833	0.578	0.533
Imputed rent D	i(V-M) – I	1437.88	2309.34		0.837	0.596	.

Notes：In order to allow for comparisons with Khan and Riskin (2008) and Sato, Sicular, and Yue in this volume, the interest rates used here are 0.08 for 1995, 0.029 for 2002, and 0.0427 for 2007, which are the rates on long-term (30-year) Chinese government bonds. As in Sato, Sicular, and Yue in this volume, interest on housing debt is set equal to the interest on long-term Chinese government bonds plus two percentage points.

[1] See the Appendix to this chapter.

[2] It should be noted that the 2007 income and consumption data used in this research come from the NBS. Although the data pay limited attention to subsidies/allowances, they pay close attention to housing statistics.

[3] We do not calculate cash expenditures in 2007 because in 2007 food consumption was not divided into two parts on the questionnaires, i.e., cash and household production.