

# **HOW WELL DO NATIONAL ACCOUNTS AND SURVEYS AGREE? A NEW LOOK FROM THE PROVINCES OF CHINA**

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## **Abstract :**

The dispute over the extent of global poverty hinges mostly on the disparity between household surveys and the national accounts estimates. In this paper we use data from the provinces of China to document the extent of this disparity in a major contributor to global poverty.

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## 1. Introduction

The recent debate on the evolution of world poverty over the last twenty years has been fuelled by the existence of two alternative and mostly independent sources of data for measuring aggregate welfare. Using household sample surveys the evaluation of the reduction of poverty across the countries of the world is positive although somehow disappointing. In fact using only information on household surveys the conclusion is that the fight against poverty has still a long way to go. A much brighter view is obtained by using a combination of national account statistics (NAS) and survey income distributions. Bhalla (2000) and Sala-i-Martin (2002) use the average income per capita from the NAS and the income distribution derived from household surveys to conclude that the current level of poverty in the world is much lower than previously thought. Obviously, the accuracy of the calculation that combines indicators from the NAS and the distribution coming from household survey depends on how well both sources agree. In addition it has been argued that world poverty should be calculated across individuals and not across countries. In this case the size of the population of India, Eastern Europe and, particularly China, is critical for the interpretation of the results which calculates poverty using individuals.

Only very recently several studies have looked into the issue of the relationship between national account statistics and surveys based measures of households welfare. Ravallion (2003) shows that private consumption per capita derived from the NAS deviates significantly from mean household income as measured by national sample surveys. Deaton (2005) shows that consumption measured by the NAS grows faster than consumption from household surveys using 557 surveys from 127 developing countries. He argues that less compliance<sup>2</sup> among rich households biases downward the growth rate of income from household surveys. However, income growth from the NAS is upward biased while NAS consumption contains many items not consumed by the poor and, therefore, not included in the surveys.

The comparison of NAS and household surveys in Ravallion (2003) and Deaton (2005) uses information of very different countries, statistical operations and data gathering

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<sup>2</sup> For a detailed analysis of this issue see Korinek, Mistiaen and Ravallion (2005).

methods. In fact Ravallion (2003) finds that several regional dummies are statistically significant in the explanation of the differences between surveys mean income and national account consumption. Additionally, there is a difficult issue of aggregation across countries which requires the use of PPP data. In this paper we analyze the degree of consistency of household surveys and NAS using information for the provinces of China over the period 1988-2001. This choice has several reasons. First, it eliminates some of the heterogeneity present in the comparison of surveys and NAS and, since it is a panel, we can also control systematically for province specific effects. Moreover China is a particularly important case since, as we argued before, the size of its population and its average level of welfare is determinant for results on the evolution of world's poverty. Another reason to choose the Chinese case is the continuing debate over the quality of its official statistics<sup>3</sup>. Finally, the view from the provinces is very relevant since Ravallion and Chen (2005) have recently argued that the progress against poverty in China has been uneven over time and across provinces.

## **2. Data.**

The National Bureau of Statistics of China (NBS) did not start calculating GDP following the international guidance of the UN System of National Accounts until 1985. The NBS established the system for GDP estimation at the national and provincial level. Before that date the national income was calculated using the Material Product System used by the old Soviet Union<sup>4</sup>.

However, it was not until 1993 that the NBS presented the decomposition of GDP by expenditure and, therefore, calculated household consumption. Also in the same year the NBS switched from indirect estimation to direct estimation for raw data sources. The estimation of consumption household expenditure by the NBS uses three main data sources. The most important is the statistics on total sales of consumers goods. This information is supplemented by several components obtained from the rural and urban household survey (among them the consumption of own-produced consumer goods, the consumption of income in kind and the consumption of housing, water, electricity and gas). Finally, the statistics of the Social Security are used to calculate the consumption of medical services and the consumption of collective services.

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<sup>3</sup> Holz (2004) provides an excellent summary of the Chinese statistical system and its evolution.

<sup>4</sup> See Xu (2004).

In general there are several reasons why household consumption measured by the NAS may be different from the estimates using the household surveys. In some countries NAS consumption is calculated as a residual after eliminating from output other forms of domestic absorption. As we commented before this is not the case of the NAS of China. In fact, at least partly, the NAS consumption is based on the NBS rural and urban household survey. Additionally since NAS consumption in China calculates the imputed owner-occupied rents using the household surveys this is not a source of measurement error as it is in the case of India analyzed by Deaton (2005). Still there are some services that are included in the estimation of NAS consumption but not in the surveys. This is the case of free medical services and collective welfare services.

### **3. How different are NAS and household surveys estimates in China?**

Ravallion (2003) argues that if private consumption from the NAS is an unbiased estimate of the mean household income from nationally representative surveys the ratio of the two should be one on average. Using a sample of 88 developing countries Ravallion (2003) rejects the null hypothesis that the ratio is unity<sup>5</sup>.

We are going to use the information on the provinces of China to test the same hypothesis. The relevant NAS variable is the provincial level consumption household expenditure per capita in 1980 yuan. The Consumers Price Index of each province is used to deflate these series. We use the rural and urban household surveys to obtain the average income in rural and urban areas. Both are deflated to 1980 yuan. In order to calculate the average provincial income we aggregate using the proportion of rural registered and non rural registered population of each province. Figure 1 shows the estimation of the density of the ratio of surveys mean provincial income over provincial consumption per capita from the NAS, obtained pooling together provinces and years for the period 1988-2001<sup>6</sup>. Most of the probability mass is concentrated around 1. The average ratio of income over consumption per capita (NAS) is 1.07 which is not significantly different from 1 ( $t=0.35$ ). This result contrasts with the rejection of the hypothesis when using cross country data reported in Ravallion (2003).

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<sup>5</sup> This is not surprising given the large heterogeneity of countries and estimation procedure.

<sup>6</sup> Year 1989 is missing because the rural household survey cannot be properly deflated by the new prices (after 1990).

Figure 2 shows the average ratio of mean income over consumption per capita (NAS) calculated over the provinces of China. The average is obtained both weighted by population and not weighted. The level and the evolution is similar to the ratio of survey income to NAS consumption obtained using national data reported by Deaton (2005). The ratio evolves around 1.07 without a clear temporal pattern. Figure 3 depicts the evolution of the distribution of the ratio across time in the form of a box plot. The median of the distribution seems to have increase slightly after 1993 and there are several outliers which did not appear previously to that date. These outlier are from two specific provinces: Beijin and Shanxi. Since the median is quite robust to the existence of outlier the previous result on the median being higher after 1993 is still supported by the data. One possible explanation is the change in the measurement of GDP that took place in 1993 when the NBS moved from indirect to direct estimation.

We can investigate further the correspondence between mean survey income and NAS consumption per capita using regressions. Since we have a panel we could estimate the basic specification

$$\left[ \frac{INC}{CONS} \right]_{it} = \alpha + u_i + \varepsilon_{it}$$

where INC is the mean income from provincial surveys and CONS is consumption per capita. Column 1 in table 1 shows the results for the basic specification. The estimated intercept is equal to 1.07 with a very small standard deviation. In fact the null hypothesis that this estimator is 1 can be easily rejected. The individual effects are significantly different from 0. Column 2 considers the change in the method of calculation of the Chinese NAS and includes a dummy for years after 1993 (D93). The estimator of the intercept is smaller than before (1.05) but still significantly different from 1. Not surprisingly the dummy for years after 1993 is significantly different from 0. As before the dummies for provinces are jointly statistically significant. Finally column 3 considers the effect of including time dummies in the regression. In this case the estimation of the intercept is 1.01 and, opposite to the previous columns, it is not significantly different from 1. The dummy for years after 1993 is also significantly different from 0 and positive. By contrast, the regressions in Ravallion (2003) show that for income surveys the ratio is significantly less than 1 even after controlling for regional differences.

#### **4. Conclusions.**

Some recent calculation on the evolution of global poverty are based on the combination of national accounts estimates and household surveys. However, several authors have shown, using cross country data for developing countries, that consumption per capita from the national accounts deviates on average from mean household income based on national sample surveys. In this article we show that this is not the case for the provinces of China over the 1988-2001 period if we adjust for changes in statistical procedures and provincial differences in the application of those changes. Despite all the questions about the quality of China's official statistics it seems that GDP estimates are not systematically biased, as already argued by Holz (2004), and the correspondence between household surveys and NAS is closer than in many other developing countries.

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Figure 1. Ratio mean income over consumption per capita

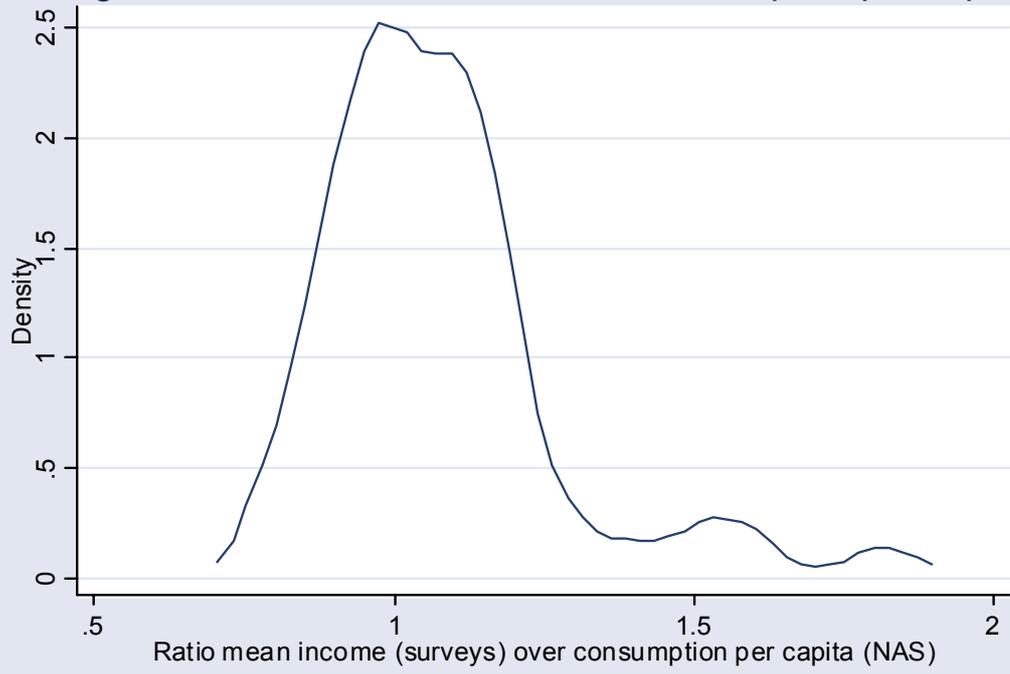


Figure 2. Ratio of survey income to NAS consumption per capita.  
Provincial averages over time.

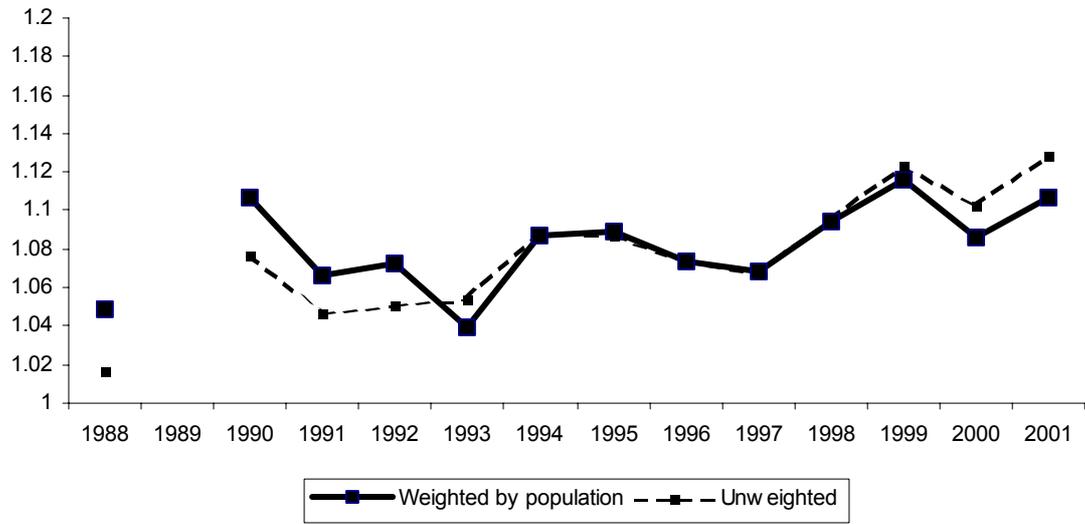


Figure 3. Box plot of the ratio over time

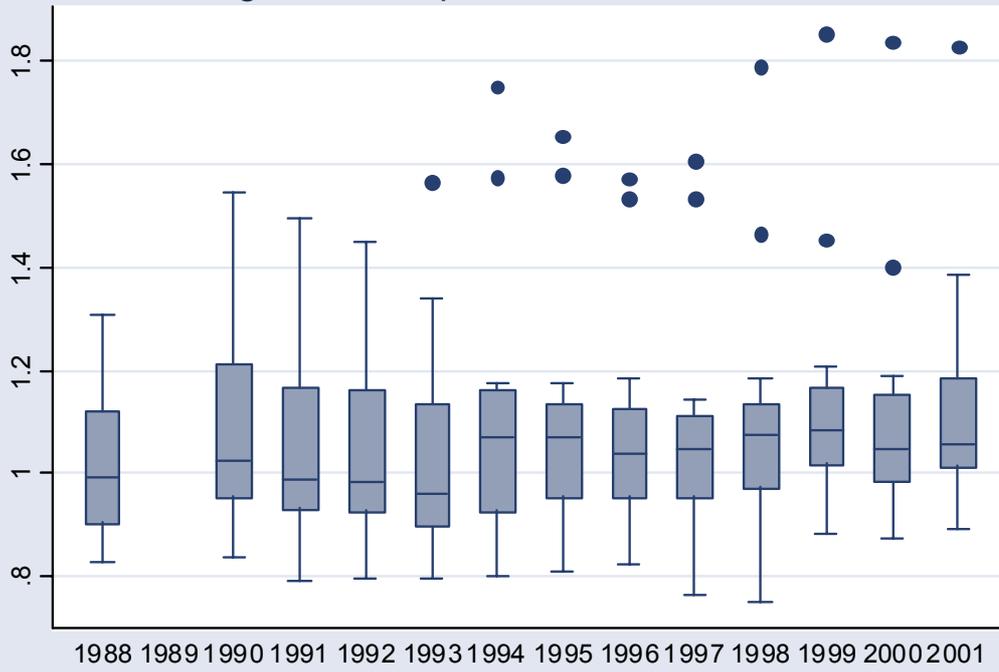


Table 1. Regressions for the ratio of surveys mean income to consumption per capita (NAS)

	(1)	(2)	(3)
Constant	1.07 (0.005)	1.05 (0.01)	1.01 (0.02)
D93		0.04 (0.01)	0.08 (0.03)
H0: constant=1	12.87	5.15	0.50
p-value	0.00	0.00	0.61
F(provinces)	49.52	52.68	52.42
p-value	0.00	0.00	0.00
Time dummies	NO	NO	YES
N	242	242	242

\* Standard error between parenthesis.