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Why is income inequality so low in China compared to other countries? The effect of household survey methods

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Abstract

Many studies suggest that income inequality in China is comparatively low. But if income inequality in urban China was measured using monthly income, as in many other countries, it would be from 17 to 69% higher, depending on the inequality measure used.

Keywords: China; Income distribution; Inequality; Survey methods

JEL classification: D31; O15

1. Introduction

Many studies comparing income inequality across countries note that measured inequality in China was, at least until recently, substantially lower than in other countries in the East Asia region and the rest of the world (Rozelle, 1994). This comparatively low level of inequality appears to have been a feature of both urban and rural areas of China, but it is most apparent and persistent, and also therefore most puzzling, in the urban sector (Chai and Chai, 1994). According to Oshima (1998, p. 373): 'What is unique about the Chinese experience is that ... the urban Gini coefficient was very low ... even though industrial policy emphasized heavy industrialisation.'

Even Khan and Riskin (1998), who suggest that urban income inequality is understated by the State Statistical Bureau (SSB, 1993), which excludes certain components from total income calculations,

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agree that the distribution of urban incomes in China are fairly tight when compared to other countries.

Although the institutions associated with China's Socialist legacy (which are often credited with the low levels of inequality) are fairly well documented, it is not commonly recognised that methods of collecting the household survey data used to measure inequality differ widely between China and other countries. In China, sampled households report their incomes every month for a full 12-month period. No other country in the world has such a comprehensive data collection method for their household income and expenditure survey. Although household surveys in some other countries use an annual reference period for certain types of income, data on wages and salaries — the main income source in urban areas — are collected for just a single month or fortnight (ILO, 1994).

In comparison to a household's monthly income, its annual income is likely to have less variability because shocks occurring in a particular month are often offset by shocks of the opposite sign in some other month of the year (Deaton, 1995). Hence, part of the difference in reported income inequality between China and other countries may just reflect the difference in the length of the survey period over which income is measured in the various countries. Failure to adjust for the difference in methods could bias descriptive comparisons between countries (such as those made by Oshima, 1998; Deininger and Squire, 1996), and also could affect cross-country regression studies of the relationship between inequality and growth.

In this paper we show what income inequality in urban China would look like if it was calculated with monthly income. In other words, we use Chinese data to mimic household survey methods used in other countries. Our study is based on a unique data set from two urban areas in Hebei and Sichuan provinces. Although the data are the same as those collected and reported by China's national Household Income and Expenditure Survey, local State Statistical Bureau's provided us with the raw data files, and we were able to reconstruct a set of income variables by household for each month of the survey year. We use data from 1992, which is the year in our dataset closest to an existing time series of income inequality estimates for urban China reported by Chai and Chai (1994).

2. Methods

Data were the monthly income records for 247 households over all 12 months of 1992. These data were used to simulate a sampling scheme where a single monthly observation on income was extracted. This sample was spread evenly over the year, with 21 households surveyed per month for the first 7 months and 20 per month for the last 5 months $((21 \times 7) + (20 \times 5) = 247)$. Households were drawn directly from the full frame rather than first selecting clusters (Primary Sampling Units) for a particular month and then selecting households within clusters. The sampling strategy reflects the gradual phase-out of residential clustering in the fieldwork design used by the SSB in urban areas (Gibson et al., 1999) and is also forced upon us because our local SSB collaborators did not preserve any of the remaining clustering information when re-entering the data for us; files were provided only in alphabetical order — or stroke order form — by survey region.

A total of 100 such samples were drawn and used to calculate the following four measures of inequality:

1. The ratio of income for the individual at the 90th percentile to the income for the person at the 10th percentile of the per-capita income rank.
2. The Theil inequality measure (which is a member of the Generalized Entropy family with an income difference sensitivity parameter equal to one), $I_T = \frac{1}{N}\Sigma_{i=1}^{N}\frac{x_i}{\mu}\ln\left(\frac{x_i}{\mu}\right)$, where x_i is the income of the ith person, μ is the mean income and N is the total number of persons. The Theil index is sensitive to income differences towards the top of the distribution.
3. The Gini coefficient, $G = \Sigma_i \Sigma_j \frac{|x_i - x_j|}{2N^2\mu}$, which is most sensitive to income differences around the mode of the distribution.
4. The Atkinson inequality measure, $A = 1 - \left[\Sigma_{i=1}^{N}\left(\frac{x_i}{\mu}\right)^{1-\epsilon}\right]^{\frac{1}{(1-\epsilon)}}$ with the coefficient of relative inequality aversion, $\epsilon = 2$ making the index sensitive to income differences at the bottom of the distribution.

Each inequality measure was calculated for each of the 100 samples of monthly incomes as well as for the sample of annual incomes. Individuals are treated as the recipient unit by using per capita income of a household and weighting each household by the number of persons. This maintains comparability with the Gini coefficients reported by Chai and Chai (1994) and also with the other reported inequality measures for China in the database assembled by Deininger and Squire (1996).

3. Results

Regardless of the inequality measure used, there are large and systematic differences when using monthly rather than annual incomes (Table 1). Using just 1 month's data on each household's income, measured inequality appears to be from 1.17 to 1.69 times higher than when annual income is used. Hence, income inequality in urban China would appear rather higher if it was measured with the survey methods used in other countries. The greatest changes are found when using the Theil index, which is sensitive to income differences at the top of the distribution, and the Atkinson index, which is sensitive to income differences at the bottom of the distribution. The Gini coefficient and the 90/10 percentile ratio show the least sensitivity to the length of the reference period used to collect income data.

Table 1
Comparisons of various measures of inequality using annual and randomly-selected monthly observations from sample households in urban China: 1992[a]

Alternative measures of inequality	Using all 12 months of income observations	Using just one (staggered) month of income observations	Proportionate overstatement from using just 1 month data
90/10 percentile ratio	2.2030	2.5680	1.17
Theil index	0.0601	0.1015	1.69
Gini coefficient	0.1888	0.2325	1.23
Atkinson index ($\epsilon = 2$)	0.1079	0.1659	1.54

[a] Data source: Author's data provided by State Statistical Bureau in two urban areas in Sichuan and Hebei Provinces.

Should these differences be considered large? The difference between the Gini coefficient calculated with monthly data and that calculated with annual data is 4.4 percentage points, a discrepancy of 23%. This gap may be enough to overturn some conclusions about the level of income inequality in urban China relative to other countries (especially when considering the rise in recent years and the other factors that may be accounting for its understatement: Khan and Riskin, 1998). This difference between the annual and the monthly estimates exceeds the 18% difference between expenditure-based and income-based Gini coefficients reported by Deininger and Squire (1996). Thus, just as those authors were careful to identify which inequality estimates came from expenditure surveys and which from income surveys, so that investigators could adjust them to a consistent basis, so too it would be worth identifying which Gini coefficients come from surveys that use an annual rather than monthly reference periods for collecting income data.

How representative are our results, given that they are based on a sample of households in only two cities? Our sample estimates of the mean annual income and the inequality in annual incomes closely match published estimates for the Chinese urban sector. For example, our estimated Gini coefficient in 1992 is 0.189 (Table 1, row 3), while Chai and Chai (1994) report SSB estimates of the national Gini coefficient for urban areas of 0.180 for 1990 and 0.175 for 1991. Similarly, our sample estimate of average annual per capita income was 2000 yuan while the SSB estimate for all urban areas in China is 2027 yuan.

The problem of comparability between monthly and annual reference periods does *not* appear when estimating *mean-based* measures, such as average per capita income. If instead of using the 12 months of data on each household to calculate this annual average, we used just 1 (staggered) month's income for each household and extrapolated to annual totals, the average per capita annual income is estimated as 2003 yuan. This estimate from our monthly sample is almost identical to the estimate from our annual sample (2003 compared to 2000).

4. Conclusion

Income inequality in urban China appears to be low partly because it is calculated from a survey that records household incomes for a full year. In other countries, surveys record household incomes in urban areas for only a month or less. If this shorter reference period was used in China, measured inequality would be between 17 and 69% higher. Hence, in answering the question regarding why China's urban income inequality is so low compared to other countries, the answer appears to be that it is in part a statistical anomaly.

In fact, the question of whether to use monthly versus annual data is not only relevant to studies that concentrate on generating measures of inequality, but may be important to any study that is concerned with variance-based measures. For example, in other work using the same data set (Gibson et al., 1999), we find that poverty head counts and indices of poverty severity are overstated when using monthly observations instead of data for all months. The inclusion of intra-household variability of income or expenditure over the year-long survey period introduces a new component into the estimated overall variance of the distribution of income, and artificially increases the area of the distribution that falls to the left of the poverty line. The consequence of being able to provide policy makers with precise, or at least consistent, estimates of poverty counts and inequality measures, should be obvious. Among other things, such information is useful in calculating absolute budget

needs to meet welfare commitments and for allocating funds fairly among regions or sub-groups of society.

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