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Consumption based estimates of urban Chinese growth

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ABSTRACT

This paper estimates the household income growth rates implied by food demand in a sample of urban Chinese households in 1993–2005. Our estimates, based on Engel curves for food consumption, indicate an average per capita income growth of 6.8% per year in 1993–2005. This figure is slightly larger than the 5.9% per year obtained by deflating nominal incomes by the CPI. We attribute this discrepancy to a small bias in the CPI, which is of a similar magnitude to the one often associated with the CPI in the United States. This result supports the view that Chinese price statistics are reliable. Our estimates indicate stronger gains among poorer households, suggesting that urban inflation up to 2005 in China was "pro-poor," in the sense that the increase in the cost of living for poorer households was smaller than for the average one.

1. Introduction

China has enjoyed a very large economic growth since it began to liberalize its economy. Real GDP per capita has increased almost 10-fold since 1978, growing at an average of 8.5% per year. This growth has brought increasing prosperity to Chinese households, lifting tens of millions out of poverty at unprecedented rates. Large growth rates in real per capita income are also observed in urban and rural household surveys: 7% per year since 1978 for urban households and 5% per year since 1985 for rural households.[1]

This paper uses a subset of the Urban Household Survey in 1993–2005 to estimate the real income growth implied by Engel curves for food consumption, following the method developed in Nakamura (1997), Costa (2001) and Hamilton (2001) for the United States; and explored by de Carvalho Filho and Chamon (2012) for Brazil; and Gibson, Stillman, and Le (2008) for Russia, Barrett and Brzozowski (2010) for Australia, among others.

One of the strongest empirical regularities in economics is that the share of food in total household expenditures declines as (real) income grows (Engel's law).[2] We estimate a model for household-level budget share of food as a function of real expenditure, relative prices, and household characteristics, using different household expenditure survey cross-sections. Assuming that nominal expenditure is measured accurately and preferences are stable, we attribute the difference between the real expenditure growth based on our estimates and the "headline" real expenditure growth obtained by deflating nominal income by the Consumer Price Index (CPI) to measurement error in the latter.

These estimates are particularly interesting in the case of China for a number of reasons.

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[1] The discrepancy between GDP growth and income growth in the household surveys can be partly attributed to a declining share of household income in GDP. The household's share in total GDP has been declining over time, which can help explain the gap between the growth rates in the household surveys and the GDP figures, which can also be caused by other measurement problems (Deaton & Kozel, 2005).

[2] This empirical regularity was first documented in the pioneering work by Engel (1857).

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First, it yields real income growth figures that are unrelated to those of standard methods, providing an interesting cross-check. That is particularly relevant in the Chinese context as the reliability of Chinese statistics have generated heated debate among researchers. Some have raised a number of concerns that growth may be overestimated (e.g. Maddison, 2006; Young, 2003), while others have argued that these concerns are exaggerated and that the statistics are not biased (e.g. Chow, 2006, and Holz, 2006a, 2006b). Our findings suggest that the urban CPI overstated the true cost of living (so actual real income growth is even higher than indicated by official statistics), but that bias is only about 1% per year, which is in line with bias estimates for the U.S.

Second, our estimates are not sensitive to errors in price deflators. In fact, the method was developed as a way to infer an implicit price deflator which was then used to gage the potential error in the standard Consumer Price Index (CPI).

Finally, our estimates contribute to the debate about income inequality in China. Much of that literature has focused on the urban–rural gap (e.g. Almås & Auglænd Johnsen, 2012; Montalvo & Ravallion, 2010; Ravallion & Chen, 2007). But rising inequality has also been documented even within urban China (e.g. Cai, Chen, & Zhou, 2010). While our paper cannot inform urban versus rural comparisons, since it focuses only on urban households, it sheds new light on the inequality debate within urban China. The method can be used to estimate income growth rates at different points of the distribution implicitly using income-specific price deflators. This can control for whether inflation was higher or lower for poor households, yielding insights that could not be obtained just by deflating incomes of the rich and the poor by the same inflation rate.[3] Our findings confirm the strong growth in income among the Chinese households. In fact, if anything the growth has been slightly stronger than official statistics indicate. Moreover, our estimates indicate stronger growth among the poorer households until 2005.[4]

Using this method, Costa (2001) and Hamilton (2001) estimate real household income growth in the U.S. since the 1980s to be roughly 1% per year higher than implied by nominal income deflated by the CPI. Their estimates are similar to those of the Boskin Commission, which estimated CPI bias at 1.1 percentage points per year in 1995–96 (Boskin, Dulberger, Gordon, Griliches, & Jorgenson, 1996). Our estimates for China point to a similar figure, which is remarkable given the challenges of measuring prices in an economy undergoing rapid transformation.[5]

There is an extensive literature arguing that changes in the CPI overestimate the increase in cost of living in the United States.[6] The main sources of bias include the late introduction of new goods into the CPI basket, failure to (fully) account for improvements in quality, and consumer substitution. Any of these channels could account for the small bias estimated.

There are a few papers that have used Engel curves to estimate CPI bias in other countries. Among advanced economies, in addition to the Costa (2001) and Hamilton (2001) papers on the U.S., Gibson and Scobie (2010) estimate a bias of one percent per year in New Zealand in 1984–2001, and Beatty and Larsen (2005) estimate a bias of 1.5% per year in Canada during 1978–2000. Among developing countries, Gibson et al. (2008) estimated CPI bias in Russia during 1994–2001 to be about 1% per month.[7] de Carvalho Filho and Chamon (2012) estimated the bias in Brazil 1987–2002 and Mexico 1984–2004 to be about 3% per year (with the large bias being attributed to one-off effects of the trade reforms). Contemporaneous papers on China (both of which cite the present paper) include Cook (2013), who uses the data from the Chinese Household Income Project and estimates a bias similar to ours, and Nakamura, Steinsson, and Liu (2013) who use aggregate data and find that inflation was underestimated in the 1990s but overestimated in the 2000s.

The remainder of this paper is organized as follows. Section 2 describes the methodology. Sections 3 presents the results and Section 5 concludes.

2. Empirical methodology

This section uses the same approach as de Carvalho Filho and Chamon (2012), which builds on the methods developed in Nakamura (1997), Costa (2001) and Hamilton (2001).

We start with the demand function for food that emerges from Deaton and Muellbauer's (1980) Almost Ideal Demand System:

$$\begin{aligned} w_{i,j,t} = {} & \phi + \gamma\left(\ln P_{F,j,t} - \ln P_{N,j,t}\right) \\ & + \beta\left(\ln Y_{i,j,t} - \ln P_{G,j,t}\right) \\ & + \sum_x \theta_x \mathbf{X}_{i,j,t} + \mu_{i,j,t}, \end{aligned} \tag{1}$$

where the subscripts refer to household i, region j, and period t; w is the share of food in total household expenditures; P_F, P_N and P_G are the true but unobservable price indices of food, nonfood and the general index for all goods; Y is the household's nominal

[3] Please note that our sample ends in 2005, and it is possible that relative price changes since then (notably higher food prices) may have disproportionately affected poorer households.

[4] The CPI computed by statistical agencies can be interpreted as a weighted average of household price indexes, the weight of each household determined by its total expenditures. Therefore, CPIs tend to track more closely the evolution of the price of more wealthy households (Ley, 2001). The importance for inequality of differences across the income spectrum in the inflation faced by households is highlighted by Goñi, López, and Servén (2006) in the Latin American context.

[5] In a middle income country context, de Carvalho Filho and Chamon (2012) estimated CPI bias of about 3 percentage points per year in Brazil and Mexico.

[6] For an overview of this literature, see National Research Council (2002), Hausman (2003) and Lebow and Rudd (2003).

[7] It is possible that challenges related to deflating past expenditures in a high-inflation environment have caused an overestimation of the food budget share during years of high inflation (since typically the recall window to measure non-food expenditures is longer), thereby leading to implausibly large CPI bias estimates in Russia. It is also possible that estimating an expenditure level-specific bias and weighting those estimates by household expenditure as we do would lower their bias estimates for Russia.