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The Cost of Living and its Implications for Inequality and Poverty Measures for China

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The cost of living and its implications for inequality and poverty measures for China

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Abstract

The World Bank reports significant poverty reduction for China after 1978, the year when reforms were initiated. However, a main challenge when measuring poverty in a large and diversified country such as China, is that price levels differ and this has to be adjusted for. This paper calculates spatial price indices, and based on these, provides new real incomes for Chinese households. Subsequently, new estimates of inequality and poverty are provided. Several findings appear. First, there is substantial price variation across provinces and across urban and rural areas, the price level being higher in coastal than inland areas, and higher in urban than in rural China. Second, although the price variation is substantial in the period under study, we have seen price convergence in the period; the price difference between rural and urban as well as coastal and inland areas have decreased. Third, whereas nominal incomes indicate that inequality has decreased, the real incomes indicate that inequality has increased. Fourth, whereas the nominal incomes reveal a substantial poverty reduction, our calculated real incomes are unable to confirm any significant poverty reduction.
(*JEL*: D1, E31, F01)

1 Introduction

Since reforms were initiated in 1978, the economic development of China has been tremendous. The World Bank reports an average growth rate of 9.9 percent as well as a significant poverty reduction in this period. The poverty measures are, however, subject to debate and uncertainty (Bishop et al, 2006; Chen and Ravallion, 2007; Chen and Ravallion, 2008; Kahn et al, 1999; The World Bank, 2009).

Correcting for the cost of living is essential to inequality and poverty measurement, making prices a central part of the poverty reduction discussion. Considering the differences across provinces as well as across urban and rural China, regional price levels are likely to differ significantly in this vast and populous country.

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In this paper, we identify Chinese spatial price indices (SPIs) by applying a simple, but empirically robust, economic regularity, namely Engel's law, on household data. Incomes are adjusted using our spatial price measures providing new estimates of real income. Subsequently, new inequality and poverty estimates are calculated and compared to those not adjusted for SPIs, i.e., those based on nominal incomes.

This paper reports four main findings. First, prices vary substantially across provinces and across coastal[1] and inland as well as urban and rural areas, the coastal and urban prices being higher than those of inland and rural China. Second, although prices differ substantially in the whole period under study, price levels are converging from 1995 to 2002, i.e., price differences decrease across provinces as well as across urban and rural areas. Third, whereas nominal incomes indicate that inequality is falling, real incomes on the other hand imply that inequality is increasing. Fourth, whereas nominal measures reveal a substantial reduction in poverty within this period, we are unable to find support of a significant poverty reductions using our calculated real incomes.

Procedures for measuring cost of living would typically have to compromise between data availability and the consistency with consumer preferences, leading to well-known problems such as the quality, substitution, outlet and weighting biases (Brandt and Holz 2006; Hamilton 2001; Hill 2000; Neary, 2004; Nuxoll, 1994; Almås 2012). The problems related to the construction of the consumer price index are dealt with by Hamilton (2001). Hamilton uses Engel's law to estimate biases in the consumer price index (CPI). Engel's law states that a household's budget share for food is inversely related to household real income. This regularity implies that there is a unique relationship between the budget share for food and total expenditures. Hamilton's main idea is to see the potential in applying Engel's law to measure the cost of living. If two households with identical characteristics, observed in different periods, have the same budget share for food, they should also have the same real income. As real incomes are produced by deflating nominal income by the CPI, a difference in their measured real incomes reveals a CPI bias. By acknowledging the analogy between the SPI and the CPI we are able to deal with the problems related to the construction of the SPI and CPI directly - by applying the method proposed by Hamilton to estimate spatial price levels for Chinese provinces. This allows us to investigate whether provinces have different price levels, and furthermore whether the price levels differ according to whether a household is located in the urban or rural part of the provinces. In addition, we are able to identify price changes over time for provinces as well as urban and rural areas. Engel's law provides the theoretical background, and the method is based on the same principles as Hamilton's method. Consequently, the idea is that if two identical households located in different provinces have the same budget share for food but different nominal income; this reveals a price level difference.

The chosen approach in this paper has two clear advantages. For one, even in cases where regional price data actually exists, the construction of a SPI is a time-consuming and a complex procedure. The Engel curve approach however, is a much more straightforward and less tedious approach. Second, and perhaps more importantly, the Engel curve approach infers cost of living directly from consumer behavior, and hence, welfare consistency is secured.

In the literature, other methods to identify SPIs have been proposed. First, nominal

[1]The following provinces are defined as coastal: Beijing, Guangdong, Hebei, Jiangsu, Jilin, Liaoning, Shandong and Zhejiang.

values could be used as an approximation to real income, thus ignoring spatial differences. This approach contradicts the basic premise on which this paper is based, namely that prices matter. As we expect that there will be considerable spatial price differences in a large country with substantial differences across provinces and urban/rural areas, this approach is far from ideal for China. Second, we could assume that prices were the same in all regions in a specific base year and then use the regional CPIs to lead us from this base year to comparable cross-regional price levels for the year that we study. Brandt and Holz (2006) follow this latter procedure and construct spatial deflators based on this method for 1990. It is possible to argue that this method is attractive in the case of transitional economies with former centralized pricing systems, such as China. However, this method has two clear disadvantages. First, prices can differ in the base year. Second, the method relies on the CPI, which is in itself a potentially biased measure of price changes. Gluschenko (2006) compares such CPI proxied price levels with SPI constructed ones for Russian regions and he concludes that this method fails to provide precise estimates of cross-regional price variation. Thus, neither of these proposed methods prove themselves to be ideal for identifying regional price levels.[2]

Gong and Meng (2008) apply the Hamilton method to identify SPIs for households in the urban parts of different provinces for the period 1986-2001. The approach here has many similarities to theirs, but with one main difference. The strength of this analysis is the inclusion of a large number of rural as well as urban households covering several provinces in all of China's regions, whereas they cover only urban households. As poverty is mainly a rural phenomenon, inclusion of rural areas is of outmost importance when studying poverty and inequality. The inclusion of rural areas allows for the investigation of the relative price levels of the less advanced economic regions compared to the more advanced urban areas.

The paper is organized as follows. Section 2 explains the methodology in detail. Section 3 discusses the household data applied in the analysis and Section 4 outlines the empirical results. Section 5 concludes the paper.

2 Methodology

2.1 Econometric specification

Following the approach of Hamilton (2001), cross-provincial Engel curves for food for the years 1995 and 2002 are estimated by using the Almost Ideal Demand System (Deaton and Muellbauer, 1980). Household data (CHIP) for several provinces and municipalities in China for 1995 and 2002 are used to estimate the relationship between the budget share for food and household income. Based on the assumptions that the demand function is correctly specified, that consumer preferences are stable throughout the period, and that the micro data contain no systematic errors, a set of urban and rural dummy variables reveal a set of price levels. Based on the dummy coefficient estimates, the SPIs are constructed.

[2]In the context of poverty measurement, spatial price differences can also be dealt with by deriving poverty lines that take costs of food and non-food into account (see for instance Khan and Riskin, 2001; Chen and Ravallion, 2007, 2008). We will come back to this in the section on poverty lines).

According to Hamilton (2001) and Costa (2001), food is an ideal indicator good for measuring real income for the following reasons. First, the indicator good should be sensitive to variation in income, which is the case for food as the income elasticity of food is substantially different from unity. Second, food can be characterized as a nondurable good. Expenditures and consumption of food in one period are nearly identical, as opposed to a durable good, which is bought in one period but consumed throughout several periods of time. Third, the definition of food is straightforward, as opposed to other goods such as leisure (Hamilton, 2001).

The AIDS system is given by:

$$m_{h,p,u,t} = a + b_1(\ln y_{h,p,u,t} - \ln P_{p,u,t}) + \gamma(\ln P^f_{p,u,t} - \ln P^n_{p,u,t}) + \theta X_{h,p,u,t} + \varepsilon_{h,p,u,t}, \quad (1)$$

where $m_{h,p,u,t}$ is the budget share for food for household h, in province p in rural/urban area u at time t. $P_{p,u,t}$ is a price index, homogenous of degree 1 in prices. $P^f_{p,u,t}$ and $P^n_{p,u,t}$ are prices for food and non-food, respectively. $X_{h,p,u,t}$ is a vector of demographic control variables, and $\varepsilon_{h,p,u,t}$ is the residual.

The identification strategy is the following: $P_{p,u,t}$ is the only variable that is specific for each province p area u, and time t, and hence by including dummy variables indicating area and time, $d_{p,u,t}$, we can identify the local price level differences. The AIDS specification given by (1) can then be estimated by:

$$m_{h,p,u,t} = a + b(\ln y_{h,p,u,t}) + \gamma(\ln P^f_{p,u,t} - \ln P^n_{p,u,t}) + \theta X_{h,p,u,t} + \sum_{p=1}^{N} d_{p,u,t} D_{p,u,t} + \varepsilon_{h,p,u,t} \quad (2)$$

Finally, the price level of province p and area u at time t can be expressed as follows:

$$d_{p,u,t} = -blnD_{p,u,t} \Longleftrightarrow P_{p,u,t} = e^{(-d_{p,u,t}/b)} \quad (3)$$

A positive dummy variable for province p in urban/rural area u at time t implies that the budget share for food for households in this specific province is higher than that of identical households in the base. As the budget share for food is decreasing in income, the coefficient for nominal income b is negative. Hence, if the provincial dummy is positive the price level exceeds unity, which implies that the price level of this province exceeds that of the base.

Based on the price level estimates, a spatial price index (SPI) is calculated. The SPIs are normalized relative to the overall price level in 1995. This is given by a population weighted sum of the price estimates over the total population in 1995:

$$\overline{P^{1995}} = \frac{\sum_{p=1}^{N} pop^{1995}_{p,u} * p^{1995}_{p,u}}{\sum_{p=1}^{N} pop_{p,u}} \quad (4)$$

2.2 Inequality and poverty measurement

In order to evaluate the results, we adjust nominal incomes using the SPIs. The nominal and price adjusted incomes are then compared through an investigation of how measures of inequality and poverty change when taking into account the differences in cost of living across provinces. We study the inequality and poverty in 1995 and 2002 and report the changes between these two years. We use the gini index to measure inequality, and the headcount index to measure poverty, i.e. the percentage of the sample population with income per person (or equivalence scale adjusted income) below the poverty line.

The poverty line is set to be $1.08/day measured in 1993 prices, and we also provide estimates based on $2 a day. The poverty line is converted to Chinese currency (Yuan) using Purchasing Power Parity (PPP) exchange rates. We use the PPPs provided by the The International Comparison Program (ICP)/ World Bank in the 2005 round (WB 2008). The second step is to adjust this estimate for inflation in the period between 1993 and 2005.[3] Finally, the poverty line should reflect annual consumption expenditures, which is found by multiplying by 365 days. The formula for the poverty line in 1995, hence becomes:

$$PL^{1995} = 1.08 * \frac{PPP_{CHN}^{1993}}{PPP_{US}^{1993}} \frac{CPI^{1995}}{CPI^{1993}} * 365 = 1.08 * 2.74 * \frac{396.9}{273.1} * 365 = 1571.19 Yuan \quad (6)$$

For real incomes we can apply the same poverty line for the 2002 data, as incomes are adjusted for temporal as well as spatial price variation using the estimated SPIs. For nominal incomes however, we have to price adjust the poverty lines. The procedure for the 2002 line differs only in that numbers for 2002 are used instead. Table 1 presents the four derived poverty lines for China:

Table 1: The ICP Poverty Lines for China (CNY)

	1995	2002
1 dollar day	1571.19	1716.08
2 dollar day	2909.62	3177.93

[3]The implied 1993 PPP conversion rate of the 2005 PPP can be found by deflating the PPP conversion rate by inflation in China and the US, using the published CPIs for both countries, respectively. The PPP conversion factor (US$=1) for China equals 3.45 in 2005 (ICP 2008) This procedure is summarized in the following formula. The 1993 PPP conversion rate:

$$\frac{PPP_{CHN}^{1993}}{PPP_{US}^{1993}} = \frac{PPP_{CHN}^{2005}}{PPP_{US}^{2005}} * \frac{1CNY^{2005} * \frac{CPI_{CHN}^{1993}}{CPI_{CHN}^{2005}}}{1USD^{2005} * \frac{CPI_{US}^{1993}}{CPI_{USD}^{2005}}} = 3.45 * \frac{\frac{273.1}{463.9} 1CNY^{1993}}{\frac{144.5}{195.3} 1USD^{1993}} = 2.74 \frac{CNY^{1993}}{USD^{1993}} \quad (5)$$

Having found the implied PPP conversion rate for 1993, we multiply this by the poverty line in 1993 prices. Then we use the Chinese CPI to adjust the poverty line for price increases from 1993 to 1995. This is done using the Chinese Consumer Price Index for the years 1993 and 1995, both with base year 1978.

3 Data

3.1 Micro data from household surveys

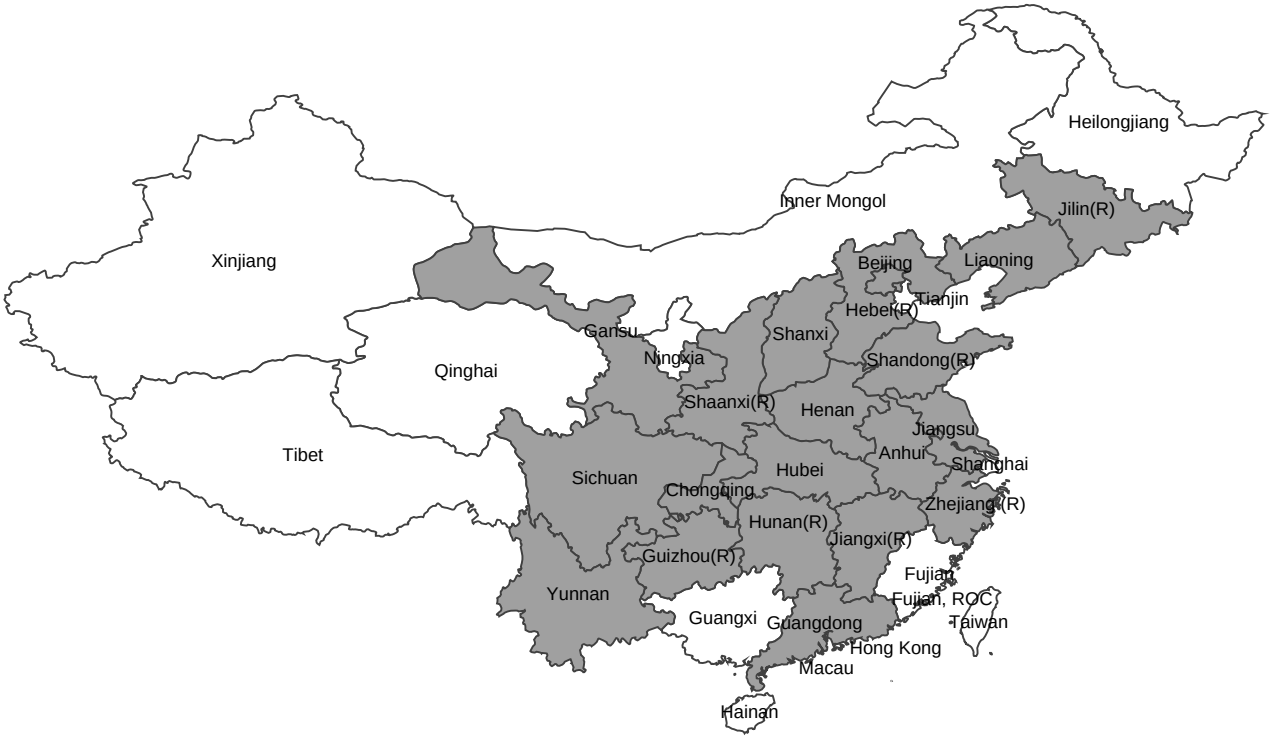
Household data used in the estimation are provided by the "Chinese Household Income Project" (CHIP), collected in 1995 and 2002 by an independent group of economists in collaboration with the Chinese Academy of Social Sciences (CASS).[4] The data consist of an urban and a rural part, and these households were selected from a larger sample collected by the National Bureau of Statistics.[5] In 1995 19 provinces were selected to constitute a representative sample of the economic characteristics of China's rural regions, and the same principle was applied when selecting 11 urban provinces. Two more provinces (Xinjiang and Guianxi) were added to the rural survey provinces in 2002 to investigate issues related to ethnic minorities. We have not included these two provinces in the analysis to ensure comparability between 1995 and 2002. Chongqing was established in 1997, prior to that it was a part of Sichuan. As Chongqing is included in the 2002 data we follow the approach of Khan et al. (2005) and combine Sichuan and Chongqing in 2002. Finally, the 2002 survey data covers the migrant population, which we are unable to include in the estimation as we have no data on this for 1995.

Figure 1 illustrates data coverage of the analysis in this paper:

[4]The survey also covers 1988 but due to comparison issues we have not included these data as of now

[5]The urban households come from a sample consisting of approximately 35 000 households in 1995 and 45 000 in 2002 selected for the NBS annual household survey. These samples represent total urban populations of approximately 350 million and 450 million in the two years, respectively. The rural households were drawn from a sample consisting of approximately 65 000 - 68 000 rural households for 1995 and 2002. For a complete description of the data, see Khan et al. (1998, 1999, 2005).

Figure 1: Map over survey data covered both in 1995 and 2002



Gray: Data Coverage for both 1995 and 2002. (R) means data only on rural households: Guizhou, Hebei, Hunan, Jilin, Jiangxi, Shaanxi, Shandong, Zhejiang.

The survey consists of one part answered by the individuals and one for the household as one. As we can see from Table 2 below, the average household size for rural households is larger than the urban average for both years, which is consistent with the one-child policy being less restrictive for rural households.[6] The average household size continues to fall from 3.79 to 3.66 from 1995 to 2002.[7]

Table 2: Comparison of the surveys

	1995			2002		
	Individuals	Households	MHH	Individuals	Households	MHH
Rural	34 739	7 998	4.35	37 969	9 200	4.14
Urban	21 687	6 931	3.13	20 632	6 835	3.02
Total	56 426	14 929	3.79	58 601	16 035	3.66

MHH: mean household size.

[6]There are exceptions from the one-child rule on province as well as county levels. One of the more general exceptions encompass household where the first child has a disability or both parents work in high-risk occupations, another if both parents come from one-child families. In rural areas a second child is generally allowed after five years, but this sometimes only applies if the first child is a girl. Another exception concerns only ethnic minorities, who can be allowed to have a third child (see Hesketh et al 2005).

[7]Average household size for all of China 4.32 in 198, 3.53 for urban households and 5.01 for rural.

In the estimation of the demand system, we use expenditure to identify income. This is standard procedure to estimate demand systems. As we find the price of consumption, we also use expenditure as our income measure when calculating poverty. According to Deaton and Zaidi (2002) expenditure is a more satisfactory measure of well-being. Income can be erratic, especially in agricultural societies. Self-employment can involve several sources of income, which can lead to large variations in annual income. Expenditures are smoother over the period of a year, and more reliable in the sense that it reflects actual behavior. Further, there are no obvious reasons to underreport consumption expenditures as compared to income. With income data, the respondents might underreport income if they suspect that these data could become available to the tax authorities. When studying China, the decision of using expenditure and not income is of outmost importance due to the exceptionally high savings rates that are prevalent in China. Thus, as we want to study well-being, measuring income in terms of expenditures has clear advantages in the case of China, and hence we use expenditure data to measure income.

Age of household head, number of adults, number of children and number of elders are included as demographic control variables[8]. Average number of members in a household included in the analysis is 3.1 (largest 8) for urban households and 4.3 for rural (largest 10) for 1995. The variable for number of adults was constructed by subtracting number of children from total members of household. Children are defined as being younger than 16. Elders are defined by the official retirement age in China, which is 60 for men, and 55 for women. In order to deal with outliers we drop the top and bottom one percent of the observations of expenditure and food (within urban/ rural provinces on an annual basis). Furthermore, if there are any other observations where age of head of household is either 0 or missing, expenditure on food is equal to zero or incomes are negative, these households are also dropped.

To control for possible systematic variation between food and non-food prices a measure of relative prices is included in the estimation. This requires detailed price information on food and non-food for urban and rural households. As the survey data only includes food prices for rural households, we rely on various statistical publications for price data. We combine the rural food prices in the survey data with urban food prices from the China Price Statistical Yearbook 2003[9] with information on non-food prices from the Price Statistical Yearbook of China in 1992 (Zhong guo wujia tongji nianjian 1992), see appendix B for details.

The main specification includes all households and uses the OECD equivalence scale to adjust for household size and composition. One of the main advantages of using micro level data is that we can study groups of households with identical characteristics. We provide a robustness check where we restrict the estimation to households consisting of two adults and one child in order to secure that differences in household size and composition does not drive any of our main findings (see e.g., Deaton and Paxson (1998) for a discussion of how demographic characteristics can shift Engel curves).

[8]In the rural data set for 1995 all but 328 (352 in 2002) head of households are male, while 2289 (2220 in 2002) out of the urban heads of household are female.

[9]The 2002 data on urban food prices come from the China Price Statistical Yearbook 2003, which covers 69 food items for 36 cities. Urban food prices in 1995 are collected from the China Price Information Network, which covers 11 food items and 34 cities. The prices of these province capitals are assumed to be representative of the remaining urban areas of each province.

A main issue related to price adjustments in China, as well as in many other countries, is how to include housing prices. As housing expenses typically constitutes a substantial fraction of total household expenditures, it is important to include housing prices in studies of economic development and poverty. However, there are substantial measurement problems related to housing expenditures (see e.g., ...). In the survey we use, there are information on housing for both urban and rural areas.

We follow the approach by Khan et al (1993, 1995, 2005) in constructing the housing aggregate. For urban households in 1995, rental value for owner occupied housing is estimated adding housing subsidies (if the house is publicly-owned) and rental value of owner occupied housing for urban households. For rural households we use rental value of housing equity for 1995 as well as 2002.[10] The approach differs slightly for urban 2002.[11] We include the results from including housing expenses in the estimation in the robustness chapter.

We also include a robustness check that incorporates the value of in-kind income in the expenditure aggregate and food aggregate. Although the value of in-kind services and goods do not constitute a large fraction of total expenditures (on average less than 1 percent), we want to check whether the exclusion of consumption from in-kind could drive any of our results. The income in-kind is a self-reported measure of "The monetary value of income in-kind". As this is not market-based consumption, we do not know whether the responders evaluate the monetary value of the same income in-kind as equally high. In addition, we do not know whether, if possible, the consumers would have substituted away from some of the in-kind consumption and towards other goods available in the market, if possible (that is, if income was given as money and the in-kind consumption goods and services were available in the market). Hence, we have chosen to only include it not to include it in our main specification.

One part of consumption needs special attention, namely food consumption out of own production (referred to as self-production). This is available in the rural survey only, and it is given as quantity consumed. Although we have reasons to expect that self-production is a substantially larger phenomenon in rural than in urban China, it is problematic to include self-production for rural households only, in the pooled regression. Moreover, it is not clear how to value the self-production. An upper bound for the evaluation would be the market value of of the products. However, as with in-kind, we do not know whether this represents the actual value of the product for the consumers, or if they, if possible, would rather have sold the produce at market value and bought other products instead. A lower bound for the evaluation would be to put the value zero on self-production, and hence exclude it from the regression. This is what we do in the main pooled regression. However, we also provide an upper bound for the budget share for food and expenditure, and subsequent SPIs and poverty and inequality rates, by using the market value to evaluate self-production. However, in the latter case we have to identify the price increase

[10] Codebook 1995: for urban households, see *UY10:Rental value of owner occupied housing* and *Uy9: Housing subsidy for urban households*. For rural households in 1995 and 2002: *RY6: Rental value of housing equity* (note that in 1995 this variable is not in the questionnaire, only in the documentation).

[11] See footnote 25 in Khan et al (2005). The approach used for urban 1995 proved unusable for urban 2002, causing the estimation of rental value of urban housing to be reverted back to the 1988 approach) See codebook from 1988: *UY9: Housing subsidy in kind* and *UY10: Rental value of owner occupied housing* Variables such as sanitary facilities and total living area are used to estimate the market value of present resident house.

for the rural area separately as we do not have self-production reported for the urban areas. In this specification we take the urban rural price gap for 1995 resulting from the pooled regression as given and run estimations on the rural and urban sample separately to find price changes and subsequent changes to poverty and inequality. In these separate regressions we include housing and in-kind as well as self-production.

4 Analysis and Findings

4.1 The pooled regression

The main results from the pooled regressions are presented in Table **??** (the complete table containing all dummy variables can be found in the appendix, Table **??**). The first column shows the results from the main regression including expenditure on market purchases only. In order to correct for economies of scale in the households we adjust expenditures using the OECD equivalence scale.[12] The second column defines only households consisting of two adults and one child, while the third column shows estimates based on an alternative measure of housing in the defined income measure. The fourth and final column presents estimates where in-kind income is included in the income variable.

As predicted by Engel's law, expenditures are negatively related to the budget share for food, and the coefficient is highly significant. All of the control variables are statistically significant. Age of head of household and number of elders have a small and positive effect on the budget share for food. The negative coefficients for number of children and the number of adults in the households imply that the budget share for food decreases as the households get bigger. The relative price coefficient is positive and significant. The price dummy variables for rural provinces in 1995 are all significant on a 5% level and negative, implying a lower price level than urban Beijing 1995. Of the urban price dummies in 1995 all are statistically significant, with Jiangsu, Hubei and Guangdong getting positive coefficient estimates. The rural 2002 price coefficients are all statistically significant and negative, with the exception of Guangdong, Yunnan and Xinjiang (positive), and Sichuan (not significant). For urban 2002, the price estimates for Sichuan, Yunnan and Jiangsu are not statistically significant, and the price level estimate indicates that Guangdong has a higher price level than Beijing 1995. Thus, a large majority of the estimated province coefficients are significantly estimated indicating significant different price levels from urban Beijing 1995.[13]

[12] The idea behind equivalence scales is that the needs of a household do not grow proportionally with each new member of the family, i.e., there are economies of scale in the households. The OECD Social Policy Division defines three equivalence scales (OECD 2009). The OECD-scale implies some, but not extensive, presence of economics of scale. This scale produces the best estimate compared to other studies on economies of scale in China; the main analysis will thus be based on this scale (OECD 2009):

$$OECD^{ES} = 1 + (adults - 1) * 0.7 + children * 0.5 \tag{7}$$

.

[13] These results are robust to inclusion of several control variables, such as education, gender of head of household, ratio of female members of household and elders.

Table 3: Regression Table (OLS, robust errors)

	(1) M (EX)	(2) M (EX)	(3) M (EX)	(4) M (EX)
Log of EX (ES-adj)	-0.187*** (0.00181)			
Log of EX (2adults1child)		-0.208*** (0.00362)		
Log of EX alt. hous. (ES-adj)			-0.160*** (0.00168)	
Log of EX with in-kind				-0.185*** (0.00182)
Log of relative prices	0.0696*** (0.0107)	0.0375 (0.0324)	0.0636*** (0.00910)	0.0693*** (0.0107)
Adults	-0.0349*** (0.000963)		-0.0287*** (0.000828)	-0.0347*** (0.000960)
Children	-0.0244*** (0.00134)		-0.0185*** (0.00115)	-0.0245*** (0.00134)
Elders	0.0161*** (0.00144)	0.0275*** (0.00655)	0.0117*** (0.00124)	0.0161*** (0.00143)
Age HH	0.00159*** (0.000103)	0.00197*** (0.000273)	0.00110*** (0.0000878)	0.00151*** (0.000103)
Constant	2.028*** (0.0184)	2.271*** (0.0385)	1.741*** (0.0174)	2.019*** (0.0185)
Adjusted R^2	0.433	0.487	0.421	0.425
Observations	27145	5919	27466	27155

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Based on the estimated coefficients we can identify the regional price levels relative to urban Beijing in 1995 by equation 3. We use these relative prices to identify the spatial price indexes, which are measured relative to a national average, i.e., we use equation 4 to normalize to the weighted national mean.

As we can see from Figure 2, the estimation results suggest a positive relationship between price level and nominal income. This is consistent with a Balassa-Samuelson effect, stating that as countries or regions develop economically, prices increase. However, we are only able to identify a significant increasing relationship between price level and income in 1995 ($p - value < 0.001$ for both rural and urban areas). In 2002, however, we also get a positive relationship when running regressions explaining price level by income, but the relationship is not significantly estimated ($p - value = 0.413$ for rural and $p = 0.218$). Further, we can see that the urban price level is not, in general, very much higher than in rural areas, and it seems like rural areas would have the same price level as urban areas at a lower level of income. This could indicate that the Balassa-Samuelson effect could be offset by an effect where more developed regions have access to some cheaper products than less developed regions. This could be caused by larger outlets existing in more developed regions supplying goods cheaper than smaller stores

in less developed areas. It could further be caused by trade costs, indicating that the more developed urban areas would get access to traded goods less expensive than the rural areas. Such an effect could also exist within the urban areas, where the more developed coastal areas would get traded goods at a lower cost than the in-land regions. This could lead to a less clear upward sloping trend between SPI and income in 2002 than in 1995.

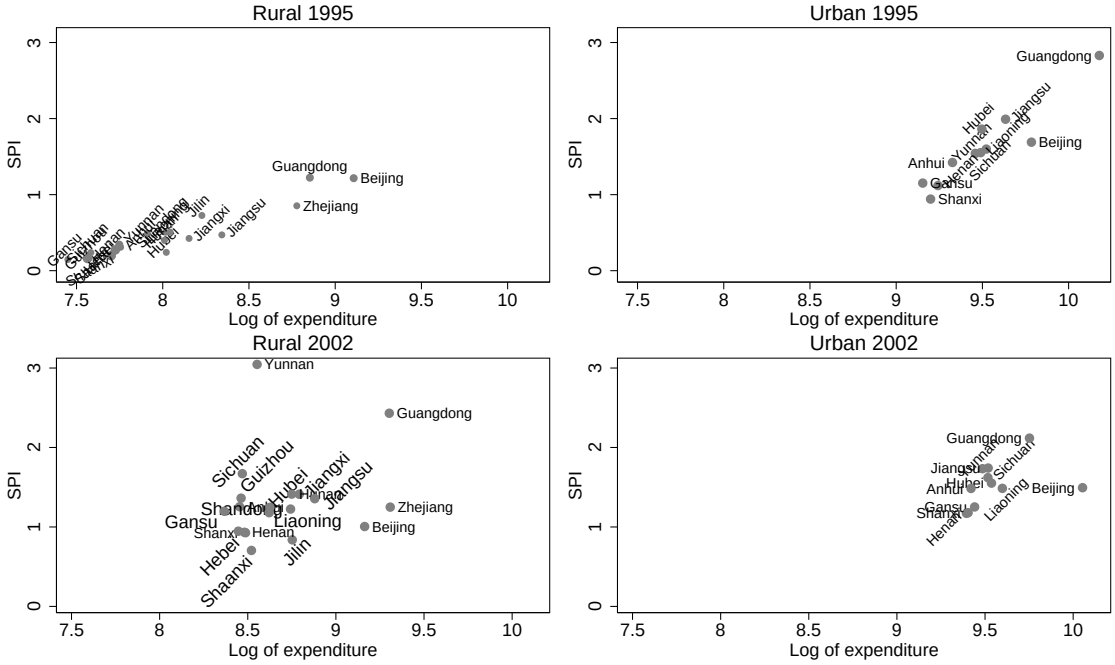
Table 4 shows our first and second main findings. First, there are substantial price differences across provinces and between coastal and inland as well as rural and urban areas, according to the estimated SPIs. This constitutes our first main finding. Second, the price difference across provinces and between coastal and inland as well as between urban and rural areas were reduced from 1995 to 2002. Our results show that there was a large gap in price levels between coastal and inland as well as between rural and urban areas in 1995. In 2002 these gaps were considerably smaller, although still existent. The price variation across provinces measured through the coefficient of variation (CV) has decreased both in rural and urban China. As the difference between urban and rural China as well as the variation within urban and rural areas have decreased in the period under study, the price variation for all China has decreased. This constitutes our second main finding. The CV for the whole of China is approximately 71 in 1995 and 29 in 2002.

Inspecting the CV-values for price variation in table 4 below, we see that the variability of rural prices exceeds that of urban prices in both 1995 and 2002. This is particularly strong in 1995. In 2002 the variation in both rural and urban areas is lower, and the price level difference between rural and urban areas has also decreased.

Table 4: Summary statistics SPIs

	1995	2002
Mean (all)	1.00	1.59
Mean (urban)	1.82	1.73
Mean (rural)	0.53	1.51
Mean (coastal)	1.31	1.61
Mean (inland)	0.80	1.57
Coefficient of variation (all)	77.3	33.9
Coefficient of variation (urban)	31.9	18.2
Coefficient of variation (rural)	69.4	41.6
Coefficient of variation (coastal)	64.8	33.1
Coefficient of variation (inland)	83.8	35.4

Figure 2: SPIs for rural and urban China in 1995 and 2002



4.1.1 Inequality

Table 5 reports inequality measures for rural, urban and all China, respectively. We can see that the nominal incomes indicate that inequality has decreased in both urban, rural and overall China. The real incomes on the other hand indicate increasing inequality for China as a whole, and urban and rural separately. This constitutes our third main finding.

Table 5: Inequality

	1995			2002		
	Rural	Urban	All	Rural	Urban	All
Nominal	0.41	0.30	0.55	0.33	0.29	0.43
Real	0.36	0.27	0.34	0.35	0.29	0.40

4.1.2 Poverty

The ICP poverty line is equal to 1571.19 Yuan a year in 1995, hence if annual equivalence scale adjusted income is less than this, an individual will be defined as poor. Table 6 displays the headcount ratios derived from the nominal and real incomes, respectively. We can see that according to nominal incomes, poverty decreased in rural China and all China, whereas it increased slightly in urban China in the period under study. However, according to the real incomes, poverty increased in rural and all China whereas it decreased in urban China. The poverty results constitute our fourth main finding.

Table 6: Head count ratios

	"One-dollar-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.91	0.71	0.04	0.05	0.48	0.38
Real	0.52	0.78	0.17	0.15	0.35	0.47
	"Two-dollars-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.98	0.93	0.30	0.31	0.64	0.62
Real	0.84	0.95	0.65	0.55	0.74	0.75

4.2 Robustness analysis

4.2.1 Identification on household with same composition

In order to avoid inaccuracies created by equivalence scales and test whether differences in household size and composition across provinces and rural and urban China drive any of the results in this paper, we run the analysis on the subsample of households with two adults and one child.

From Table 7 we can see that the main picture remains the same as for the estimation including the whole sample. There is a slight difference in that the SPI estimates shows that overall the urban price level also increased slightly. Hence, the finding that the urban price level decreased is not a robust finding.

Table 7: Summary statistics SPIs

	1995	2002
Mean (all)	1.00	1.38
Mean (urban)	1.57	1.59
Mean (rural)	0.48	1.24
Coefficient of variation (all)	68.3	32.2
Coefficient of variation (urban)	31.5	17.3
Coefficient of variation (rural)	68.1	38.8

Table 8 shows the same finding for inequality as we had for the estimation on the whole sample: The nominal values show a decrease in inequality for urban, rural and all China, whereas the real incomes show a decrease for rural, an increase for urban and an increase for all China.

Table 8: Inequality

	1995			2002		
	Rural	Urban	All	Rural	Urban	All
Nominal	0.41	0.30	0.55	0.33	0.29	0.43
Real	0.37	0.26	0.35	0.34	0.28	0.38

We can see from Table 9 that the two-dollar-a-day measure confirms the same findings as we had for poverty for the whole sample: According to nominal incomes, poverty decreased in rural China and all China, whereas it increased slightly in urban China in the period under study. However, according to the real incomes, poverty increased in rural and all China whereas it decreased in urban China. When looking at the one-dollar-a-day measure however, we see that also poverty in urban China is reported to have increased in period under study.

Table 9: Head count ratios

	"One-dollar-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.91	0.71	0.04	0.05	0.48	0.38
Real	0.57	0.74	0.14	0.17	0.36	0.45
	"Two-dollars-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.98	0.93	0.30	0.31	0.64	0.62
Real	0.86	0.94	0.62	0.58	0.74	0.76

4.2.2 Including housing

Table 10:

Table 10: Summary statistics SPIs

	1995	2002
Mean (all)	1.00	1.37
Mean (urban)	1.70	1.49
Mean (rural)	0.37	1.29
Coefficient of variation (all)	74.8	32.4
Coefficient of variation (urban)	25.9	12.4
Coefficient of variation (rural)	59.4	41.8

Table 11:

Table 11: Inequality

	1995			2002		
	Rural	Urban	All	Rural	Urban	All
Nominal	0.39	0.32	0.54	0.33	0.29	0.43
Real	0.32	0.29	0.31	0.37	0.29	0.41

Table 12:

Table 12: Head count ratios

	"One-dollar-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.85	0.55	0.02	0.02	0.43	0.28
Real	0.22	0.59	0.13	0.06	0.18	0.31
	"Two-dollars-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.96	0.87	0.20	0.18	0.58	0.52
Real	0.63	0.88	0.55	0.35	0.59	0.61

4.2.3 In-kind

Table 13:

Table 13: Summary statistics SPIs

	1995	2002
Mean (all)	1.00	1.44
Mean (urban)	1.63	1.63
Mean (rural)	0.43	1.31
Coefficient of variation (all)	70.6	30.0
Coefficient of variation (urban)	27.9	14.7
Coefficient of variation (rural)	65.5	36.9

Table 14:

Table 14: Inequality

	1995			2002		
	Rural	Urban	All	Rural	Urban	All
Nominal	0.41	0.30	0.55	0.33	0.28	0.43
Real	0.37	0.26	0.34	0.35	0.29	0.40

Table 15:

Table 15: Head count ratios

	"One-dollar-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.91	0.71	0.04	0.04	0.48	0.38
Real	0.51	0.77	0.16	0.17	0.34	0.47
	"Two-dollars-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.98	0.93	0.29	0.29	0.64	0.61
Real	0.83	0.94	0.65	0.58	0.74	0.76

4.3 Self-production and discussion of results

Throughout this chapter, we have seen that adjusting incomes for spatial price differences has a large effect on inequality as well as poverty estimates. However, in order to secure comparability between rural and urban China, we have focused on market purchases and added housing and in-kind to that in robustness checks. However, we know that consumption of self-production of food constitutes a substantial fraction of food consumed, especially in rural China. Hence, we would like to be able to include self-production in our analysis. The challenge though is twofold. First, we only have self-production from rural China, and hence we cannot include self-production *and* both urban and rural households in our analysis. Subsequently, we cannot through an estimation including self-production establish the rural/urban price gap. Consequently, we need to take the urban/rural price gap identified through other estimations, such as the main specification based on market purchases, as given and estimate only the development of poverty in rural and urban China separately, when including self-production. In this section we will normalize so that the urban-rural price gap for 2002 established in Section 4.1 is taken as given. The second challenge when intending to include self-production, is that we do not really know the value of self-production for the households. It is possible that the value of the products for the households are lower than the market value, and that they would have preferred to get an income equal to the market value and spent it on other goods. This is possible because there could exists costs related to selling the products on the market, say transportation or information costs, or there could be excess supply and incomeplete markets for some products. If this is the case, using the market value reported in the survey, would overestimate the total expenditure for food for the household, and hence the budget share for food calculated in this way, would give an upper bound for this variable.

In this section we compare the results from the stripped down version based on market consumption to the version including self-production for rural households, as well as in-kind and housing for all households. Since the variables that we can include differ between urban and rural China, we are unable to run pooled regressions and hence we have to run a separate analysis on the rural households (including self-production) and

one on the urban households (excluding self-production).

Estimation results for rural and urban households respectively in Table 16:

Table 16: Regression Table (OLS, robust errors)

	(1) M(EX) RURAL	(2) M(EX) URBAN
Log of EX (ES-adj) with self-production	-0.105*** (0.00328)	
Log of EX (ES-adj)		-0.219*** (0.00206)
Log of relative prices	-0.0267** (0.0107)	0.0227 (0.0451)
Adults	-0.0126*** (0.00113)	-0.0425*** (0.00130)
Children	0.0000972 (0.00141)	-0.0367*** (0.00194)
Elders	0.0126*** (0.00193)	0.00994*** (0.00172)
Age Head of Household	0.000761*** (0.000137)	0.00168*** (0.000122)
Constant	1.265*** (0.0304)	2.332*** (0.0290)
Adjusted R^2	0.323	0.556
Observations	15411	12026

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 17:

Table 17: Summary statistics SPIs

	1995	2002
Mean (all)	1.00	0.21
Mean (urban)	1.27	1.32
Mean (rural)	0.76	1.15
Coefficient of variation (all)	51.0	56.3
Coefficient of variation (urban)	27.1	14.5
Coefficient of variation (rural)	67.5	75.5

Table 18:

Table 18: Inequality

	1995			2002		
	Rural	Urban	All	Rural	Urban	All
Nominal	0.28	0.32	0.44	0.28	0.28	0.32
Real	0.47	0.28	0.40	0.58	0.28	0.51

Table 19:

Table 19: Head count ratios

	"One-dollar-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.61	0.20	0.02	0.02	0.32	0.11
Real	0.35	0.27	0.03	0.05	0.19	0.16
	"Two-dollars-a-day"					
	Rural		Urban		All	
	1995	2002	1995	2002	1995	2002
Nominal	0.92	0.67	0.20	0.22	0.56	0.45
Real	0.56	0.54	0.30	0.34	0.43	0.44

5 Concluding Remarks

In this paper we identify Chinese SPIs by applying a simple, but empirically robust, economic regularity, namely Engel's law, on household data. Incomes are then adjusted using the new price estimates given by the SPIs, providing new estimates of real income. Subsequently new inequality and poverty estimates are calculated and compared to those not adjusted for SPI, i.e., those based on nominal incomes.

This paper reports four main findings. First, there is a substantial price variation across provinces and acrsoo urban and rural areas, the price level being higher in urban than rural China. Second, we have seen price convergence; the price differences between urban and rural China has decreased as well as the price differences across provinces within urban and rural areas. Third, we find that income inequality has increased although nominal incomes indicate that it has decreased. Fourt, whereas nominal measures reveal a substantial poverty reduction, real incomes are unable to confirm any significant poverty reduction.

A Regressions

A.1 Full sample

Table 20: Regression Table (OLS, robust errors)

	(1) M (EX)	(2) M (EX)	(3) M (EX)	(4) M (EX)
Log of EX (ES-adj)	-0.187*** (0.00181)			
Log of EX (2adults1child)		-0.208*** (0.00362)		
Log of EX alt. hous. (ES-adj)			-0.160*** (0.00168)	
Log of EX with in-kind				-0.185*** (0.00182)
Log of relative prices	0.0696*** (0.0107)	0.0375 (0.0324)	0.0636*** (0.00910)	0.0693*** (0.0107)
Adults	-0.0349*** (0.000963)		-0.0287*** (0.000828)	-0.0347*** (0.000960)
Children	-0.0244*** (0.00134)		-0.0185*** (0.00115)	-0.0245*** (0.00134)
Elders	0.0161*** (0.00144)	0.0275*** (0.00655)	0.0117*** (0.00124)	0.0161*** (0.00143)
Age HH	0.00159*** (0.000103)	0.00197*** (0.000273)	0.00110*** (0.0000878)	0.00151*** (0.000103)
Rural 95 Beijing	-0.0617*** (0.0133)	-0.0713** (0.0298)	-0.0531*** (0.0113)	-0.0641*** (0.0132)
Rural 95 Hebei	-0.299*** (0.00987)	-0.353*** (0.0361)	-0.293*** (0.00803)	-0.302*** (0.00989)
Rural 95 Shanxi	-0.342*** (0.0131)	-0.411*** (0.0540)	-0.296*** (0.0109)	-0.341*** (0.0130)
Rural 95 Liaoning	-0.226*** (0.0122)	-0.229*** (0.0272)	-0.207*** (0.0102)	-0.228*** (0.0122)
Rural 95 Jilin	-0.158*** (0.0116)	-0.186*** (0.0242)	-0.152*** (0.00987)	-0.162*** (0.0116)
Rural 95 Jiangsu	-0.239*** (0.00960)	-0.248*** (0.0196)	-0.235*** (0.00794)	-0.233*** (0.0101)
Rural 95 Zhejiang	-0.128*** (0.00993)	-0.0740*** (0.0221)	-0.126*** (0.00827)	-0.132*** (0.00985)
Rural 95 Anhui	-0.319*** (0.00976)	-0.299*** (0.0297)	-0.283*** (0.00848)	-0.319*** (0.00972)
Rural 95 Jiangxi	-0.259*** (0.00994)	-0.231*** (0.0466)	-0.209*** (0.00882)	-0.263*** (0.00994)

Rural 95 Shandong	-0.226***	-0.226***	-0.213***	-0.227***
	(0.00897)	(0.0220)	(0.00790)	(0.00901)
Rural 95 Henan	-0.403***	-0.426***	-0.356***	-0.404***
	(0.00885)	(0.0273)	(0.00747)	(0.00890)
Rural 95 Hubei	-0.365***	-0.396***	-0.310***	-0.368***
	(0.0108)	(0.0286)	(0.00914)	(0.0108)
Rural 95 Hunan	-0.271***	-0.274***	-0.216***	-0.274***
	(0.00953)	(0.0238)	(0.00863)	(0.00952)
Rural 95 Guangdong	-0.0606***	-0.0504	-0.0840***	-0.0648***
	(0.0104)	(0.0448)	(0.00847)	(0.0104)
Rural 95 Sichuan	-0.367***	-0.370***	-0.307***	-0.369***
	(0.00987)	(0.0203)	(0.00871)	(0.00988)
Rural 95 Guizhou	-0.432***	-0.495***	-0.352***	-0.434***
	(0.0140)	(0.0355)	(0.0125)	(0.0139)
Rural 95 Yunnan	-0.232***	-0.269***	-0.213***	-0.235***
	(0.0137)	(0.0436)	(0.0119)	(0.0138)
Rural 95 Shaanxi	-0.441***	-0.467***	-0.369***	-0.443***
	(0.0125)	(0.0494)	(0.0109)	(0.0125)
Rural 95 Gansu	-0.458***	-0.554***	-0.381***	-0.458***
	(0.0139)	(0.0365)	(0.0123)	(0.0140)
Urban 95 Shanxi	-0.110***	-0.133***	-0.0700***	-0.100***
	(0.00640)	(0.00955)	(0.00561)	(0.00629)
Urban 95 Liaoning	-0.0160**	-0.0209**	-0.00369	-0.0178***
	(0.00635)	(0.00972)	(0.00531)	(0.00634)
Urban 95 Jiangsu	0.0308***	0.00721	0.0484***	0.0302***
	(0.00640)	(0.0104)	(0.00560)	(0.00636)
Urban 95 Anhui	-0.0322***	-0.0530***	-0.00472	-0.0348***
	(0.00738)	(0.0121)	(0.00649)	(0.00733)
Urban 95 Henan	-0.0772***	-0.102***	-0.0432***	-0.0759***
	(0.00646)	(0.0102)	(0.00569)	(0.00643)
Urban 95 Hubei	0.0181***	0.00415	0.0493***	0.0178***
	(0.00671)	(0.0104)	(0.00614)	(0.00665)
Urban 95 Guangdong	0.0967***	0.115***	0.0821***	0.0910***
	(0.00733)	(0.0141)	(0.00606)	(0.00730)
Urban 95 Sichuan	-0.0103	-0.0117	0.0192***	-0.0157**
	(0.00631)	(0.0110)	(0.00562)	(0.00629)
Urban 95 Yunnan	-0.0172***	-0.0201**	0.0124**	-0.0191***
	(0.00639)	(0.00969)	(0.00570)	(0.00634)
Urban 95 Gansu	-0.0719***	-0.0971***	-0.0418***	-0.0717***
	(0.00745)	(0.0112)	(0.00677)	(0.00740)
Rural 02 Beijing	-0.0974***	-0.0842***	-0.0954***	-0.103***
	(0.0128)	(0.0316)	(0.00952)	(0.0128)
Rural 02 Hebei	-0.109***	-0.178***	-0.102***	-0.113***

	(0.01000)	(0.0302)	(0.00868)	(0.0100)
Rural 02 Shanxi	-0.113***	-0.192***	-0.103***	-0.117***
	(0.0110)	(0.0342)	(0.00925)	(0.0110)
Rural 02 Liaoning	-0.0570***	-0.0956***	-0.0437***	-0.0618***
	(0.00973)	(0.0267)	(0.00856)	(0.00974)
Rural 02 Jilin	-0.132***	-0.142***	-0.101***	-0.137***
	(0.00815)	(0.0185)	(0.00718)	(0.00816)
Rural 02 Jiangsu	-0.0413***	-0.0685***	-0.0456***	-0.0460***
	(0.00863)	(0.0202)	(0.00721)	(0.00863)
Rural 02 Zhejiang	-0.0566***	-0.0638***	-0.0540***	-0.0616***
	(0.00779)	(0.0150)	(0.00625)	(0.00778)
Rural 02 Anhui	-0.0558***	-0.0397**	-0.0533***	-0.0597***
	(0.00826)	(0.0172)	(0.00713)	(0.00827)
Rural 02 Jiangxi	-0.0337***	-0.0528**	-0.0118*	-0.0384***
	(0.00758)	(0.0262)	(0.00675)	(0.00758)
Rural 02 Shandong	-0.0603***	-0.0658***	-0.0514***	-0.0649***
	(0.00937)	(0.0240)	(0.00792)	(0.00938)
Rural 02 Henan	-0.111***	-0.128***	-0.0966***	-0.116***
	(0.0101)	(0.0296)	(0.00880)	(0.0101)
Rural 02 Hubei	-0.0674***	-0.126***	-0.0518***	-0.0723***
	(0.00847)	(0.0228)	(0.00753)	(0.00847)
Rural 02 Hunan	-0.0335***	-0.0434**	-0.0274***	-0.0386***
	(0.00791)	(0.0219)	(0.00662)	(0.00792)
Rural 02 Guangdong	0.0682***	0.0852**	0.0641***	0.0626***
	(0.00796)	(0.0420)	(0.00718)	(0.00797)
Rural 02 Sichuan	-0.00214	-0.0395**	0.00713	-0.00629
	(0.00787)	(0.0169)	(0.00695)	(0.00788)
Rural 02 Guizhou	-0.0404***	-0.0802***	-0.0105	-0.0446***
	(0.00892)	(0.0272)	(0.00803)	(0.00893)
Rural 02 Yunnan	0.110***	0.0844*	0.122***	0.106***
	(0.0111)	(0.0430)	(0.0103)	(0.0111)
Rural 02 Shaanxi	-0.164***	-0.201***	-0.143***	-0.169***
	(0.0100)	(0.0292)	(0.00869)	(0.0100)
Rural 02 Gansu	-0.0647***	-0.0771**	-0.0360***	-0.0687***
	(0.0110)	(0.0314)	(0.00987)	(0.0110)
Urban 02 Beijing	-0.0231***	0.0113	-0.00475	-0.0135**
	(0.00643)	(0.0120)	(0.00520)	(0.00664)
Urban 02 Shanxi	-0.0674***	-0.0676***	-0.0339***	-0.0608***
	(0.00674)	(0.0107)	(0.00604)	(0.00677)
Urban 02 Liaoning	-0.0241***	-0.0119	-0.0130**	-0.0146**
	(0.00623)	(0.0107)	(0.00520)	(0.00613)
Urban 02 Jiangsu	0.00565	-0.0157	-0.00465	0.0123*
	(0.00664)	(0.0109)	(0.00524)	(0.00658)

Urban 02 Anhui	-0.0243***	-0.0241**	-0.00997*	-0.0136**
	(0.00633)	(0.00965)	(0.00547)	(0.00635)
Urban 02 Henan	-0.0687***	-0.0725***	-0.0451***	-0.0497***
	(0.00625)	(0.00947)	(0.00523)	(0.00621)
Urban 02 Hubei	-0.0160**	-0.00854	-0.00377	-0.00553
	(0.00631)	(0.00978)	(0.00527)	(0.00626)
Urban 02 Guangdong	0.0424***	0.0779***	0.0310***	0.0533***
	(0.00810)	(0.0157)	(0.00663)	(0.00808)
Urban 02 Sichuan	-0.00787	-0.00740	0.00182	0.00381
	(0.00669)	(0.0120)	(0.00550)	(0.00666)
Urban 02 Yunnan	0.00470	0.00574	0.0124**	0.00445
	(0.00671)	(0.0109)	(0.00560)	(0.00667)
Urban 02 Gansu	-0.0562***	-0.0538***	-0.0485***	-0.0493***
	(0.00768)	(0.0132)	(0.00602)	(0.00763)
Constant	2.028***	2.271***	1.741***	2.019***
	(0.0184)	(0.0385)	(0.0174)	(0.0185)
Adjusted R^2	0.433	0.487	0.421	0.425
Observations	27145	5919	27466	27155

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

A.2 Rural sample

Table 21: Regression Table (OLS, robust errors)

	(1) M (EX)
Log of EX (ES-adj) with self-production	-0.105*** (0.00328)
Log of relative prices	-0.0267** (0.0107)
Adults	-0.0126*** (0.00113)
Children	0.0000972 (0.00141)
Elders	0.0126*** (0.00193)
Age head of household	0.000761*** (0.000137)
Rural 95 Hebei	0.0269** (0.0114)
Rural 95 Shanxi	-0.0102 (0.0129)
Rural 95 Liaoning	0.135*** (0.0138)
Rural 95 Jilin	0.100*** (0.0120)
Rural 95 Jiangsu	0.0995*** (0.0112)
Rural 95 Zhejiang	0.0741*** (0.0115)
Rural 95 Anhui	0.165*** (0.0113)
Rural 95 Jiangxi	0.212*** (0.0119)
Rural 95 Shandong	0.128*** (0.0111)
Rural 95 Henan	0.0736*** (0.0112)
Rural 95 Hubei	0.186*** (0.0114)
Rural 95 Hunan	0.213*** (0.0112)
Rural 95 Guangdong	0.129*** (0.0112)

Rural 95 Sichuan	0.249***
	(0.0107)
Rural 95 Guizhou	0.213***
	(0.0125)
Rural 95 Yunnan	0.258***
	(0.0122)
Rural 95 Shaanxi	0.0867***
	(0.0132)
Rural 95 Gansu	0.242***
	(0.0128)
Rural 02 Beijing	-0.0898***
	(0.0129)
Rural 02 Hebei	0.132***
	(0.0144)
Rural 02 Shanxi	0.0735***
	(0.0140)
Rural 02 Liaoning	0.213***
	(0.0130)
Rural 02 Jilin	0.250***
	(0.0127)
Rural 02 Jiangsu	0.132***
	(0.0130)
Rural 02 Zhejiang	0.0382***
	(0.0115)
Rural 02 Anhui	0.246***
	(0.0118)
Rural 02 Jiangxi	0.247***
	(0.0118)
Rural 02 Shandong	0.140***
	(0.0124)
Rural 02 Henan	0.193***
	(0.0126)
Rural 02 Hubei	0.222***
	(0.0123)
Rural 02 Hunan	0.193***
	(0.0113)
Rural 02 Guangdong	0.186***
	(0.0120)
Rural 02 Sichuan	0.271***
	(0.0109)
Rural 02 Guizhou	0.237***
	(0.0114)
Rural 02 Yunnan	0.364***

	(0.0124)
Rural 02 Shaanxi	0.0619***
	(0.0137)
Rural 02 Gansu	0.224***
	(0.0137)
Constant	1.265***
	(0.0304)
Adjusted R^2	0.323
Observations	15411

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

A.3 Urban sample

Table 22: Regression Table (OLS, robust errors)

	(1) M (EX)
Log of EX (ES-adj)	-0.219*** (0.00206)
Log of relative prices	0.0227 (0.0451)
Adults	-0.0425*** (0.00130)
Children	-0.0367*** (0.00194)
Elders	0.00994*** (0.00172)
Age head of household	0.00168*** (0.000122)
Urban 95 Shanxi	-0.109*** (0.00573)
Urban 95 Liaoning	-0.0332*** (0.00663)
Urban 95 Jiangsu	0.0212** (0.00880)
Urban 95 Anhui	-0.0365*** (0.0115)
Urban 95 Henan	-0.0878*** (0.00575)
Urban 95 Hubei	0.0226*** (0.00668)
Urban 95 Guangdong	0.109*** (0.0144)
Urban 95 Sichuan	-0.00527 (0.0102)
Urban 95 Yunnan	-0.0173*** (0.00561)
Urban 95 Gansu	-0.0841*** (0.00768)
Urban 02 Beijing	0.0223*** (0.00755)
Urban 02 Shanxi	-0.0571*** (0.00713)
Urban 02 Liaoning	-0.0118** (0.00545)

Urban 02 Jiangsu	0.00651
	(0.00595)
Urban 02 Anhui	-0.0120**
	(0.00584)
Urban 02 Henan	-0.0470***
	(0.00546)
Urban 02 Hubei	0.00468
	(0.00585)
Urban 02 Guangdong	0.0706***
	(0.0143)
Urban 02 Sichuan	0.0168
	(0.0103)
Urban 02 Yunnan	0.0132*
	(0.00745)
Urban 02 Gansu	-0.0601***
	(0.00794)
Constant	2.332***
	(0.0290)
Adjusted R^2	0.556
Observations	12026

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

B Relative Prices

Food price indexes are constructed from the food prices – using four common basic headings, namely cereals, vegetables, meat, and eggs[14]. We use the country product dummy method (Rao 2005) to aggregate the four basic heading food prices into one price for food. This produces food price indexes at household level in the rural case, and at province level for the urban case.

We have no information on non-food prices from the surveys. To overcome this limitation in the data, we apply information on non-food prices from the Price Statistical Yearbook of China (1992). This book incorporates a table of item prices for 29 cities, which are assumed to be representative of the remaining urban part of the province.

The same yearbook also includes a conversion table that expresses how farm products can be transformed into industry products. The conversion table can be interpreted as a food to non-food ratio for rural areas, and we use this to estimate rural non-food prices on a county level, again using the country product dummy method (Rao 2005)[15].

Finally, we price adjust the non-food indexes using the consumer price index (base year 1985) for urban and rural areas. The relative price control variable is constructed by combining the food price indexes from the survey and yearbook data with these non-food indexes.

[14] Whenever the basic headings include more than one good in a survey, we use the mean price per kilo over the subcategories as the basic heading price.

[15] As we have food prices for farm products in our data, this enables us to construct non-food prices. For instance, we have kilograms of wheat to kilos of soap. As we know the price of wheat per kg, we can use this ratio to approximate the price of soap for rural areas. We do this conversion for wheat, rice, sweet corn and eggs to each non-food item, and the non-food price is based on an average of these converted rates. The non-food to food items are textiles, soap, bicycles, black and white tv's and matches.

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