Review of Income and Wealth
Series 53, Number 1, March 2007

URBAN POVERTY IN CHINA AND ITS CONTRIBUTING FACTORS, 1986–2000

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Food price increases and the introduction of radical social welfare and enterprise reforms during the 1990s generated significant changes in the lives of urban households in China. During this period urban poverty increased considerably. This paper uses household level data from 1986 to 2000 to examine what determines whether households fall below the poverty line over this period and investigates how the impact of these determinants has changed through time. We find that large households and households with more nonworking members are more likely to be poor, suggesting that perhaps the change from the old implicit price subsidies, based on household size, to an explicit income subsidy, based on employment, has worsened the position of large families. Further investigation into regional poverty variation indicates that over the 1986–93 period food price increases were also a major contributing factor. Between 1994 and 2000 the worsening of the economic situation of state sector employees contributed to the poverty increase.

1. Introduction

Although income increases in urban China pushed the average household to higher living standards, economic circumstances among poor households may not have improved in the 1990s. For example, Gustafsson and Wei (2000), Khan and Riskin (2001), Xue and Wei (2003), and Meng *et al.* (2005) find that urban poverty increased considerably during this period.[1] There were many reasons for this. First, in the early 1990s price reform led to a significant increase in food prices, which play an important role in determining living standards of the poor. Second, acceleration of social welfare reform, which switched government provision of medical care, old age pensions, and highly subsidized education and housing to more reliance on individual provision, also put significant economic strains on low income groups. Third, poor households were particularly affected by enterprise restructuring, which increased the urban unemployment rate from 6 percent in 1993 to 12 percent in 2000 (Giles *et al.*, 2005; Knight and Xue, 2006).

Note: We would like to thank Terry Sicular, other participants at the WIDER 2005 Helsinki conference on "China Income and Poverty", two anonymous referees and the editor for very useful and constructive comments and suggestions. Financial support from the Australian Research Council is acknowledged.

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[1]The findings of Ravallion and Chen (2004), however, differ. They find extremely low poverty rates in urban China in the 1990s (the highest was in 1990 at 2.6 percent and the lowest was in 2000 at 0.54 percent).

Within this environment of rapid economic change, a range of questions naturally arise: Who are the urban poor? What are their important demographic, family and labor market characteristics? Has the impact of these characteristics on poverty changed over time and can the change of the impact be linked to the broad macro structural changes described above? This paper uses 1986 to 2000 urban household data from 15 provinces to address these questions.

The paper is structured as follows. The next section discusses factors that may have contributed to increased poverty. Section 3 describes the data and poverty measures. Section 4 searches for the determinants of poverty and explores how they changed during the 1990s. Section 5 concludes the paper.

2. Economic Restructuring and Social Welfare Reform in the 1990s

The 1990s saw the most radical economic restructuring in China since gradualist economic reform began in 1978. Three important reform measures may have contributed to the growth of poverty: food price, social welfare, and enterprise reforms.

Before reform, food prices in urban China were highly subsidized through a coupon ration system, whereby coupons were distributed according to the number of family members and their ages. In the late 1970s and early 1980s market orientated reforms in the agriculture sector led to significant increases in production and to the introduction of an urban two-tier food price system, in that urban households received subsidized food coupons but were also free to purchase better and more varieties of food in the market place. Gradually, however, the government increased subsidized food prices so that two-tier prices were almost equal to each other (Tang, 1998). When the government finally abolished food coupons in 1993, workers were compensated by an explicit wage subsidy at a universal rate. Households with more non-working members, however, were disadvantaged because food coupons had been distributed according to the number of household members and their ages, while the explicit wage subsidies were distributed only to household working members. In addition, financial help for transportation, rent, and many other consumption items were switched from implicit price subsidies to explicit income subsidies. All these changes would have had an adverse impact on large households with fewer working members.

Social welfare reform also begun in the late 1980s and early 1990s. By the mid 1990s, reform had gradually removed most of the public provision of subsidized low rent housing, free education, and free medical services. According to the Urban Income and Expenditure survey conducted by the National Statistical Bureau, medical, education, and housing expenditure as a share of total expenditure more than doubled between 1986 and 2000 for both average and poor (bottom 20 percentile income) households alike (see left and right panel of Figure 1, respectively). Furthermore, the government provided pension scheme was changed to a three pillar system, and individual contributions would eventually play the most important role. These reforms reduced "real" disposable incomes as households were increasingly faced with the need to provide for pensions and to pay higher prices for many services that had been previously provided for free or almost free.

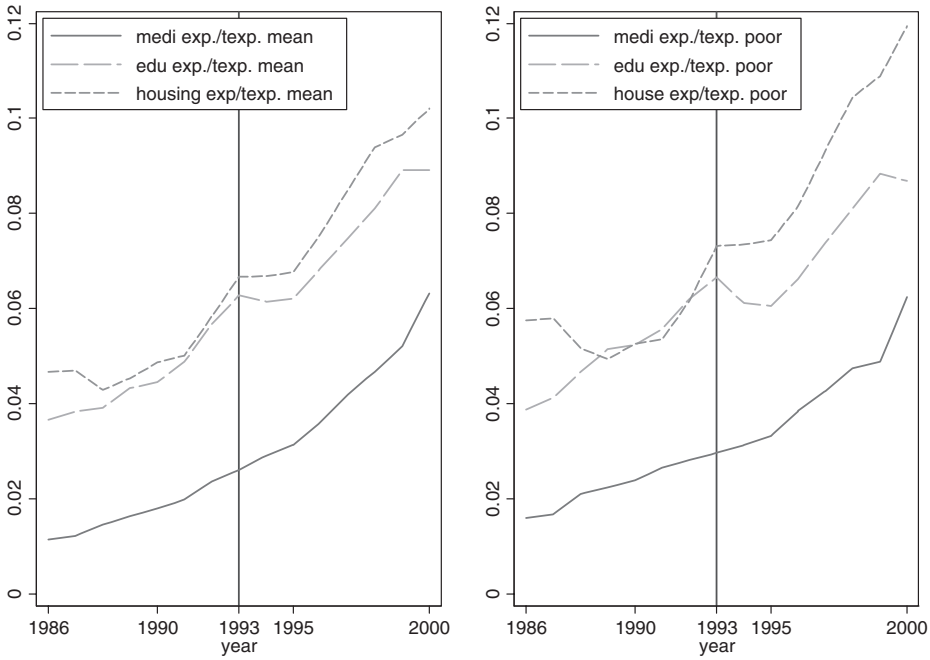


Figure 1. Medical, Education, and Housing Expenditure Shares of Total Expenditure

The third important reform involved state sector restructuring. State enterprises often made losses, and received substantial subsidies, but by the mid 1990s these losses quickly increased due to intensified competition from the non-state sector. In response, a reform policy was introduced and subsidies became more difficult to obtain. Many small and medium size state enterprises were bankrupted and those that survived began to take efficiency measures seriously. These two forces led to large-scale retrenchments. Between 1995 and 2001 around 43 million workers were laid off (Ministry of Labour and Social Security, 2002) and the urban unemployment rate doubled (Knight and Xue, 2006; Giles *et al.*, 2005). The poverty impact of the resultant unemployment is straightforward. However, there was an additional poverty effect which appeared in the form of arrears in wages, pensions, and medical reimbursement from loss making or bankrupted state enterprises. Based on a survey of five large cities (China Urban Labor Survey), Giles *et al.* (2006) estimated that in 2000, among employed workers aged 16–60, 11 percent experienced wage arrears and 22 percent experienced health insurance arrears. For retired workers, 11 percent had been subject to pension arrears and 30 percent had been subject to health insurance arrears.

To help offset increasing rates of urban poverty the government introduced the Urban "Di Bao" program (the minimum living allowance) toward the end of the period (1997–2000). "Di Bao" guaranteed a minimum income defined with respect to a local poverty line for individuals with urban registration (O'Keefe, 2004). The program was initially piloted in Shanghai in 1993. Later when it was

introduced to other regions it was not effectively enforced at the beginning and the degree of enforcement differed from region to region. It became national policy during 1997–99, and from 1999 it was fully implemented nationwide.

3. Data and Poverty Measure

We use the Urban Household Income and Expenditure Survey (UHIES) 1986–2000 to examine factors associated with household poverty. The UHIES began in 1956 and was resumed in 1980 after its suspension during the Cultural Revolution (Fang *et al.*, 2002). The survey samples households with Urban Household Registration for every province in the nation (29 provinces before 1990 and 30 after 1990 due to the newly established province "Hainan" in 1990).[2] The sample is based on several stratifications at the regional, provincial, county, city, town, and neighborhood community levels. The intention is to randomly select households within each chosen neighborhood community and these households are expected to keep a diary of all expenditures (disaggregated for hundreds of product categories) for each day for a full year. Enumerators visit sample households once or twice each month to review the records, assist the household with their questions, and to collect the household records for data entry in the local Statistical Bureau office (Han *et al.*, 1995; Fang *et al.*, 2002; Gibson *et al.*, 2003). The earliest electronic data available is from 1986. Gibson *et al.* (2003) argue that in recent years, in some regions, some households have been reluctant to participate in the surveys due to the falling value of the payment. This may make the sampling procedure less random, but the UHIES is still the most nationally representative urban household survey in China. We use data from 15 of the 29 provinces: Beijing, Shanxi, Liaoning, Heilongjiang, Shanghai, Jiangsu, Anhui, Jiangxi, Shandong, Henan, Hubei, Guangdong, Sichuan, Yunan, and Gansu. The total number of households ranges from 8,100 to 10,250.[3]

The poverty lines used in this study are calculated using various applications of the "cost-of-basic-needs" (CBN) method proposed by Ravallion (1994). The usual CBN poverty line used in the literature is to allow the CBN bundle in one year to differ by region, and, keeping each regional CBN bundle fixed through time, adjust it by a regional CPI deflator (see, for example, Ravallion and Chen, 2004). This approach is often supported by the argument that it is desirable to keep a fixed bundle of goods through time to measure absolute poverty. But the exceptional circumstances associated with Chinese economic reforms over this period lead us to adopt different approaches.[4]

One of the approaches adopted is to apply the CBN method to calculate a poverty line *for each province and each year* over the data period (labeled as "varying

[2]The UHIES excludes rural migrants in cities. As rural migrants disproportionately constitute the lower end of the income distribution, excluding them will result in an underestimate of urban poverty. This should be borne in mind when interpreting the results.

[3]The UHIES questionnaire changed three times during the data period (1988, 1992, and 1997), with the introduction of more detailed food categories in 1992 being the most relevant change for this study. Before 1992, 39 food items were included in the expenditure questions. Since 1992 the number was increased to 112. Consequently, some discontinuity in the data series may occur.

[4]For detailed discussion on this issue, see Meng *et al.* (2005).

weight CBN poverty line"). The implications of this poverty line calculations are two-fold. First, we allow the poor (refering to the poorest 20% of the population) in each region, and over time, to change the pattern of food consumption in response to changes in food availability and prices. Second, we allow the poor to substitute non-food necessities for food in response to reforms which significantly raised prices of many non-food necessities such as education, healthcare and housing. Poverty lines calculated in this manner are not based on a fixed basket of goods.

The other approach is to use a "chained weight CBN poverty line." For each region we calculate the food poverty line (cost of 2,100 calories for the lowest 20 percent income group) and a non-food poverty line (as used in the normal CBN poverty line calculation) at the beginning of the period and adjust them, within a four year period, by the grain price index (for food poverty line) and the CPI (for non-food poverty line), respectively. For the fifth year, we recalculate the food and non-food poverty lines and perform the same deflating adjustment for the next four years. We apply this procedure for the rest of the period. This procedure can be thought of as being similar to using a Chained Laspeyres index. This poverty line allows the poor to change their pattern of food consumption and to substitute between food and non-food every five years.[5]

Once the poverty lines are estimated we calculate the proportion of sample population whose per capita income or expenditure is under the poverty lines for each province and each year (a headcount index). This index is calculated in two ways: an income measure, those with per capita income less than the poverty line; and an expenditure measure, those with per capita expenditure less than the poverty line. We present these indices in Figure 2. They show that while the poverty rate, as measured by expenditure, is lower than the poverty line measured by income, the changes over time are very similar. Poverty increased from 1990, reached a peak in 1993, and then remained at a high level for most of the 1990s. Poverty began falling from 1998, coinciding with the national implementation of the Di Bao program. The results are similar if we adopt the "chained weight CBN poverty line," with the exception that it peaks at 1995 rather than 1993. However, 1992–93 still exhibits the highest one year poverty increment.

We also examine the severity of poverty at each point in time using the "varying weight CBN line" only.[6] Panel 1 of Figure 3 shows the estimated mean poverty line and mean total expenditure of those below the poverty line. The gap between the two lines seems to have widened. Panel 2 of Figure 3 presents the

[5]There are a number of important issues that should be borne in mind when applying the CBN method. For example, we use unit values for food prices faced by the poor to calculate the cost of buying 2,100 calories. The use of unit values as price proxies may produce biases caused by quality variations and measurement errors (see, for example, Deaton, 1988, 1990). In addition, Capéau and Dercon (2006) and Gibson and Rozelle (2005) show that for poor rural villages in Ethiopia and Papua New Guinea, unit values may overstate prices faced by the rural poor and suggest that rural poverty may be overstated by as much as 20 percent. The extent to which this problem in rural data collections applies to urban China, where the data have been collected by a year long continuous diary (checked each month by authorities from the statistical bureau), is unknown. The unit values used in this section are calculated for the bottom 20 percent of households in the expenditure distribution. Section 4.3 explores regional variations in poverty and uses average unit values for each province.

[6]The results using the "chained weight CBN line" are similar and are available upon request from the authors.

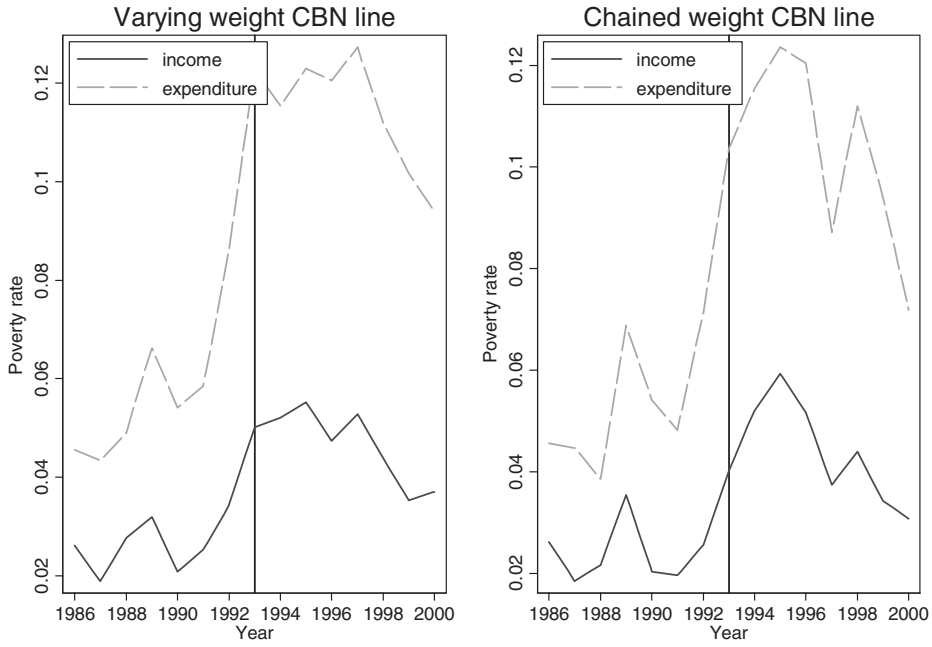


Figure 2. Poverty Headcount Index

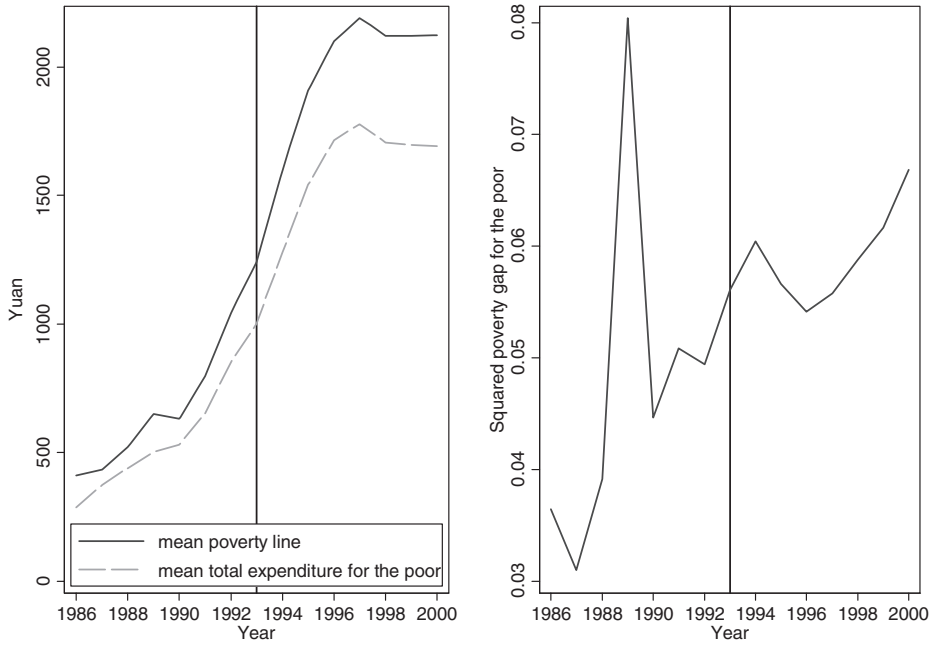


Figure 3. Severity of Poverty

squared povertygap,[7] which illustrates even more clearly that the severity of poverty has increased more or less continuously since 1988, with the exception of 1989–90. On average, the squared poverty gap for the poor is much higher for the 1990s than for the 1980s and it is higher for the late 1990s than for the early 1990s.

Summary statistics by poverty status for each of the 15 years are presented in Appendix A. We find that poor households on average are larger, less educated, have fewer members working, more members working as laborers, significantly fewer members working as professionals or government/enterprise officials, more children aged 15 and below, and more elderly female members.

4. Methodology and Empirical Results

We examine two questions: what determines whether a household falls below the poverty line, and has the importance of these determinants changed over time? Initially we proceed in two ways. One way is to estimate the following probit model for each survey year:

$$P_{ij} = X'\beta + \upsilon_j + \varepsilon_i \tag{1}$$

where P_{ij} indicates whether per capita expenditure of household i in province j is below the poverty line for the province and survey year. X is a vector of observable characteristics which may be related to household income or other factors affecting poverty, υ is a vector of provincial fixed effects, and ε is a standard normal error term.

The other way is to follow Datt and Jolliffe (2005) and Gibson and Rozelle (2003) and utilize the consumption variable directly.[8] Their approach may be summarized as follows.

$$\ln\left(\frac{c_{ij}}{z_j}\right) = X'\beta + \upsilon_j + \varepsilon_i \tag{2}$$

where the dependent variable is log nominal per capita consumption expenditure of household i in province j, deflated by provincial specific poverty lines, z_j. Normalizing household per capita consumption by the poverty line indicates

[7]Note that the squared poverty gap (SPG) calculated here is for households under poverty only. The formula for the calculation is: $SPG = \frac{\sum_{i=1}^{Q}[(Z - Y_i)/Z]^2}{Q}$, where Q is the total number of households whose per capita total expenditure is under the poverty line Z.

[8]Ravallion (1996) has criticized using a dichotomous variable (whether a household's per capita expenditure is below the poverty line) to analyze poverty determinants when the underlying continuous variable (expenditure) is available. His criticism is mainly related to the inefficiency of suppressing information on the degree to which households' living standards are above or below the poverty line. He is also concerned with the use of a non-linear probit model estimation which requires more assumptions than the OLS estimation of the underlying consumption variable. Datt and Jolliffe (2005) and Gibson and Rozelle (2003) have followed Ravallion (1996) and developed this empirical approach.

that any household whose $\ln\left(\frac{\hat{c}_{ij}}{z_j}\right) < 0$ is living below the poverty line and the probability of the household being poor can be derived from the following equation:

$$prob\left[\ln\left(\frac{c_{ij}}{z_j}\right)\right] < 0 = \Phi\left[\frac{\left(-X'\hat{\beta}\right)}{\hat{\sigma}}\right] \tag{3}$$

where $\Phi[\bullet]$ is the standard normal cumulative density function, and $\hat{\sigma}$ is the standard error of the regression. Using estimated results from equation (2), we can simulate the marginal effect of one unit change in X on the change in the probability of being poor.

We find no significant difference in the estimated results from the two methods presented above. So, after discussing the results, attention is focused on equation (1) because it leads naturally to a probit decomposition procedure proposed by Doiron and Riddell (1994) to quantify the changing impact of different variables over time. Their decomposition of the difference in the probabilities of falling below the poverty line between any two years can be written as:

$$\Phi_t\left(\tilde{X}_t^k\hat{\beta}_t^k\right) - \Phi_{t+n}\left(\tilde{X}_{t+n}^k\hat{\beta}_{t+n}^k\right) \simeq \frac{\partial\Phi(\varphi)}{\partial\varphi}\left(\tilde{X}_t^k\hat{\beta}_t^k - \tilde{X}_{t+n}^k\hat{\beta}_{t+n}^k\right) \tag{4}$$

where subscript t indicates the year of the survey and k is the number of variables included in the probit estimation. The first term on the right hand side of equation (4) is the normal probability density function evaluated at the point φ, while the second term is a linear function of characteristics and coefficients.

The X vector used in this study includes household size, age and gender of the household head, years of schooling of household head and spouse, the proportion of household members who are working and their occupational distributions. Household composition variables, such as the proportion of household members who are male and household members' age and gender distributions are also included. Finally, as income and price variations across different regions in China have always been high and persistent, fixed provincial effects are included. We loosely group our variables into economic reform (household size and proportion of household members who are working), human capital, and regional dispersion effects.

4.1. *Determinants of Poverty at the Household Level*

The estimated results from equations (1) and (2) using "varying weight CBN line" measured poverty as the dependent variable are reported in Tables 1 and 2, respectively. Table 1 gives the marginal effects obtained from the probit estimation of whether a household has a per capita expenditure below the poverty line, while Table 2 reports the OLS coefficients from the log per capita expenditure equation. The results from the two tables are very consistent, but because of the different dependent variables used, the signs are opposite and the magnitudes are different. All standard errors are adjusted for the clustered nature of the sample. We

TABLE 1

SELECTED RESULTS OF ESTIMATED EQUATION (1) DEPENDENT VARIABLE: DUMMY FOR BEING POOR

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Household size	0.002	0.007	0.008	0.010	0.011	0.017	0.027	0.043	0.038	0.049	0.048	0.051	0.046	0.041	0.034
	(0.000)***	(0.001)***	(0.001)***	(0.002)***	(0.002)***	(0.003)***	(0.004)***	(0.006)***	(0.005)***	(0.006)***	(0.005)***	(0.005)***	(0.005)***	(0.004)***	(0.004)***
HH age	−0.001	−0.004	−0.004	−0.002	−0.004	−0.009	−0.013	−0.025	−0.014	−0.022	−0.022	−0.015	−0.018	−0.017	−0.013
	(0.000)***	(0.001)***	(0.001)***	(0.002)	(0.001)***	(0.002)***	(0.003)***	(0.005)***	(0.004)***	(0.005)***	(0.003)***	(0.004)***	(0.003)***	(0.003)***	(0.003)***
HH gender	0.002	0.004	0.005	0.005	0.001	0.006	0.014	0.037	0.027	0.027	0.021	0.033	0.026	0.028	0.021
	(0.001)***	(0.002)*	(0.002)***	(0.003)**	(0.002)	(0.002)**	(0.005)***	(0.008)***	(0.005)***	(0.008)***	(0.006)***	(0.006)***	(0.005)***	(0.005)***	(0.005)***
HH years of schooling	−0.001	−0.001	−0.002	−0.001	−0.003	−0.003	−0.004	−0.007	−0.010	−0.012	−0.011	−0.008	−0.011	−0.010	−0.008
	(0.000)***	(0.000)	(0.001)***	(0.001)*	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.001)***	(0.001)***
Spouse years of schooling	0.000	−0.001	−0.001	−0.002	−0.001	−0.002	−0.003	−0.006	−0.005	−0.006	−0.006	−0.008	−0.005	−0.004	−0.004
	(0.000)**	(0.000)**	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***
% of members are working	−0.013	−0.043	−0.053	−0.079	−0.044	−0.080	−0.090	−0.142	−0.106	−0.147	−0.137	−0.125	−0.106	−0.070	−0.067
	(0.002)***	(0.006)***	(0.008)***	(0.013)***	(0.007)***	(0.011)***	(0.013)***	(0.019)***	(0.014)***	(0.021)***	(0.015)***	(0.017)***	(0.016)***	(0.015)***	(0.012)***
% as managerial	−0.001	−0.009	−0.007	−0.020	−0.008	−0.014	−0.032	−0.047	−0.027	−0.024	−0.019	−0.034	−0.031	−0.045	−0.036
	(0.002)	(0.006)	(0.007)	(0.009)**	(0.007)	(0.010)	(0.013)**	(0.019)**	(0.014)*	(0.018)	(0.016)	(0.019)*	(0.018)*	(0.012)***	(0.014)**
% as clerks	0.000	0.004	0.001	−0.004	0.005	0.004	0.014	0.018	0.030	0.027	0.021	0.019	0.013	0.004	−0.008
	(0.001)	(0.004)	(0.004)	(0.005)	(0.004)	(0.006)	(0.009)	(0.012)	(0.012)**	(0.013)**	(0.013)*	(0.014)	(0.010)	(0.007)	(0.010)
% as retail/ wholesale trade	0.007	0.019	0.022	0.014	0.021	0.021	0.036	0.088	0.067	0.085	0.071	0.086	0.060	0.053	0.055
	(0.002)***	(0.004)***	(0.005)***	(0.006)**	(0.004)***	(0.007)***	(0.009)***	(0.016)***	(0.011)***	(0.014)***	(0.016)***	(0.017)***	(0.012)***	(0.010)***	(0.009)***
% as service workers	0.005	0.027	0.015	0.018	0.008	0.007	0.024	0.023	0.043	0.062	0.068	0.052	0.042	0.050	0.045
	(0.002)***	(0.005)***	(0.005)***	(0.007)**	(0.006)	(0.011)	(0.009)**	(0.017)	(0.011)***	(0.019)***	(0.018)***	(0.015)***	(0.012)***	(0.011)***	(0.010)***
% as production workers	0.002	0.008	0.007	0.009	0.014	0.008	0.017	0.031	0.034	0.046	0.041	0.040	0.025	0.031	0.024
	(0.001)**	(0.003)**	(0.004)*	(0.004)**	(0.004)***	(0.005)	(0.008)**	(0.012)**	(0.008)***	(0.011)***	(0.009)***	(0.011)***	(0.010)***	(0.008)***	(0.007)***
% as other laborers	0.007	0.011	0.028	0.028	0.030	0.043	0.034	0.108	0.051	0.103	0.093	0.092	0.053	0.065	0.066
	(0.003)***	(0.008)	(0.006)***	(0.009)***	(0.007)***	(0.010)***	(0.017)**	(0.032)***	(0.014)***	(0.026)***	(0.029)***	(0.032)***	(0.025)**	(0.015)***	(0.021)***
% of members are males	−0.002	−0.003	−0.001	−0.006	0.015	0.013	0.004	0.014	0.007	−0.003	0.004	0.024	−0.005	0.001	0.025
	(0.002)	(0.005)	(0.005)	(0.007)	(0.005)***	(0.009)	(0.013)	(0.014)	(0.016)	(0.017)	(0.014)	(0.016)	(0.013)	(0.011)	(0.013)*
% are children 0–5	0.001	0.005	0.053	0.093	0.035	0.054	0.083	0.116	0.100	0.095	0.142	0.141	0.084	0.061	0.074
	(0.004)	(0.010)	(0.010)***	(0.018)***	(0.011)***	(0.015)***	(0.023)***	(0.028)***	(0.026)***	(0.032)***	(0.033)***	(0.033)***	(0.027)***	(0.028)**	(0.030)**
% are children 6–10	0.009	0.003	0.034	0.051	0.028	0.033	0.053	0.104	0.098	0.050	0.081	0.111	0.071	0.036	0.043
	(0.003)***	(0.007)	(0.008)***	(0.013)***	(0.009)***	(0.014)**	(0.020)***	(0.029)***	(0.023)***	(0.028)*	(0.027)***	(0.028)***	(0.024)***	(0.019)*	(0.024)*
% are children 11–15	0.004	0.010	0.032	0.053	0.024	0.038	0.027	0.048	0.038	0.036	−0.004	0.042	0.016	0.024	0.046
	(0.002)*	(0.006)*	(0.007)***	(0.012)***	(0.007)***	(0.012)***	(0.016)	(0.022)**	(0.020)**	(0.023)	(0.021)	(0.023)*	(0.020)	(0.018)	(0.019)**
% are female 16–20	0.001	−0.006	0.038	0.046	0.024	0.023	0.039	0.075	0.071	0.056	0.073	0.057	0.053	−0.004	0.056
	(0.004)	(0.009)	(0.011)***	(0.015)***	(0.009)***	(0.016)	(0.020)*	(0.035)**	(0.022)***	(0.033)*	(0.032)**	(0.029)**	(0.028)*	(0.024)	(0.022)**
% are male 16–20	−0.004	−0.018	0.025	0.071	0.025	0.034	0.073	0.076	0.108	0.051	0.069	0.066	0.031	0.032	0.009
	(0.004)	(0.011)	(0.010)***	(0.016)***	(0.009)***	(0.014)**	(0.021)***	(0.032)**	(0.026)***	(0.034)	(0.025)***	(0.030)**	(0.024)	(0.023)	(0.026)
% are male >65	−0.002	0.003	0.010	−0.033	−0.022	−0.007	−0.002	0.047	−0.037	−0.024	−0.087	−0.105	−0.072	−0.066	−0.050
	(0.003)	(0.009)	(0.013)	(0.017)**	(0.013)*	(0.018)	(0.033)	(0.031)	(0.028)	(0.026)	(0.039)**	(0.031)***	(0.028)***	(0.022)***	(0.024)**
% are female >65	0.007	0.011	0.029	0.027	0.023	0.037	0.050	0.084	0.045	0.029	0.086	0.070	0.090	0.060	0.020
	(0.003)**	(0.007)	(0.008)***	(0.014)*	(0.011)**	(0.014)***	(0.019)***	(0.041)**	(0.022)**	(0.028)	(0.032)***	(0.037)*	(0.033)***	(0.023)***	(0.023)
Regional effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	8,084	7,698	7,948	6,948	7,581	7,692	9,341	9,824	9,991	9,999	10,000	9,999	10,000	10,000	9,999
Adjusted R^2	0.26	0.24	0.27	0.26	0.28	0.23	0.22	0.19	0.22	0.19	0.17	0.18	0.19	0.21	0.20

Note:
Cluster adjusted robust standard errors in parentheses.
*Significant at 10%; **significant at 5%; ***significant at 1%.

TABLE 2

SELECTED RESULTS OF ESTIMATED EQUATION (2) DEPENDENT VARIABLE: LOG PER CAPITA EXPENDITURE DEFLATED BY POVERTY LINE

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Household size	−0.078	−0.089	−0.110	−0.116	−0.129	−0.139	−0.126	−0.139	−0.147	−0.143	−0.143	−0.142	−0.149	−0.163	−0.162
	(0.008)***	(0.008)***	(0.006)***	(0.007)***	(0.006)***	(0.008)***	(0.010)***	(0.013)***	(0.013)***	(0.014)***	(0.014)***	(0.010)***	(0.013)***	(0.014)***	(0.011)***
HH age	0.063	0.068	0.039	0.029	0.044	0.057	0.050	0.063	0.059	0.050	0.054	0.043	0.053	0.060	0.066
	(0.007)***	(0.008)***	(0.007)***	(0.008)***	(0.008)***	(0.009)***	(0.008)***	(0.012)***	(0.010)***	(0.009)***	(0.008)***	(0.008)***	(0.008)***	(0.009)***	(0.010)***
HH gender	−0.053	−0.060	−0.051	−0.029	−0.046	−0.024	−0.047	−0.075	−0.074	−0.056	−0.058	−0.073	−0.099	−0.095	−0.099
	(0.010)***	(0.011)***	(0.010)***	(0.013)**	(0.012)***	(0.010)**	(0.010)***	(0.014)***	(0.013)***	(0.013)***	(0.011)***	(0.012)***	(0.012)***	(0.012)***	(0.016)***
HH years of schooling	0.017	0.018	0.015	0.014	0.018	0.014	0.018	0.024	0.026	0.028	0.027	0.026	0.032	0.034	0.038
	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.003)***	(0.003)***	(0.002)***	(0.002)***	(0.003)***	(0.002)***	(0.003)***	(0.003)***
Spouse years of schooling	0.000	0.000	0.013	0.009	0.013	0.012	0.009	0.013	0.015	0.014	0.015	0.016	0.016	0.015	0.019
	(0.001)	(0.002)	(0.001)***	(0.002)***	(0.002)***	(0.001)***	(0.001)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***
% of member are working	0.235	0.229	0.495	0.429	0.372	0.360	0.319	0.309	0.362	0.368	0.310	0.259	0.262	0.313	0.336
	(0.029)***	(0.029)***	(0.030)***	(0.036)***	(0.024)***	(0.029)***	(0.027)***	(0.027)***	(0.031)***	(0.026)***	(0.027)***	(0.030)***	(0.026)***	(0.034)***	(0.033)***
% as managerial	0.108	0.108	0.050	0.070	0.061	0.062	0.055	0.070	0.098	0.061	0.062	0.092	0.104	0.107	0.115
	(0.021)***	(0.022)***	(0.025)**	(0.028)**	(0.020)***	(0.019)***	(0.026)**	(0.025)***	(0.022)***	(0.027)**	(0.024)**	(0.030)***	(0.027)***	(0.034)***	(0.032)***
% as clerks	−0.022	−0.019	−0.051	−0.043	−0.076	−0.062	−0.072	−0.072	−0.091	−0.083	−0.071	−0.072	−0.063	−0.051	−0.055
	(0.017)	(0.018)	(0.018)***	(0.024)*	(0.019)***	(0.019)***	(0.018)***	(0.019)***	(0.022)***	(0.019)***	(0.020)***	(0.017)***	(0.019)***	(0.025)**	(0.028)*
% as retail/ wholesale trade	−0.160	−0.142	−0.184	−0.138	−0.196	−0.205	−0.212	−0.207	−0.277	−0.256	−0.233	−0.254	−0.254	−0.274	−0.288
	(0.032)***	(0.032)***	(0.028)***	(0.036)***	(0.029)***	(0.026)***	(0.027)***	(0.028)***	(0.031)***	(0.035)***	(0.031)***	(0.035)***	(0.027)***	(0.029)***	(0.034)***
% as service workers	−0.112	−0.149	−0.126	−0.087	−0.101	−0.106	−0.144	−0.082	−0.164	−0.215	−0.167	−0.175	−0.175	−0.202	−0.238
	(0.025)***	(0.032)***	(0.033)***	(0.039)**	(0.036)***	(0.035)***	(0.029)***	(0.028)***	(0.029)***	(0.030)***	(0.034)***	(0.020)***	(0.028)***	(0.035)***	(0.032)***
% as production workers	−0.064	−0.046	−0.098	−0.090	−0.086	−0.069	−0.112	−0.101	−0.164	−0.155	−0.122	−0.137	−0.150	−0.179	−0.177
	(0.017)***	(0.020)**	(0.018)***	(0.022)***	(0.018)***	(0.017)***	(0.018)***	(0.021)***	(0.019)***	(0.020)***	(0.016)***	(0.020)***	(0.023)***	(0.029)***	(0.024)***
% as other laborers	−0.143	−0.089	−0.362	−0.284	−0.200	−0.270	−0.210	−0.299	−0.227	−0.193	−0.190	−0.179	−0.184	−0.236	−0.287
	(0.035)***	(0.045)**	(0.044)***	(0.044)***	(0.055)***	(0.059)***	(0.060)***	(0.081)***	(0.046)***	(0.065)***	(0.054)***	(0.054)***	(0.059)***	(0.049)***	(0.081)***
% of members are males	0.033	0.058	−0.010	0.017	−0.049	−0.056	−0.041	−0.045	−0.043	−0.035	−0.014	−0.002	−0.044	−0.020	−0.091
	(0.023)	(0.036)	(0.027)	(0.028)	(0.028)*	(0.025)**	(0.024)*	(0.027)	(0.026)	(0.026)	(0.025)	(0.026)	(0.028)	(0.029)	(0.037)**
% are children 0–5	−0.175	−0.062	−0.654	−0.604	−0.414	−0.456	−0.507	−0.364	−0.354	−0.401	−0.407	−0.475	−0.402	−0.323	−0.333
	(0.054)***	(0.085)	(0.054)***	(0.064)***	(0.061)***	(0.059)***	(0.054)***	(0.055)***	(0.061)***	(0.061)***	(0.066)***	(0.063)***	(0.063)***	(0.057)***	(0.069)***
% are children 6–10	−0.424	−0.341	−0.436	−0.454	−0.386	−0.364	−0.366	−0.388	−0.295	−0.310	−0.292	−0.358	−0.327	−0.261	−0.243
	(0.046)***	(0.051)***	(0.049)***	(0.056)***	(0.054)***	(0.051)***	(0.039)***	(0.056)***	(0.060)***	(0.039)***	(0.047)***	(0.054)***	(0.053)***	(0.053)***	(0.053)***
% are children 11–15	−0.377	−0.340	−0.477	−0.436	−0.342	−0.322	−0.318	−0.241	−0.182	−0.191	−0.137	−0.231	−0.205	−0.207	−0.170
	(0.046)***	(0.051)***	(0.039)***	(0.045)***	(0.043)***	(0.045)***	(0.039)***	(0.046)***	(0.055)***	(0.040)***	(0.040)***	(0.044)***	(0.041)***	(0.044)***	(0.054)***
% are female 16–20	−0.124	−0.002	−0.403	−0.361	−0.284	−0.371	−0.346	−0.279	−0.260	−0.247	−0.235	−0.258	−0.278	−0.166	−0.212
	(0.061)**	(0.061)	(0.057)***	(0.055)***	(0.059)***	(0.052)***	(0.053)***	(0.057)***	(0.053)***	(0.061)***	(0.055)***	(0.055)***	(0.055)***	(0.051)***	(0.057)***
% are male 16–20	−0.079	−0.040	−0.439	−0.493	−0.396	−0.387	−0.375	−0.318	−0.295	−0.268	−0.196	−0.274	−0.141	−0.238	−0.050
	(0.066)	(0.055)	(0.054)***	(0.055)***	(0.057)***	(0.055)***	(0.047)***	(0.062)***	(0.053)***	(0.065)***	(0.055)***	(0.068)***	(0.055)**	(0.053)***	(0.067)
% are male >65	−0.151	−0.117	−0.079	−0.074	−0.031	−0.053	−0.048	−0.078	−0.034	0.013	0.028	0.028	0.016	0.055	0.047
	(0.052)***	(0.058)**	(0.068)	(0.061)	(0.057)	(0.060)	(0.071)	(0.057)	(0.042)	(0.040)	(0.061)	(0.058)	(0.049)	(0.042)	(0.047)
% are female >65	−0.348	−0.280	−0.288	−0.218	−0.200	−0.287	−0.252	−0.242	−0.167	−0.220	−0.172	−0.201	−0.219	−0.127	−0.057
	(0.043)***	(0.050)***	(0.059)***	(0.053)***	(0.055)***	(0.051)***	(0.040)***	(0.057)***	(0.060)***	(0.052)***	(0.064)***	(0.054)***	(0.054)***	(0.059)**	(0.056)
Regional effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	8,078	7,698	7,946	7,147	7,580	7,692	9,991	9,824	9,991	9,999	10,000	9,999	10,000	10,000	9,999
R^2	0.37	0.3	0.36	0.36	0.32	0.34	0.46	0.32	0.39	0.3	0.27	0.26	0.28	0.27	0.3

Notes:
Cluster adjusted robust standard errors in parentheses.
*Significant at 10%; **significant at 5%; ***significant at 1%.

also estimate the two equations using the "chained weight CBN line" measured poverty as the dependent variable and the results are also very similar to those presented here.[9]

The marginal effects for a group of selected important variables from equation (1) are presented in the first panel of Figure 4.[10] The second panel of Figure 4 shows the simulated marginal effects for the same set of variables using estimated results from equation (2).[11] The trends of the change in the marginal effect for all the variables are remarkably similar across the two estimation procedures. The magnitude difference at each point in time is mainly due to the difference in the estimation procedure, the evaluating point, and the difference in the choice of the marginal effect as indicated in footnote 11.

Since both estimation procedures provide consistent trends and the results from Table 1 are more intuitive, the discussion below focuses on Table 1. The model (probit estimation of equation (1)) performs fairly well, considering the low variation in the dependent variable, with pseudo R^2 being around 0.20 for each of the 15 years.[12]

First, we consider the effects of the changing influence of household composition characteristics. One important finding is that household size has a strong positive effect on the probability of a household being poor. The effect increases dramatically from 0.2 percent in 1986 to 4.3 percent in 1993, further increases to 5.1 percent in 1997, and then reduces to 3.4 percent in 2000.[13] The year-by-year increment is highest during 1992 to 1993 when food coupons were abolished. The increasing household size effect continued slowly until 1998 when the Di Bao (Minimum Living Allowance) program was implemented. After this the household size effect began to decline. We also observe that the proportion of household members who are working is associated with poverty reduction and this effect increased the most in 1993. The effects of household size and proportion of household members working are related and the changing pattern in the effect of these two variables may be associated with macro-economic policy changes during this period. As we know, food coupons were distributed according to the number of household members and their age, but after the abolition of food coupons compensation was only provided to the working population via a wage

[9]These results are not presented here but are available upon request from the authors. We do, however, present the plots of some of the important coefficients in Appendix B. There is a close similarity between Appendix B and Figure 4.

[10]Note that most of the coefficients presented in Figure 4 are statistically significant.

[11]Practically, we first estimate the predicted baseline average probability of being poor from equation (3). Second, we recalculate the same predicted average probability of being poor with an one unit increment for one of the explanatory variables (note that the unit chosen is arbitrary; the increment for all the percentage variables in Figure 4 is chosen to be a 30 percent increase). Finally, we take the difference between the baseline average poverty rate and the poverty rate with the additional increase in a particular variable, and this gives us the simulated marginal effects.

[12]F-tests are conducted to test whether these regressions can be pooled. The test results reject the null hypothesis in most cases. Furthermore, most coefficients for the early years are statistically significantly different from coefficients at the middle and end of the 1990s.

[13]The coefficient differences between the late 1980s and 1993 and any year after 1993 are statistically significant at the 5 percent level.

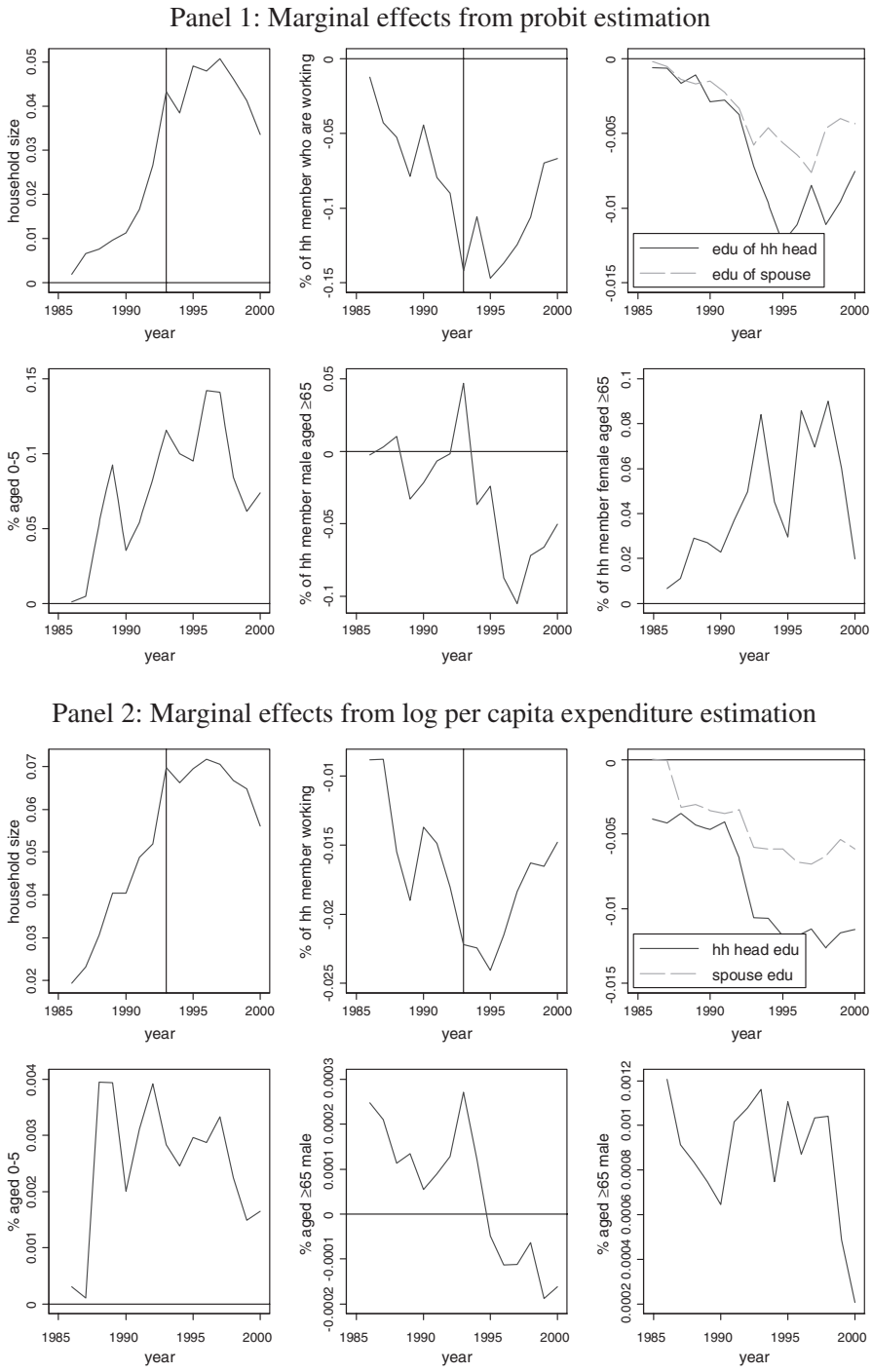


Figure 4. Change in Poverty Determinants

increase. Thus, households with proportionally fewer employed members might be worse off.[14]

A similar effect to the food coupon compensation applies to many non-food products, such as transportation, rental, and medical care. In the 1980s when price subsidies were in place, larger households received more of these subsidies. But once again compensation for the price reforms was paid through the wage system and available only to those employed. This is probably why the effects on poverty of household size and the percent of working members continues throughout the mid to late 1990s as price and social welfare reforms proceeded. We also find that households with a higher proportion of children are more likely to be poor, suggesting that households with more children were disproportionately hit by the switch from the price subsidy system to wage adjustments. More elderly male members reduces poverty (mostly in the last four years of our data) while more elderly females increases poverty, perhaps because elderly males are more likely to have worked and currently enjoy a state pension while elderly females are less likely to have a pension.

Next we turn to human capital effects. We find that more human capital (years of schooling of the household heads and their spouses) reduces poverty and this effect increases over time. This, to a large extent, reflects the increasing labor market returns to education. Zhang *et al.* (2005) find a considerable increase in return to education for the same period. There is, however, a slight trend reversal towards the end of the period, mainly since 1998. Another important finding related to labor market returns is that relative to having more professionals, households with more production or service workers are increasingly more likely to be poor, suggesting that the earnings gap between high and low paid occupations has increased over time.

Finally, the effect of regional variation seems to have increased over time and we discuss this result in a later section (Figure 5 plots the coefficients for regional dummy variables for each of the 15 years).

4.2. *Change of Poverty Determinants Over Time*

In this sub-section we combine changes in coefficients and household characteristics to put into perspective the changing significance of poverty determinants over time. From Figure 4 it is apparent that the data period can be divided into two, with the division year being 1993. Thus, we employ equation (4) to decompose the poverty change between 1986–93, and 1993–2000. During the first period, the proportion of households who lived under the poverty line increased significantly from 3 to 11 percent, while in the second period it reduced slightly from 11 to 8 percent.[15]

[14]This effect could be best understood by an example. Imagine two households, both with five members. Household A has one working member who earns ¥500 a month and Household B has five working members, each of whom earns ¥100 a month. With food coupons both households were equally well off but when the wage compensation is introduced, say at the rate of ¥10 per worker per month, Household A's income increases to ¥510, while Household B's income increases to ¥550. Household A is now more likely to be poor than Household B, relative to the coupon environment.

[15]These poverty rates refer to households. Those in Figure 2 are headcount indices (calculated for individuals).

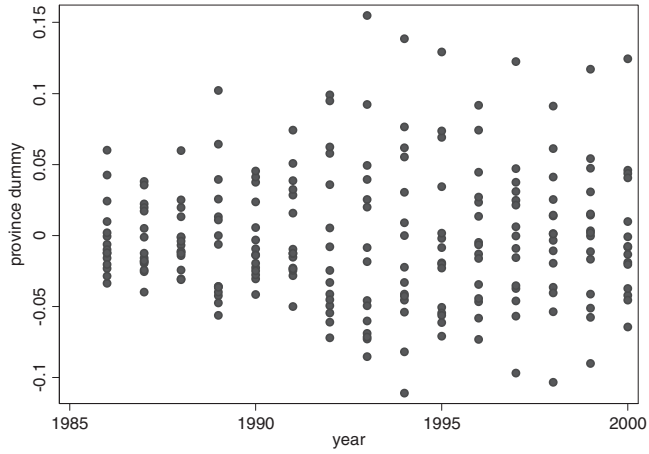


Figure 5. Regional Variation in Poverty Determination

To implement a decomposition using equation (4) we need to choose the endowments of a representative household at each of the two points in time and an evaluation point φ on the density function. Due to the non-linear nature of the probit model, and the low probability of being poor, the representative households are not sample means, hence the following adjustment is taken to adjust the sample mean to the endowments for the representative households:

$$\tilde{X}_t^k = \overline{X_j^k}\left[\frac{\Phi^{-1}\left(\overline{\widehat{\Pr}}\right)}{\bar{X}_j^k \hat{\beta}_t^k}\right] \tag{5}$$

where $\overline{\widehat{\Pr}}$ is the mean predicted probability. The linearization is performed around the point φ, which is defined as: $\varphi = \left(N_t \tilde{X}_t^k \hat{\beta}_t^k + N_{t+n} \tilde{X}_{t+n}^k \hat{\beta}_{t+n}^k\right) \Big/ \left(N_t + N_{t+n}\right)$.[16]

The results are presented in Table 3 where negative and positive values indicate the decreasing or increasing effect on poverty over the period.[17] At this point we would like to emphasize that the change in the poverty impact presented in Table 3 is obtained from combining the change in estimated coefficients and the change in endowments. The factors are grouped into three. The first group is those variables that proxy the direct reform impact on households. These reforms include the food and non-food price reform, the social welfare reform which moved from direct price subsidies to households to wage compensation to those employed, and enterprise reform which generated an increase in unemployment in the mid to late 1990s. The household variables which reflect these reforms include family size, the proportion of household members who are working and household

[16]Even with these adjustments, a slight approximation error still exists when conducting the decomposition exercise.

[17]The decomposition results with the linear probability model are consistent with the results presented here and are available upon request from the authors.

TABLE 3
DECOMPOSITION RESULTS FOR PROBIT ESTIMATIONS

	Poverty Change 1986–1993		Poverty Change 1993–2000	
	Decomposition of Components	As % of Total Actual Changes	Decomposition of Components	As % of Total Actual Changes
Total actual change	0.079	100.00	–0.029	100.00
Household effects, of which:	0.069	87.85	0.056	192.47
Household size	0.044	55.43	0.002	8.02
Proportion of household members working	0.019	24.14	0.037	126.80
Household composition	0.007	8.55	0.017	58.19
Human capital	–0.049	–61.86	–0.049	–168.51
Region	0.060	76.39	–0.036	–123.73
Total approx. change	0.081	103.11	–0.029	99.81
Approximation error	–0.002	–3.11	0.000	0.19

composition, including the age of the household head, the proportion of household members who are male, and the proportion of household members who are in each of the gender and age categories. The second group of factors are human capital variables measured by years of schooling of the household head and spouse, and the proportion of household members in different occupational classifications. The third group of factors are regional effects to capture variations in regional income, price, income inequality and varying degrees of enterprise reform. Regional effects include the constant term as it embodies the omitted regional dummy variable.

During the first period, 1986–93, the poverty rate increased significantly from 3.1 to 11.0 percent, an increase of 7.9 percentage points. Reform impact on households and regional variables contributed to this increased poverty by similar amounts. Among the reform variables the changing impact of household size is the most important one, accounting for 4.4 percentage points of the increased poverty incidence. The changing effect of the average proportion of household members who are working also increased poverty by 1.9 percentage points. But this is mainly the result of the reduction in the proportion of household working members over the period (change in endowments) rather than the result of changes in coefficients. Human capital variables are also an important force for poverty reduction. Increased average years of schooling and increased return to schooling both contributed.

In the second period, 1993–2000, poverty headcount indices reduced from 11.0 to 8.1 percent, a reduction of 2.9 percentage points. The contrast between the two periods is noticeable. The impact of household characteristics contributes much the same percentage point to an increase in poverty in both periods, but the effect is now primarily caused by the reduction in the proportion of household working members rather than household size, which now makes little contribution to the change.

The increased contribution to poverty reduction from human capital is also the same in both periods, indicating the continuous growing interactions between poverty and labor market outcomes.

The large change between the two periods is the impact of the regional/constant terms which have changed from a powerful force, increasing poverty in the first period to a force for poverty reduction in the second. However, the regional effects and the constant term cannot be separately identified.

4.3. *Further Understanding of the Regional Effects*

China has significant spatial variation in economic development, income levels, income inequality and output prices (see, for example, Chen and Fleisher, 1996; Khan and Riskin, 2001) which are reflected in regional poverty patterns. In this sub-section we look more closely at these patterns.

Following Bryk and Raudenbush (1992) we adopt the hierarchical linear modeling approach to investigate this variation. The approach involves two sequential stages. First, equation (1) is estimated using a fixed effects linear probability model. Second, the fixed provincial effects (υ) from regressions for each of the survey years are retrieved and then used as a dependent variable in the following regression analysis:

$$\upsilon_{jt} = Z'_{jt}\delta + \varepsilon_{jt} \tag{6}$$

where Z is a vector of variables which may be associated with regional poverty, including provincial average income levels, Gini coefficients, share of state sector employment and provincial level unit food and non-food values for each survey year. The food and non-food unit values are calculated from the UHIES, where both quantity and expenditure data are available at the household level. We calculated the unit calorie value for grain products as it is the major food item for the poor. For non-food basic necessities we include three major components: rent, medical expenses and education.[18] As the three non-food prices changed in the same direction, and at a similar rate through time and across regions, we solve the problem of multicollinearity by using a principal component method to generate a single non-food "price."[19]

We estimate equation (6) for the total sample as well as for the periods 1986–93 and 1994–2000 separately. The results are presented in Table 4. For the total sample we observe that the income variable has a significant and negative coefficient, indicating that provinces with higher average income levels have lower poverty. With regard to the basic necessities, a higher food price is associated with higher poverty. In addition, income inequality also reduces poverty. Other variables do not appear to be significant.

When the sample is split into the 1986–93 and 1994–2000 periods, different pictures are revealed, apart from a similar effect of higher average income on

[18]The rent price is rent per square meter, for medical expenses we use per capita expenditure, while for tuition fees we calculate per student per semester cost.

[19]The correlation coefficients among the three non-food prices are:

	Rent	Medical	Education
Rent	1.00		
Medical	0.63	1.00	
Education	0.86	0.78	1.00

TABLE 4
DETERMINANTS OF REGIONAL VARIATIONS ON POVERTY (FIXED-EFFECTS)

	Total sample	1986–1993	1994–2000
Income/1000	–0.018	–0.025	–0.013
	(0.004)***	(0.011)**	(0.004)***
Grain unit price	0.547	1.107	0.354
	(0.094)***	(0.178)***	(0.108)***
Non-food price	–0.01	–0.055	–0.009
	(0.008)	(0.039)	(0.009)
Proportion of state employment	0.044	–0.112	0.239
	(0.047)	(0.057)*	(0.070)***
Gini coefficient	–0.203	–0.547	0.133
	(0.110)*	(0.140)***	(0.161)
Constant	–0.018	0.087	–0.209
	(0.047)	(0.084)	(0.073)***
Number of observations	225	120	105
R^2	0.33	0.33	0.48

Notes:
Standard errors in parentheses.
*Significant at 10%; **significant at 5%; ***significant at 1%.

poverty reduction. First, controlling for average income levels, income inequality within a province is negatively related to poverty in the first period but has no impact on poverty in the second period. The reason that regions with the largest inequality tend to have less poverty in the first period may be related to the fact that increases in inequality were primarily generated by greater income increases at the top of the income distribution rather than income falls at the bottom (Meng, 2004).

Second, provinces with a high level of state sector employment have lower poverty in the first period and higher poverty in the second period. This finding coincides well with the enterprise reform measures introduced in the mid to late 1990s. The increase in unemployment in the second half of the 1990s is mainly a state sector phenomenon and, in addition to job loss, those who remain employed in the state sector suffered from significant wage, pension, and medical reimbursement arrears.

Finally, the relative changes in the price of basic necessities are important. Provinces with higher food prices have a higher poverty rate, but the effect is much larger in the first period than in the second period. This is consistent with the timing of the food price reform and the conjecture presented earlier that food price reform is one of the major contributing factors for poverty increases in the early 1990s.

4.4. *Robustness Check*

The dependent variables used in equations (1) and (2) are not equivalence scale adjusted. Since our story places a significant weight on household composition, it is important to ensure that these results are consistent when dependent variables are equivalence scale adjusted. We therefore adopt two commonly used equivalence scales—the "old" OECD scale (assigning the first adult a weight of

one, every additional adult a weight of 0.7, and each child a weight of 0.5) and the OECD modified scale (the weight for an additional adult is 0.5 and for a child is 0.3). Detailed results are available upon request from the authors. In Appendix C, the marginal effects from equation (1) are presented for a group of selected variables using the two equivalence scale adjusted independent variables. Comparing Appendix C with Figure 4 it is clear that the trends of the change in the marginal effect for the important selected variables, such as family size, proportion of household members working, and education variables, are almost the same as those obtained from the unadjusted data, except that the magnitudes are different. The variables especially related to scale adjustments, such as proportion of household members in different age groups, differ significantly in magnitude. This is the result of the equivalence scale adjustment.

5. Conclusion

This paper identifies factors associated with urban poverty and how they changed over the 1986–2000 period. During this period the poverty head count index increased between 1986 and 1993, stayed at a high level after 1993 for five years, and started to fall after 1998. By 2000 the poverty rate had fallen from its peak of 12 percent (1993) to 8 percent.

There appears to be three sets of factors associated with the changing pattern of household poverty. The most important factors are related to the demographic structure and labor market involvement of households. The fact that poverty increased most in larger households and households with less working members suggests that the move from implicit price subsidies for basic necessities to an explicit wage subsidy to compensate families when the subsidies were removed worsened the position of larger households with less working members.

The second set of factors relate to human capital variables which impact on poverty as might be expected. Households with more educated heads/spouses, and more workers employed in higher paying occupations had a lower probability of being poor.

The third set of factors relate to important regional effects. Households in regions with higher average income levels, relative to the poverty line, were less likely to be poor. In the period 1994–2000, households in regions with more state sector employees fared worst as state sector reform impacted adversely on many households. In addition, the changing impact of income inequality within regions is interesting. Regions with the largest inequality in the early period tended to have less poverty, partly because inequality was primarily generated by higher incomes at the top of the income distribution. In the second period, this effect disappeared.

Appendix A

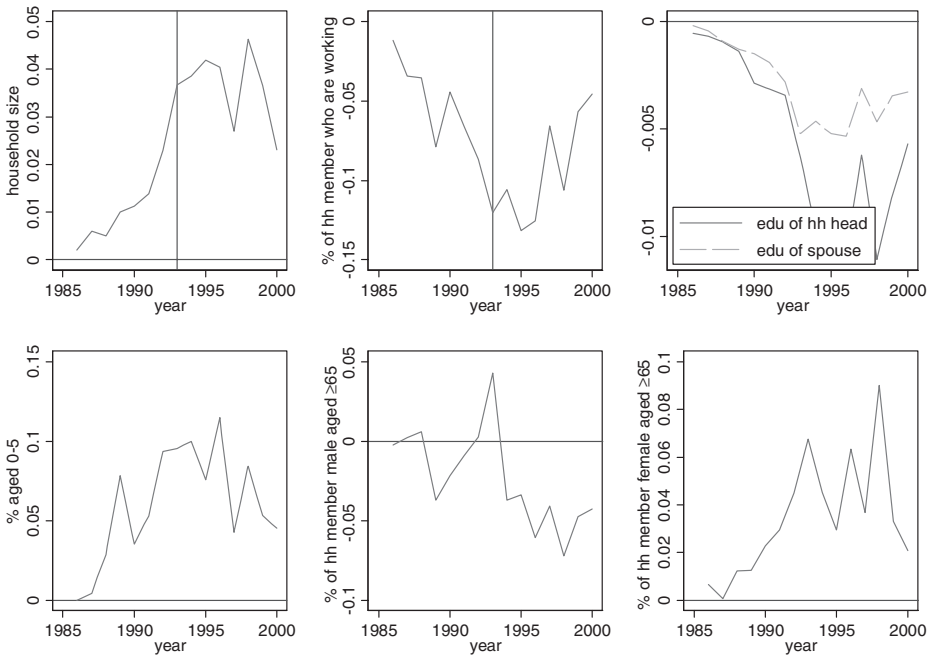
Summary Statistics for Poor and Non-Poor Households

Poor	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Log(per capita expend/Z)	–0.19	–0.16	–0.18	–0.30	–0.19	–0.22	–0.21	–0.22	–0.23	–0.22	–0.21	–0.22	–0.23	–0.23	–0.24
HH size	5.50	4.55	4.33	4.08	4.38	4.05	3.84	3.65	3.73	3.69	3.65	3.66	3.64	3.63	3.63
HH head age	43.17	44.81	44.10	43.95	45.86	43.90	43.52	43.58	44.95	44.79	44.55	45.23	45.63	45.04	46.29
HH head sex	1.30	1.30	1.30	1.28	1.33	1.26	1.23	1.22	1.25	1.28	1.30	1.27	1.29	1.27	1.25
HH head years of edu	11.12	11.29	11.06	11.64	10.86	11.67	12.10	12.21	11.96	12.02	12.15	12.24	12.18	12.25	12.15
Spouse years of edu	8.62	8.86	8.57	9.65	8.86	9.80	10.51	10.79	10.55	10.73	10.78	10.61	10.83	11.10	10.50
% HH member working	0.50	0.48	0.42	0.45	0.47	0.46	0.52	0.52	0.52	0.51	0.52	0.52	0.51	0.52	0.48
% HH member as professional	0.13	0.16	0.16	0.20	0.11	0.17	0.17	0.20	0.17	0.17	0.18	0.17	0.18	0.15	0.18
% HH member as manag.	0.05	0.04	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02
% HH member as clerk	0.12	0.15	0.13	0.14	0.14	0.17	0.17	0.18	0.17	0.17	0.17	0.16	0.17	0.16	0.12
% HH member as trades	0.13	0.12	0.14	0.09	0.11	0.11	0.10	0.11	0.11	0.11	0.10	0.11	0.11	0.12	0.14
% HH member as service worker	0.10	0.13	0.07	0.05	0.04	0.05	0.06	0.04	0.05	0.06	0.06	0.08	0.08	0.09	0.10
% HH member as laborer	0.44	0.39	0.42	0.43	0.52	0.43	0.45	0.42	0.45	0.45	0.44	0.44	0.42	0.44	0.42
% HH member as other worker	0.03	0.02	0.05	0.05	0.06	0.05	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02
% HH member are men	0.46	0.47	0.46	0.48	0.49	0.49	0.49	0.50	0.49	0.49	0.49	0.49	0.48	0.49	0.49
% HH member aged 0–5	0.03	0.03	0.09	0.08	0.06	0.08	0.08	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.06
% HH member aged 6–10	0.09	0.05	0.08	0.07	0.07	0.08	0.08	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.06
% HH member aged 11–15	0.12	0.13	0.12	0.11	0.12	0.11	0.08	0.09	0.08	0.08	0.07	0.08	0.08	0.08	0.09
% HH member male 16–20	0.04	0.05	0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03
% HH member female 16–20	0.03	0.03	0.05	0.06	0.06	0.04	0.04	0.03	0.04	0.03	0.03	0.03	0.03	0.04	0.03
% HH male aged >65	0.03	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
% HH female aged >66	0.06	0.06	0.05	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
No. of obs.	251	273	323	397	326	374	711	1,105	1,022	1,096	1,078	1,131	988	890	826

Appendix A (*continued*)

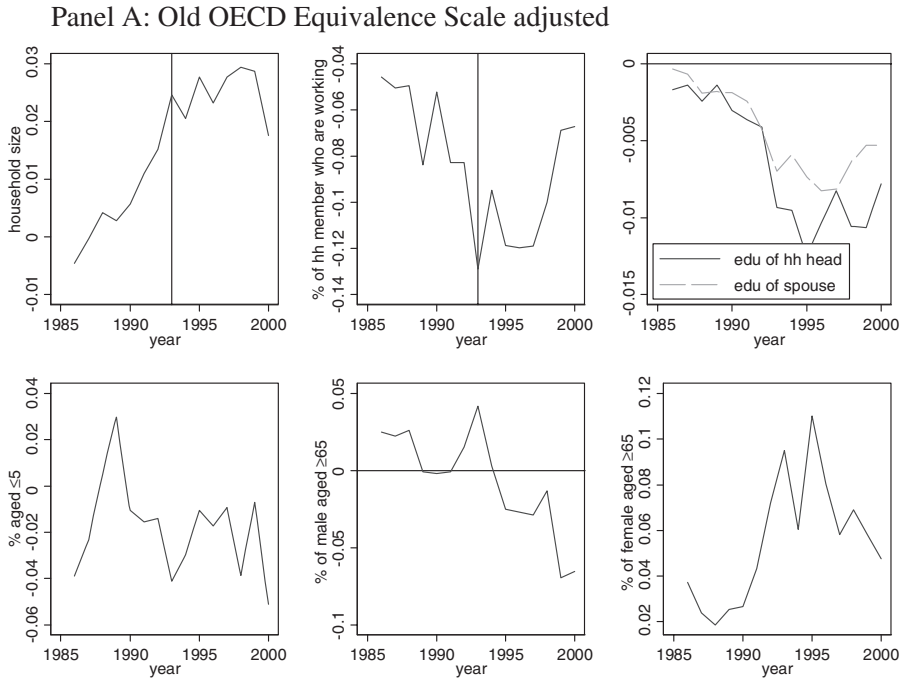
Non-poor	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Log(per capita expend/Z)	0.75	0.76	0.79	0.75	0.75	0.72	0.67	0.65	0.72	0.66	0.64	0.65	0.70	0.77	0.84
HH size	3.62	3.67	3.53	3.48	3.41	3.32	3.25	3.19	3.16	3.13	3.12	3.11	3.08	3.05	3.05
HH head age	42.53	43.16	43.60	43.80	44.89	43.69	44.87	45.57	45.57	45.83	46.05	46.03	46.44	46.66	47.42
HH head sex	1.40	1.41	1.35	1.34	1.34	1.31	1.30	1.33	1.34	1.36	1.36	1.36	1.38	1.38	1.34
HH head years of edu	12.10	12.21	12.22	12.30	12.43	12.60	12.85	12.89	12.97	13.05	13.07	13.06	13.14	13.20	13.18
Spouse years of edu	10.62	10.71	10.91	11.11	11.18	11.44	11.65	11.72	11.81	11.91	12.01	11.98	12.04	12.13	11.95
% HH member working	0.72	0.72	0.59	0.59	0.59	0.59	0.60	0.60	0.58	0.58	0.58	0.58	0.57	0.57	0.54
% HH member as professional	0.20	0.21	0.22	0.23	0.25	0.27	0.27	0.29	0.31	0.31	0.31	0.29	0.29	0.29	0.31
% HH member as manag.	0.09	0.09	0.08	0.08	0.08	0.07	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07
% HH member as clerk	0.19	0.21	0.20	0.20	0.20	0.20	0.20	0.20	0.19	0.20	0.20	0.20	0.21	0.22	0.20
% HH member as trades	0.06	0.06	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
% HH member as service worker	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.06	0.06
% HH member as laborer	0.38	0.36	0.37	0.36	0.35	0.34	0.34	0.33	0.31	0.32	0.32	0.32	0.31	0.29	0.29
% HH member as other worker	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
% HH member are men	0.49	0.49	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.49	0.49	0.49	0.49
% HH member aged 0–5	0.02	0.02	0.06	0.05	0.05	0.06	0.05	0.04	0.05	0.04	0.03	0.03	0.03	0.03	0.03
% HH member aged 6–10	0.04	0.03	0.08	0.08	0.08	0.08	0.08	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05
% HH member aged 11–15	0.06	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07
% HH member male 16–20	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03
% HH member female 16–20	0.02	0.03	0.04	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03
% HH male aged >65	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.05
% HH female aged >66	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04
No. of obs.	7,832	7,425	7,625	6,551	7,255	7,318	8,880	8,969	9,219	9,153	9,172	9,118	9,262	9,360	9,423

Appendix B



Selected Coefficients Using "Chained Weight CBN Poverty Line" Generated Poverty as the Dependent Variable

Appendix C



Change in Poverty Determinants (Equivalence Scale Adjusted) Probit Estimation

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