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Economic Restructuring, Informal Jobs and Pro-poor Growth in Urban China

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Economic Restructuring, Informal Jobs and Pro-poor Growth in Urban China

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[**ABSTRACT**] Based on household survey datasets and a framework of pro-poor growth, this paper discusses how economic growth and inequality affect poverty reduction in urban China. The findings in this paper suggest that the poor benefit from economic growth by trickle-down growth, and that the poor benefited disproportionally less in both periods, from 1988 to 1995 and from 1995 to 2002; in the later period, the pro-poorness is higher than that of the former period. Using the Shapley decomposition, this paper also develops an index of pro-poor growth for each income component, and finds that the income from informal jobs is the main contributor for the pro-poorness of growth during the period 1995 to 2002.

[**KEYWORDS**] pro-poor growth; poverty; Shapley decomposition

1. Introduction

China has experienced very high economic growth since the introduction in the late 1970s of policies to open and reform China's economy. Disposable income per capita in urban China has increased significantly. From 1978 to 2005, nominal disposable income per capita increased from 343.4 yuan to 10493.0 yuan, a fivefold increase using inflation-adjusted real values, and an average annual growth rate of about 6.9% (NBS, 2006, p.108). One of the main characteristics of China's marketization is the establishment of an incentive mechanism by removing the egalitarian income distribution system. Consequentially, during this same period in which economic growth was high, inequality in China also increased sharply, possibly beyond the policy makers' expectation. According to official publications, the widely used Gini coefficient increased for urban China from 0.16 in 1978 to 0.34 in 2005 (Zhang, 2006, p.220), while for rural China, the Gini coefficient increased from 0.21 to 0.37 in the same period. There were no official nationwide estimates of the Gini coefficient. However, according to the Chinese Household Income Project (CHIP), Kahn (1999, 2004) estimated the Gini coefficient of national income inequality to range from 0.382 in 1988 to 0.454 in 2005. As estimated by Ravallion and Chen (2007), the nationwide Gini coefficient also persistently increased from 0.3095 in 1981 to 0.4473 in 2001[1].

Economic growth and rising inequity in income distribution may have opposing effects on poverty reduction. Compared with the large number of studies on poverty in rural China, poverty in urban China has received less attention. Poverty was believed to only occur in

[1] They also estimated the national Gini coefficient for the same period after adjusting for the difference in the cost of living between urban and rural areas, which indicated the same increasing trend but a lower Gini coefficient for each year, for example, the Gini coefficient for 1981 decreased to 0.2798 and for 2001 decreased to 0.3945.

rural areas, so urban poverty was largely ignored for a long time in the literature on China's poverty. However, the few studies that did focus on China's urban poverty were not optimistic. Cheng (1997) and Chen (1997) estimated that the incidence of poverty in urban China was in the range of 4–6% at the beginning of the 1990s. Using household surveys conducted by CHIP, the poverty incidence estimated by Khan (1999, 2004) in urban China was 6.7%, 8.0%, and 2.2% in 1988, 1995, and 2002, respectively. Furthermore, based on the same dataset, the estimate of poverty incidence in urban China by Zhang and Wei (1999) was 4.29% and 11.2% in 1988 and 1995. These studies showed that urban poverty increased from 1988 to 1995, although the estimated poverty incidences were very different between Kahn (1999) and Zhang and Wei (1999). Meng, Gregory, and Wang (2005) examined the changes in urban poverty during the period from 1986 to 2000 and also concluded that the urban poverty incidence was highest in the middle of the 1990s[2]. A recent study by Xia et al. (2007) indicated a consistent decrease in urban poverty using data from CHIP 1988, 1995, 1999, and 2002 if the poverty line is set at US$2 or US$3 per day. However, using the surveys conducted by CHNS (China Health and Nutrition Survey), Wan and Zhang (2006) found that the poverty measures during the 1990s were consistently increasing. Therefore, many of the findings suggested that the poor benefited less from, or were even worse off because of, economic growth in urban China.

Based on the household surveys conducted by CHIP, and using the analytical framework of pro-poor growth (Kakwani and Pernia, 2000), this paper examines the changes in urban poverty from 1988 to 1995 and from 1995 to 2002. By decomposing the total poverty change into the growth effect and the inequality effect, we can derive an index of pro-poor growth,

[2] It should be noted that the poverty line was different from year to year in Meng et al. (2005) because the reform in welfare and household expenditure in urban China changed the minimum expenditure for "basic needs". Therefore, the implication of increasing poverty incidence in Meng et al. (2005) was that such reforms worsen the welfare of the poor. It was not so directly correlated with economic growth but rather with the economic reform in China.

defined as the elasticity of economic growth with respect to poverty reduction, which shows that the pro-poorness of growth from 1995 to 2002 is much higher than that from 1988 to 1995.

The higher pro-poorness of economic growth in the later period might be opposed to the intuitive notion that urban poverty is only linked to radical economic reform, because two "stylized facts" are generally accepted. The first is that radical measures of economic reform were adopted only in the middle of the 1990s and resulted in massive unemployment and *xiagang*, while the second is that such a reduction in job opportunities reduces household income so that the poverty indexes tend to increase. Urban poverty in China was mainly considered to be a result of radical economic restructuring, especially unemployment or *xiagang* from reform of SOEs (state-owned enterprises) (Li, 2006). To explore the reason why the pro-poorness of growth in the latter period was improved, and using the Shapley decomposition, this paper proposes a procedure to decompose the general index of pro-poor growth into indexes of pro-poor growth by income components, and finds that such improvement was because of income from informal economic activities.

The rest of the paper is organized as follows. Section 2 outlines the measurement of pro-poor growth. Both the index of pro-poor growth proposed by Kakwani and Pernia (2000) and the decomposition procedure used to obtain the indexes of pro-poor growth by income components are introduced. Datasets and poverty measurement are described in Section 3. In Section 4, the empirical results and the related implications are reported. The last section, Section 5, concludes the paper.

2. Measurement of pro-poor growth

Although many governments pursue pro-poor growth, and more and more scholars are engaged in academic research on pro-poor growth, the only point of agreement is that

economic growth should be favorable to the poor. However, there are different explanations about how to define "favorable". Dollar and Kraay (2000) and Kakwani and Pernia (2000) provided two different definitions of "favorable" (Essama-Nssah, 2005). Dollar and Kraay characterized pro-poor growth in an absolute sense as poverty reduction during the economic growth process, while Kakwani and Pernia defined pro-poor growth in a relative sense as when the incomes of the poor grow faster than those of the nonpoor. It is easy to deduce, in a relative sense, that pro-poor growth occurs if and only if the inequality and poverty associated with the growth process decline simultaneously. In this paper, Kakwani and Pernia's definition of pro-poor growth is adopted because it is more informative because the trickle-down effect can (and should) be separated from pro-poor growth (Kakwani and Pernia, 2000).

2.1 Measurement of general pro-poorness

To examine the impact of economic growth on poverty, Kakwani and Pernia (2000) proposed decomposing the total poverty change into (1) the impact of growth while the income distribution was assumed to be unchanged, and (2) the effect of the income distribution when the mean of income was assumed to be unchanged. Suppose θ is a poverty measure that is fully characterized by mean income μ, Lorenz curve (income distribution) $L(p)$ [3], and poverty line z, that is, $\theta = \theta(\mu, L(p), z)$. The poverty indexes for times 1 and 2 are denoted as $\theta_1 = \theta(\mu_1, L_1(p), z)$ and $\theta_2 = \theta(\mu_2, L_2(p), z)$, respectively. Because the poverty line is constant, it can be omitted from the expression of the poverty index. The total proportional change in poverty between times 1 and 2 can be given by the log difference of the poverty indexes for the two time periods as follows:

[3] $L(p)$ is the share of income gained by the bottom p percent of the population.

$$\theta_{12} = \eta = \ln \theta_2 - \ln \theta_1 = \ln \theta(\mu_2, L_2(p)) - \ln \theta(\mu_1, L_1(p)) . \quad (1)$$

To separate the two components of the effect of growth on poverty change, the Lorenz curve should be assumed to be constant and the same as that occurring at either time 1 or 2. If the Lorenz curve for time 2 is assumed to be the same as that occurring at time 1, the growth effect on poverty change can be written as $\ln \theta(\mu_2, L_1(p)) - \ln \theta(\mu_1, L_1(p))$; while, if the Lorenz curve for time 1 is assumed to be the same as that occurring for time 2, the growth effect on poverty change should be written as $\ln \theta(\mu_2, L_2(p)) - \ln \theta(\mu_1, L_2(p))$. The growth effect is the average of these two possibilities to make the decomposition path independent. Therefore:

$$\eta_G = 0.5((\ln \theta(\mu_2, L_1(p)) - \ln \theta(\mu_1, L_1(p))) + (\ln \theta(\mu_2, L_2(p)) - \ln \theta(\mu_1, L_2(p)))) . \quad (2)$$

A similar procedure and explanation can be applied to derive the inequality effect as follows:

$$\eta_I = 0.5((\ln \theta(\mu_1, L_2(p)) - \ln \theta(\mu_1, L_1(p))) + (\ln \theta(\mu_2, L_2(p)) - \ln \theta(\mu_2, L_1(p)))) . \quad (3)$$

After some algebraic manipulation, we can easily obtain:

$$\eta = \eta_G + \eta_I , \quad (4)$$

which implies that the total proportional poverty change equals the sum of the growth effect η_G, which measures poverty changes because of economic growth with inequality unchanged, and the inequality effect η_I, which measures poverty changes because of changes in the income distribution but with no economic growth. Kakwani and Pernia (2000) proved that such a decomposition satisfied a set of intuitively rational axioms. It is also an application of the Shapley decomposition (Shorrocks, 1999).

The index of pro-poorness was defined by Kakwani and Pernia (2000) as follows:

$$\phi = \eta / \eta_G . \quad (5)$$

Because positive growth always reduces poverty, η_G will always be negative. It is well known that, given an unchanged mean income, unequal income distribution means the poor get less while the rich get more, which increases the poverty measures. However, the sign of η_I is undetermined because the income distribution can become either more equal or unequal, depending on the growth pattern. If the income distribution becomes increasingly equal during the growth process, which means the poor gain disproportionally more than the nonpoor do, then η_I will be negative[4]. Otherwise, η_I will be positive. Therefore, if η_I is negative, the index of pro-poorness is $\phi > 1$[5]. Therefore, if $\phi > 1$, growth will be pro-poor, meaning that the poor benefit disproportionally more than the nonpoor. If $\phi < 1$, the nonpoor benefit more from the growth process. If $\eta_I > 0$ but $0 < \phi < 1$, the growth is not strictly pro-poor because the changes in income distribution are not pro-poor. The poverty index declines and the incomes of the poor increase, although the rate of increase is relatively lower than that of the nonpoor. The poor benefit from the growth process by the "trickle-down effect". $\phi < 0$ indicates the poverty index increased during the economic growth process so that it is known as immiserizing growth. Lin (2003) calculated the index of pro-poorness in rural China and found that all the indexes for the periods 1985–1990, 1990–1995, and

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[4] Such a relation can also be illustrated as follows. Poverty (P) depends on mean income (G) and inequality (I) so that $P = f(G, I)$, and by total differentiation we obtain: $dP = \frac{\partial f(G,I)}{\partial G} dG + \frac{\partial f(G,I)}{\partial I} dI$. It is easy to understand that $\frac{\partial P}{\partial G} < 0$ and $\frac{\partial P}{\partial I} > 0$. Usually, $dG > 0$; therefore, $\frac{\partial f(G,I)}{\partial G} dG < 0$. However, the sign of $\frac{\partial f(G,I)}{\partial I} dI$ depends on the sign of dI, which is determined by the growth pattern. If $dI < 0$, $\frac{\partial f(G,I)}{\partial I} dI < 0$; otherwise, $\frac{\partial f(G,I)}{\partial I} dI > 0$. If the growth is pro-poor, $dI < 0$; if $dI > 0$, the growth is pro-rich.

[5] If both η_G and η_I are negative, $\phi = 1 + \eta_I / \eta_G$ will hold, and η_I / η_G is positive. Therefore, $\phi > 1$.

1995–2001 are positive but less than 1, which indicates the poor in rural China benefit from economic growth by the trickle-down effect.

2.2 Decomposition of the general pro-poor growth index

Now that the index of pro-poor growth is defined, a natural question is, what are the contributors to pro-poor growth? The generally applied method to answer this question is regressing the poverty measures or income (share) of the poor against a set of explanatory variables. For such an analysis, a number of observations for different years and/or regions (or countries) are needed. In this paper, we attempt to answer this question by decomposing the general pro-poor growth index into pro-poor growth indexes of the various income components.

Suppose that total income can be decomposed into K items, that is, $y = \sum_k y^k$. The mean of total income and the income components satisfy $\mu = \sum_k \mu^k$. The Lorenz curve for total income and the income components can be written as $L(p_y) = \sum_k \left(\omega^k L(y^k, p_y)\right)$ [6], where p_y is the rank order of total income, $L(y^k, p_y)$ denotes the concentration ratio of the k-th income component ranked by total income, and $\omega^k = \mu^k / \mu$ is the share of the k-th income component in total income. Hence, the relation between poverty and income component y^k in time 1 is:

$$\theta_1 = \theta(\mu_1, L_1(p)) = \theta\left(\sum_k \mu_1^k, \sum_k \left(\omega^k L_1(y_1^k, p_y)\right)\right), \tag{6}$$

$$\theta_2 = \theta(\mu_2, L_2(p)) = \theta\left(\sum_k \mu_2^k, \sum_k \left(\omega^k L_2(y_2^k, p_y)\right)\right). \tag{7}$$

[6] This is an exercise in Lambert (1989, p.52).

The corresponding growth effects and inequality effects denoted by the income items in formulas (2) and (3) can be written as:

$$\ln\theta(\mu_2, L_1(p)) - \ln\theta(\mu_1, L_1(p)) = \ln\theta\left(\sum_k \mu_2^k, L_1(p)\right) - \ln\theta\left(\sum_k \mu_1^k, L_1(p)\right), \quad (8)$$

$$\ln\theta(\mu_2, L_2(p)) - \ln\theta(\mu_1, L_2(p)) = \ln\theta\left(\sum_k \mu_2^k, L_2(p)\right) - \ln\theta\left(\sum_k \mu_1^k, L_2(p)\right), \quad (9)$$

$$\ln\theta(\mu_1, L_2(p)) - \ln\theta(\mu_1, L_1(p)) = \ln\theta\left(\mu_1, \sum_k \left(\omega^k L_2(y_2^k, p_y)\right)\right) - \ln\theta\left(\mu_1, \sum_k \left(\omega^k L_1(y_1^k, p_y)\right)\right), \quad (10)$$

$$\ln\theta(\mu_2, L_2(p)) - \ln\theta(\mu_2, L_1(p)) = \ln\theta\left(\mu_2, \sum_k \left(\omega^k L_2(y_2^k, p_y)\right)\right) - \ln\theta\left(\mu_2, \sum_k \left(\omega^k L_1(y_1^k, p_y)\right)\right). \quad (11)$$

The next issue is how to identify the (marginal) growth effect and inequality effect of income component y^k. The Shapley decomposition is a method for specifying the marginal contribution of certain factors, which can be applied to formulas (8)–(11) to get the marginal effect for a given income component y^k. The advantage of the Shapley decomposition is that it calculates the (weighted) average of all possible changes in income to get a full decomposition without remainder, and the decomposition is path independent.

In this paper, total income is classified into four different components. Therefore, the total number of factors is four. Table 1 illustrates how the growth effect of income component x^1 is incorporated into the poverty index decomposition. Suppose the poverty indexes for time 1 and time 2 are $G(x_1^1, x_1^2, x_1^3, x_1^4)$ [7] and $G(x_2^1, x_2^2, x_2^3, x_2^4)$, respectively, where x are the contributors to the poverty index. The subscript indicates the number of contributors. The total number of potential ways for x^1 to cause a change in poverty is $K! = 24$. However,

[7] $G(x_1^1, x_1^2, x_1^3, x_1^4)$ can be either $\ln\theta(\sum_k \mu_1^k, L_1(p))$ or $\ln\theta(\sum_k \mu_1^k, L_2(p))$.

the order of the income components in $G(\cdot)$ does not affect the contribution of x^1, and the number of calculations to get the marginal values decreases to $2^{K-1}=8$.

Table 1 about here

The contribution of the growth effect of x^1 to changes in the poverty index is shown in Table 1 as an example. Table 1 lists all the possible ways the growth effect of x^1 can cause changes in the poverty index. In the first way the growth effect of x^1 can cause changes in the poverty index (the first row in Table 1), $G(x_2^1, x_1^2, x_1^3, x_1^4) - G(x_1^1, x_1^2, x_1^3, x_1^4)$ is the Lorenz curve for the same total income in either time 1 or time 2, with all other income components kept at their time 1 levels, except x^1 which is increased from x_1^1 to x_2^1. The weights are calculated as the formula (Shorrocks, 1999): $\frac{s!(K-s-1)!}{K!}$, where K is the total number of factors and s is the number of unchanged factors. The total growth effect of x^1 is the weighted average of all the possibilities listed in Table 1. For any other factor, we can conduct the same practice. Let η_G^j denote the weighted average of all potential ways of income item j causing change in the poverty index, that is, the contribution of the growth effect of income component j to changes in the poverty index. By the full decomposition property of the Shapley decomposition, $\sum_j \eta_G^j = \eta_G$ holds.

In principle, the same approach can be applied to define the contribution of the inequality effect of income component j to poverty index change, η_I^j. However, it is difficult in practice to aggregate the Lorenz curves for different income components from two different surveys. Considering that the index of pro-poor growth in equation (5) is defined as the ratio of the total proportional poverty change to the growth effect, we propose

to derive the total effect of income component j to total poverty index change, η^j, also under the Shapley decomposition framework, using the following procedure.

Suppose that the log of the poverty indexes for time 1 and time 2 are:

$$T(x_1^1, x_1^2, x_1^3, x_1^4) = \ln\theta\left(\sum_k \mu_1^k, \sum_k\left(\omega^k L_1(y_1^k, p_y)\right)\right),$$

$$T(x_2^1, x_2^2, x_2^3, x_2^4) = \ln\theta\left(\sum_k \mu_2^k, \sum_k\left(\omega^k L_2(y_2^k, p_y)\right)\right).$$

The function $T(\cdot)$ is different from $G(\cdot)$ in that both the growth effect and inequality effect of the income components of the poverty indicators are incorporated into $T(\cdot)$, that is, the Lorenz curve in $T(\cdot)$ is not assumed to be kept unchanged but will change when the different income components are taken into account. For any time period, the total effect of x^1 on the poverty index is decomposed as shown in Table 2, which illustrates the various components of the total effect of x^1, $\Delta T(x_t^1)$. In the first row in Table 2, if we assume all the other income components are set equal to zero and only x^1 is increased from zero to x^1 in time t, the effect of x^1 on poverty change can be expressed as $T(x_t^1, 0, 0, 0) - T(0, 0, 0, 0)$. Explanations for the other rows in Table 2 are the same. Taking the (weighted) average of all the possible effects of x^1 on poverty change, we get the marginal contribution of x^1 to total poverty change as $\Delta T(x_t^1)$. The total effect of poverty change from the change in x^1 for two time points is the difference in $\Delta T(x_t^1)$, written as:

$$\eta^1 = \Delta T(x_2^1) - \Delta T(x_1^1). \qquad (12)$$

Similar to (5), the index of pro-poor growth for income component j can be defined as:

$$\phi^j = \eta^j / \eta_G^j. \qquad (13)$$

Because $\eta = \sum_j \eta^j$ and $\eta_G = \sum_j \eta_G^j$, the relation between the index of pro-poor growth for total income, ϕ, and the index of pro-poor growth for income component j, ϕ^j, satisfies the following:

$$\phi = \frac{\sum_j \eta^j}{\sum_j \eta_G^j} = \sum_j \frac{\phi^j \eta_G^j}{\sum_j \eta_G^j} = \sum_j \phi^j \omega^j , \qquad (14)$$

where $\omega^j = \frac{\eta_G^j}{\sum_j \eta_G^j}$.

Therefore, the index of pro-poor growth for total income, ϕ, is the weighted average of the indexes of pro-poor growth for income component j, ϕ^j. The weights are the relative share of the growth effect of income component j to total poverty reduction.

Table 2 about here

3. Data description and poverty measurement

3.1 Data description

The datasets used in this paper are from the three comparable urban household surveys in 1988, 1995, and 2002 conducted by CHIP with assistance from the China National Bureau of Statistics (NBS), while the questionnaires were designed during joint workshops composed of Sino-foreign experts. The surveys included 10, 11, and 12 provinces[8] for the three survey years, respectively. In each survey, detailed information on household income

[8] In the 1988 survey, Shanxi, Liaoning, Jiangsu, Anhui, Henan, Hubei, Guangdong, Yunan, and Gansu were included. Sichuan was added in the 1995 survey. Chongqing was separated from Sichuan as an additional province in 2002.

and expenditure were included. Kahn and Riskin (1999) and Li et al. (2007) provided detailed descriptions of the datasets and sampling methodology.

In this paper, total income in each year is separated into four components: income from formal jobs, income from informal jobs, income from public transferred income and other sources. Permanent employees and long-term contracted employees are considered as working in the formal sector. Labor earnings from formal jobs and pensions for retirees are considered income from formal jobs. Labor earnings from the jobs that are not considered formal jobs and household business income are considered income from informal jobs. Transferred income usually refers to those incomes directly aimed at hardship relief, such as subsidies for living hardship from employees or the government. In 1988, in-kind incomes (market value of all kinds of coupons) allocated to the household as a whole rather than to individuals were also calculated as part of public transferred income.

Table 3 reports income per capita and its components for each survey. The definition of total income is from NBS. Compared with the income per capita provided by NBS, the mean of personal income was higher in CHIP household surveys, but the Gini coefficients from the two data sources are very close. All the income variables are deflated by the CPI and measured in 2002 prices. Real per capita income increased 37% and 78% for the periods 1988 to 1995 and 1995 to 2002, respectively. The real growth rate of the latter period is much higher than that of the former. However, there were fewer incremental Gini points for the latter period. From 1988 to 1995, the Gini coefficient increased from 0.2239 to 0.2820, an increase of 5.81 percentage points. In the latter period, from 1995 to 2002, the Gini coefficient increased 3.88 percentage points, about two percentage points less than that of the former period[9].

[9] There are several different estimates of Gini coefficients in urban China based on the CHIP datasets. Kahn and Riskin (1999, 2004) reported Gini coefficients for urban China of 0.233 in 1988, 0.332 in 1995, and 0.318 in 2002, which means the Gini coefficients increased about 10 percentage points in the former seven-year period

Table 3 indicates a significant structural change in income in urban China. From 1988 to 1995, the proportion of income from formal jobs increased by 14%, while public transferred income reduced from 14% to 1.68%. Such changes reflect the fact that in-kind allocation was replaced gradually by monetarization in this period. However, the monetarization of in-kind social welfare payments and subsidies implies that employment opportunities played an increasingly important role in income generation. Some of the in-kind social welfare payments and subsidies were allocated under the name of labor earnings. Under the full employment target of the government, monetarization mainly resulted in a trade-off between incomes from formal jobs and public transfers. From 1995 to 2002, radical economic reform measures were undertaken, which resulted in a reduction in job opportunities and massive unemployment or *xiagang*. Therefore, income from formal jobs declined dramatically. The unemployed or the poor were forced to engage in informal economic activities such that there was a large increase in income from informal jobs, both relatively and in absolute value. Another reason for the increase in income from informal jobs is the deregulation of the labor market and the associated increase in labor market flexibility.

Figure 1 about here

Although the (real) income growth rates were rather high in both periods, neither of them occurred evenly. The income growth rate for each quantile, which is usually indicated by the growth incidence curve (GIC) (Ravallion and Chen, 2003), is reported in Figure 1. It is obvious that the difference is significant among individuals in different quantiles. The shape in Figure 1 shows that the income growth rate for the higher quantiles is always much higher than that of the lower quantiles. Because the price indexes were deflated, the growth rate

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and decreased trivially in the latter period. Based on the same datasets, Gustafsson and Li (2001) estimated Gini coefficients in urban China of 0.2276 in 1988 and 0.2762 in 1995. Knight and Song (2003, 2004) estimated the Gini coefficient based on earnings per worker and found that wage inequality increased sharply. According to their estimates, the Gini coefficient increased from a low value of 0.229 in 1988 to 0.307 in 1995, but the increase in wage inequality was somewhat smaller from 1995 to 2002.

during 1995–2002 was higher than that during 1988–1995 for all quantiles and the difference was more obvious for the lower quantiles, which implies the lower quantiles experienced higher income growth rates in the latter period.

3.2 Poverty measures

The poverty measures are based on income per capita, and the poverty line is set at US$2 per day. Poverty lines are adjusted by the national consumer price index for different years. Therefore, the differences in poverty lines for various years only exist in the price index. In contrast to most of the existing studies, we also deflated by the provincial living costs according to Brandt and Holz (2004). The final adjustment based on a study by the NBS (GuoChengDiao, 1997; Wang, 2006) is to set the poverty lines for households with different scales. Households with three members was set as the benchmark, which must be multiplied by 1.13, 1.01, 0.98, and 0.94 to get the poverty line for one-, two-, four- and more than four-member households.

Consistent with the majority of studies, *FGT* indexes (Foster, Greer and Thorbecke, 1984) are applied to measure poverty:

$$FGT(\alpha) = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z - Y_i}{z}\right)^{\alpha},$$

where N is the total population, q is the total poverty population, z is the poverty line, and Y_i is individual *i*'s income. $g_i = z - Y_i$ is the poverty gap of individual *i*. The aggregation is restricted to observations identified as those with income below the poverty line. The parameter α is the degree of "poverty aversion". The larger α is, the greater the degree of poverty aversion, or the larger the weighting for the extremely poor. FGT(0) is the headcount ratio (the proportion of poor); FGT(1) is the average proportional poverty gap; and FGT(2) is

the average squared proportional poverty gap (or weighted poverty gap), which is more sensitive to income distribution among the poor.

4. Index of pro-poor growth

Table 4 shows the declining trend in urban poverty from 1988 to 2002. In the first three rows in Table 4, with the poverty line being set at US$2 per day in PPP terms, the poverty incidence, FGT(0), in 1988, 1995, and 2002 is 11%, 7%, and 2.66%, respectively. A four-percentage-point decline in poverty incidence occurred in both 1988–1995 and 1995–2002. For other poverty measures such as FGT(1) and FGT(2), the same trend exists. The last four rows in Table 4 are the simulated poverty measures using the means of income per capita and Lorenz curves for which the different years are combined. For any given year, if its mean value of income per capita is replaced by the value of latter years and the Lorenz curve is unchanged, the poverty measures decline. On the contrary, if its Lorenz curve is replaced by that of the latter years and the mean value of income per capita is unchanged, the poverty measures increase. Such simulations indicate that the economic growth process was associated with increasing inequality and affected poverty reduction by two opposite effects simultaneously: economic growth reduced poverty but inequality increased poverty.

Tables 4 and 5 about here

To derive the contributions of economic growth and income distribution to proportional poverty changes, η_G and η_I are calculated using formulas (2) and (3) and are reported in Table 5. Given an unchanged income distribution, economic growth reduces poverty in both periods because all η_G s are negative. However, the positive η_I implies that the inequality of income distribution persisted and increased so that the poverty reduction effects by economic growth were eliminated by increasing inequality. Therefore, we get a positive but less than

one index of pro-poor growth. The poor benefited from economic growth by the trickle-down effect. Neither of the periods is strictly pro-poor. Comparing the indexes of pro-poor growth, ϕ s, in the two periods, it is easily seen that all the ϕ s are much higher for the period from 1995 to 1988 than for the period from 1988 to 1995, which indicates that the poor benefited more in the latter period than they did in the earlier period. This might be counterintuitive because massive unemployment and *xiagang* from SOEs and other enterprises mainly occurred in the latter period.

To help understand the improvement in the pro-poorness of growth in the latter period, Table 6 decomposes the general index of pro-poor growth reported in Table 5 into four indexes of pro-poor growth by income component, using the methodology proposed in Section 2.2. Table 7 reports the contributions in percentage terms to the general index of pro-poor growth of the income components for each period using the formula implied by equation (14), $\omega_i\phi_i / \phi$. The information in Table 6 to Table 8 shows the following.

(1) The poor benefited from income from formal jobs by the trickle-down effect during the period from 1988 to 1995, but such income sources became anti-poor. In the previous period, the pro-poor growth index of income from formal jobs only changed marginally when the parameter α, the degree of "poverty aversion", of FGT increased from 0 to 2. However, during 1995 to 2002, the pro-poor growth index of income from formal jobs decreased (increased in absolute value) gradually when the parameter α increased, which shows that in this period the immiserizing effect of income from formal jobs was larger for the extremely poor. From Table 7, it is obvious that the income from formal jobs is the main contributor to the general index of pro-poor growth, which means formal jobs was the main channel through which the poor benefited from economic growth from 1988 to 1995. However, things changed substantially from 1995 to 2002. Income from formal jobs became a large negative contributor to the general index of pro-poor growth. Table 8 provides some

clues to understanding how such changes in the inequality of income from the formal sector increased sharply in 2002.

Tables 6, 7, and 8 about here

The changes in the pro-poorness of income from formal jobs mainly resulted from the economic restructuring. The reform of SOEs creates two effects that increase inequity in the income distribution. One effect reduces the opportunity for the poor to access formal jobs. Figure 2 reports the ratios of 16–60-year-old nonstudent labor employed in formal jobs for different income groups[10] in each year. Formal job opportunities increased from 1988 to 1995, but decreased from 1995 to 2002, and the reduction in job opportunities mainly occurred among the poor. From the survey, in 1988, there were 1.16 persons per household employed in formal jobs for poor households on average, while the number for the nonpoor households was about two persons; these two numbers increased to 1.55 and 2.05 in 1995, respectively. However, in 2002, there were only 0.39 persons in formal jobs for the poor households, but 1.09 for the nonpoor households. The other effect of the economic restructuring in the later 1990s is the large increase in income from formal jobs for those still employed in formal jobs. If deflated by the CPI and when 2002 is selected as the base year, the incomes from formal jobs in 1988, 1995, and 2002 were 4629, 6528 and 12334 yuan, respectively, which means that the income from formal jobs increased about 41% from 1988 to 1995 and 89% from 1995 to 2002.

Figure 2 about here

(2) The pro-poorness of income from informal jobs increased significantly in the latter period. Even during the period 1988 to 1995, the pro-poor index of that income source was greater than one, which means the income from informal jobs was especially

[10] The whole population is divided into 20 equal-size groups by income, ranked from low to high.

"pro-extremely-poor", in that the extremely poor benefited more. When poverty is measured by FGT(0) and FGT(1), the pro-poorness of income from informal jobs increased significantly. In each period, this kind of income contributed positively to the general index of pro-poor growth. The informal jobs played an important role in both periods in benefiting the poor. Especially for the latter period, the income from informal jobs became the most important contributor. The inequality of income from informal jobs in 2002 decreased and a one percentage increase in income from informal jobs resulted in a 0.08% decline in total income inequality. In the period 1988 to 1995, with poverty being measured by FGT(2), however, the index of pro-poor growth for income from informal jobs exceeded one, so that its contribution to the general index of pro-poor growth was much lower than that of the latter period because its share was not so high.

(3) The sign of η_G s for public transferred income in 1988 to 1995 is positive, which results from the fact that public transferred income was reduced radically from 1988 to 1995. The positive $\frac{\partial f}{\partial G}dG$ is because $dG < 0$ and $\frac{\partial f}{\partial G} < 0$. However, for the pro-poor growth index of public transferred income, $\eta < \eta_G$, which implies the negative η_I, because the contribution of the share of public transferred income to total inequality declined from 23% in 1988 to 2% in 1995 (as shown in Table 8, the Gini coefficient of public transferred income increased but the Gini correlation declined). In the latter period, from 1995 to 2002, the growth of public transferred income reduced poverty, and the η_G s of public transferred income became negative. Furthermore, the poor also benefited from the improvement in the distribution of public transferred income because the Gini coefficient and Gini correlation between public transferred income and total income both declined in the latter period.

Table 9 about here

The pro-poorness of total income and all income components for different poverty lines are reported in Table 9. For total income, the index of pro-poor growth increased in the later period from 1995 to 2002 for all poverty lines used. The income from formal jobs had a trickle-down effect from 1988 to 1995 that benefited the poor, whereas it was anti-poor from 1995 to 2002. The reduction in public transferred income reduced the welfare of the poor while the public transferred income benefited the extremely poor. Measuring the contribution in percentage terms, the pro-poorness of income from informal jobs increased significantly. Such conclusions are robust for different poverty lines. However, there are some changes for the pro-poorness of income from informal jobs. When the poverty line is reduced to US$1.5 per day, the income from informal jobs becomes anti-poor if poverty is measured by FGT(0).

5. Conclusions

The pro-poorness of growth in urban China for two periods, 1988–1995 and 1995–2002, were examined in this paper. We found the pro-poorness of growth in the latter period was higher than that in the previous period. By decomposing the general index of pro-poor growth by income component, we found that income from informal jobs was the main contributor, partly because of the pro-poorness of such income and partly because the share of such income increased significantly over the sample periods. Improvement in the pro-poorness of public transferred income is another contributor to the pro-poorness of growth in the latter period. The reduction of public transferred income made the poor worse off.

There was a very important transition in the pro-poorness of income from formal jobs. In the period from 1988 to 1995, the poor benefited from income from formal jobs by the

trickle-down effect. However, such income became anti-poor in the latter period. Such a transition might be correlated with the economic restructuring, because the opportunity to access formal jobs declined for the poor and, for those remaining in formal jobs, the faster increase in income from formal jobs increased income inequality. Such findings are important because the poor largely avoided the negative effects of economic restructuring by taking informal jobs and through public transferred income, both of which helped the poor in the latter period.

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Figure 1: Growth incidence curve for total income

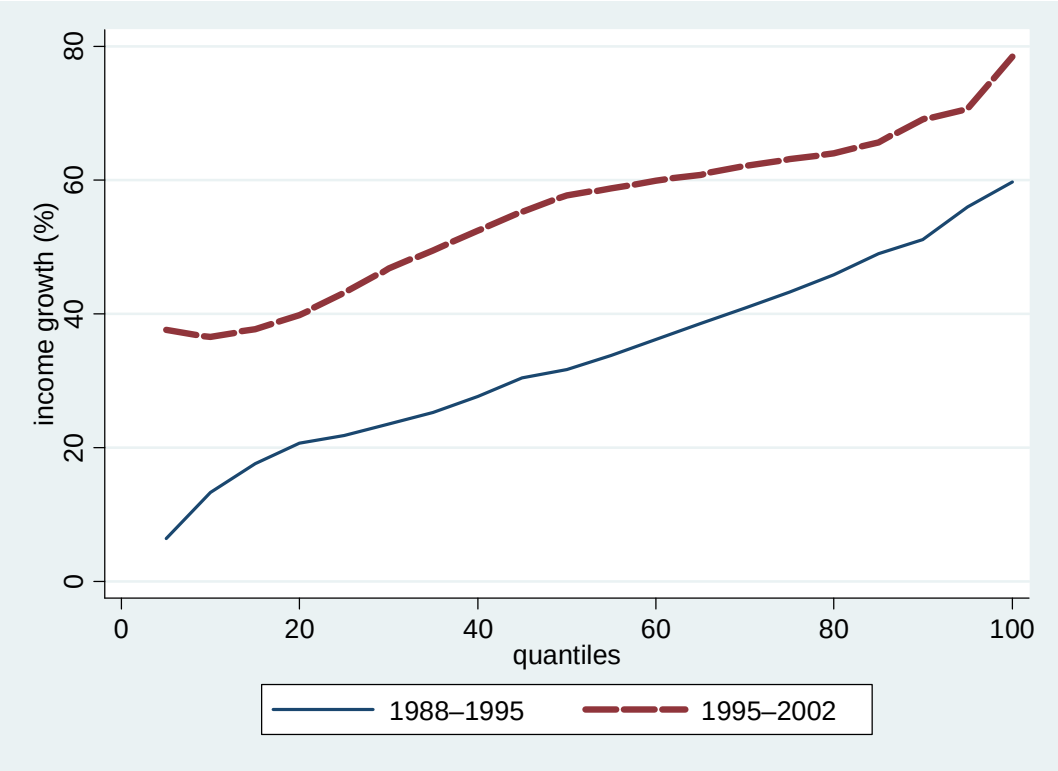
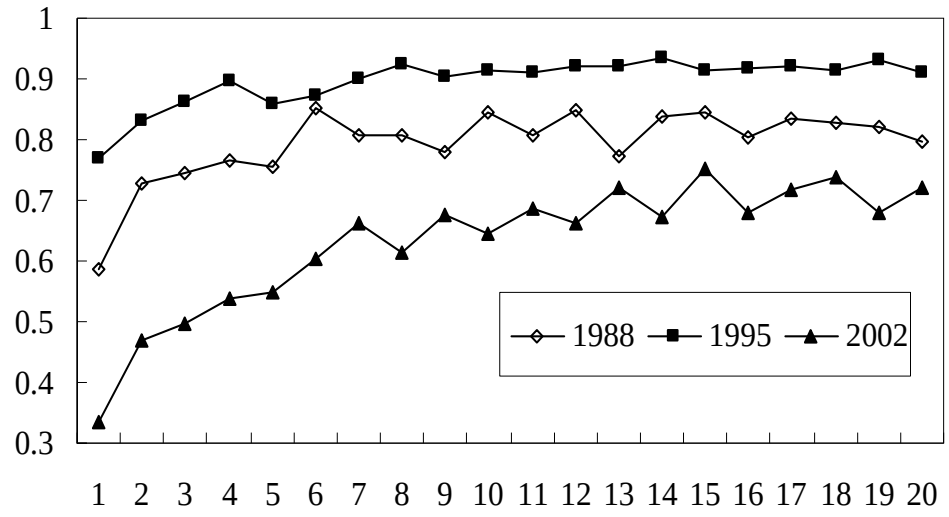


Figure 2: Formal job opportunities for different income groups



Note: the vertical axis means persons per household with formal jobs.

Table 1: The contribution of the growth effect of x^1 to changes in the poverty index

possibilities	Changes	Weights
1	$G(x_2^1, x_1^2, x_1^3, x_1^4) - G(x_1^1, x_1^2, x_1^3, x_1^4)$	6/24
2	$G(x_2^1, x_2^2, x_1^3, x_1^4) - G(x_1^1, x_2^2, x_1^3, x_1^4)$	2/24
3	$G(x_2^1, x_1^2, x_2^3, x_1^4) - G(x_1^1, x_1^2, x_2^3, x_1^4)$	2/24
4	$G(x_2^1, x_1^2, x_1^3, x_2^4) - G(x_1^1, x_1^2, x_1^3, x_2^4)$	2/24
5	$G(x_2^1, x_2^2, x_2^3, x_1^4) - G(x_1^1, x_2^2, x_2^3, x_1^4)$	2/24
6	$G(x_2^1, x_1^2, x_2^3, x_2^4) - G(x_1^1, x_1^2, x_2^3, x_2^4)$	2/24
7	$G(x_2^1, x_2^2, x_1^3, x_2^4) - G(x_1^1, x_2^2, x_1^3, x_2^4)$	2/24
8	$G(x_2^1, x_2^2, x_2^3, x_2^4) - G(x_1^1, x_2^2, x_2^3, x_2^4)$	6/24

Note: The income distribution is assumed to be constant and equal to that in either time 1 or time 2, and only the growth of x^1 is under the consideration.

Table 2: The total effect of x^1 on poverty measurement in time t ($\Delta T(x_t^1)$)

possibilities	The total effect of x^1 on poverty measurement in time t	Weights
1	$T(x_t^1, 0, 0, 0) - T(0, 0, 0, 0)$	6/24
2	$T(x_t^1, x_t^2, 0, 0) - T(0, x_t^2, 0, 0)$	2/24
3	$T(x_t^1, 0, x_t^3, 0) - T(0, 0, x_t^3, 0)$	2/24
4	$T(x_t^1, 0, 0, x_t^4) - T(0, 0, 0, x_t^4)$	2/24
5	$T(x_t^1, x_t^2, x_t^3, 0) - T(0, x_t^2, x_t^3, 0)$	2/24
6	$T(x_t^1, 0, x_t^3, x_t^4) - T(0, 0, x_t^3, x_t^4)$	2/24
7	$T(x_t^1, x_t^2, 0, x_t^4) - T(0, x_t^2, 0, x_t^4)$	2/24
8	$T(x_t^1, x_t^2, x_t^3, x_t^4) - T(0, x_t^2, x_t^3, x_t^4)$	6/24

`Table 3: Income and its composition in urban China in 2002 prices

	1988	1995	2002
Income per capita (yuan)	3601.74	5012.65	8083.65
	(100)	(100)	(100)
from, formal jobs (yuan)	2542.89	4256.52	4370.80
	(70.60)	(84.92)	(54.07)
informal jobs (yuan)	393.53	454.38	3182.17
	(10.93)	(9.06)	(39.37)
public transferred income (yuan)	506.76	84.11	194.80
	(14.07)	(1.68)	(2.41)
other income (yuan)	158.55	217.63	335.88
	(4.40)	(4.34)	(4.16)
Gini coefficient of total income per capita	0.2247	0.2812	0.3197
Observations (individuals)	31775	21696	20632
Income per capita from NBS			
Income per capita (yuan)	2974.94	4736.57	8177.40
Gini coefficients	0.23	0.28	0.32

Note: The numbers in brackets are the percentage of the income components relative to total income.

Table 4: Poverty measurements

	FGT(0)		FGT(1)		FGT(2)	
	θ	$\ln\theta$	θ	$\ln\theta$	θ	$\ln\theta$
μ_{1988}, L_{1988}	0.1141	–2.1708	0.0227	–3.7863	0.0081	–4.8151
μ_{1995}, L_{1995}	0.0727	–2.6210	0.0165	–4.1022	0.0063	–5.0633
μ_{2002}, L_{2002}	0.0266	–3.6265	0.0057	–5.1752	0.0019	–6.2440
μ_{1995}, L_{1988}	0.0276	–3.5888	0.0062	–5.0827	0.0031	–5.7778
μ_{1988}, L_{1995}	0.2122	–1.5502	0.0499	–2.9968	0.0188	–3.9748
μ_{2002}, L_{1995}	0.0132	–4.3254	0.0034	–5.6930	0.0017	–6.3527
μ_{1995}, L_{2002}	0.1229	–2.0963	0.0292	–3.5338	0.0108	–4.5284

Note: μ is the mean of income per capita, L is the Lorenz curve.

Table 5: Poverty decomposition and pro-poorness of growth

	1988–1995			1995–2002		
	FGT(0)	FGT(1)	FGT(2)	FGT(0)	FGT(1)	FGT(2)
η	–0.4501	–0.3159	–0.2482	–1.0055	–1.0730	–1.1807
η_G	–1.2444	–1.2009	–1.0256	–1.6173	–1.6161	–1.5025
η_I	0.7942	0.8849	0.7774	0.6118	0.5432	0.3218
ϕ	0.3617	0.2631	0.2420	0.6217	0.6639	0.7858

Table 6: Index of pro-poor growth by income component

	FGT(0)			FGT(1)			FGT(2)		
	η^j	η_G^j	ϕ^j	η^j	η_G^j	ϕ^j	η^j	η_G^j	ϕ^j
1988–1995									
Formal	–0.6867	–1.5033	0.4568	–0.6501	–1.459	0.4456	–0.6231	–1.2536	0.4971
Informal	–0.0207	–0.0517	0.4011	–0.0347	–0.0516	0.6723	–0.0788	–0.0455	1.7313
Public	0.2468	0.3612	0.6833	0.3524	0.3598	0.9795	0.4366	0.3177	1.3741
Other	0.0105	–0.0505	–0.2075	0.0165	–0.0501	–0.3294	0.0172	–0.0442	–0.3885
1995–2002									
Formal	0.3305	–0.0500	–6.6150	0.7436	–0.0600	–12.3996	0.8944	–0.0575	–15.5598
Informal	–1.2290	–1.4639	0.8395	–1.6288	–1.4360	1.1343	–1.8181	–1.3299	1.3671
Public	–0.0784	–0.0484	1.6178	–0.0510	–0.0581	0.8784	–0.0665	–0.0557	1.1936
Other	–0.0287	–0.0550	0.5210	–0.1367	–0.0620	2.2034	–0.1906	–0.0595	3.2044

Table 7: Contributions to the general index of pro-poor growth by income component (%)

	1988–1995			1995–2002		
	FGT(0)	FGT(1)	FGT(2)	FGT(0)	FGT(1)	FGT(2)
Formal	152.55	205.81	251.06	–32.87	–42.42	–44.36
Informal	4.61	10.98	31.74	122.22	128.90	130.22
Public	–54.83	–111.56	–175.88	7.80	10.06	10.51
Other	–2.33	–5.22	–6.92	2.85	3.46	3.62

Table 8: Income inequality and sources for each year

Source	Sk	Gk	Rk	Share	% change
1988					
Formal	0.7060	0.2837	0.6814	0.6075	–0.0986
Informal	0.1093	0.8056	0.2684	0.1051	–0.0041
Public transfer	0.1407	0.5623	0.6521	0.2296	0.0889
Others	0.0440	0.6684	0.4415	0.0578	0.0138
1995					
Formal	0.8492	0.3103	0.873	0.8180	–0.0312
Informal	0.0906	0.8567	0.3336	0.0921	0.0015
Public transfer	0.0168	0.8839	0.4565	0.0241	0.0073
Others	0.0434	0.7994	0.5336	0.0659	0.0224
2002					
Formal	0.5407	0.5539	0.6487	0.6078	0.0671
Informal	0.3937	0.5860	0.4302	0.3105	–0.0832
Public transfer	0.0286	0.8595	0.2662	0.0205	–0.0081
Others	0.0371	0.9993	0.5294	0.0613	0.0243

Note: Sk is the share of each income source in total income, Gk is the source Gini, Rk is the Gini correlation of income from source k with the distribution of total income, and "Share" is the share of each income source to total inequality. "% change" refers to the impact that a 1% change in the respective income sources has on inequality.

Table 9: Index of pro-poor growth by different poverty lines

	1988–1995			1995–2002		
	FGT(0)	FGT(1)	FGT(2)	FGT(0)	FGT(1)	FGT(2)
Poverty line being set at US$1.5 per day						
Total income	0.1719	0.1485	0.3368	0.5848	0.7705	1.1169
	(100)	(100)	(100)	(100)	(100)	(100)
From, formal job	0.3717	0.4386	0.6766	–12.8945	–15.0388	–16.6966
	(261.06)	(361.43)	(248.87)	(–65.74)	(–77.70)	(–59.65)
Informal job	–0.5082	0.6367	4.0531	0.9759	1.3608	1.6820
	(–14.98)	(18.95)	(56.37)	(152.51)	(155.48)	(132.54)
Public transfer	0.7676	1.2635	2.0791	0.4659	3.2995	5.5439
	(–136.47)	(–264.27)	(–204.44)	(2.44)	(16.52)	(19.19)
Other sources	–0.3464	–0.5575	–0.0595	2.4541	1.0666	2.1403
	(–9.62)	(–16.10)	(–0.80)	(10.78)	(5.70)	(7.92)
Poverty line being set at US$2.5 per day						
Total income	0.5011	0.3831	0.3127	0.6856	0.6949	0.7343
	(100)	(100)	(100)	(100)	(100)	(100)
From, formal job	0.5344	0.4983	0.4899	–1.1396	–9.5097	–13.5193
	(129.80)	(157.70)	(190.27)	(–6.30)	(–54.52)	(–73.01)
Informal job	0.7595	0.8500	1.4027	0.7760	1.0495	1.2179
	(6.03)	(9.56)	(19.34)	(100.32)	(141.60)	(155.19)
Public transfer	0.6099	0.8536	1.1114	0.6377	1.6403	2.4859
	(–35.99)	(–66.25)	(–106.34)	(3.44)	(9.11)	(13.01)
Other sources	0.0202	–0.0930	–0.2443	0.4501	0.6421	0.8614
	(0.16)	(–1.01)	(–3.27)	(2.54)	(3.81)	(4.81)

Note: the numbers in brackets are the percentages.