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Chinese Rural and Urban Income Inequality Re-Examined
by Income Polarization

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Abstract: The purpose of this article is to contribute to the analysis of Chinese income inequality by focusing more specifically on income polarization, which captures both alienation (i.e. heterogeneity between income groups) and identification (i.e. homogeneity within groups). The empirical investigations conducted as part of this research are based on the China Health and Nutrition Survey data from 1989 to 2006 and indicate that Chinese household income is strongly polarized. After a period of stagnation between 1989 and 1997, the degree of polarization increased significantly between 1997 and 2006, indicating the constitution of identified groups in middle and upper income ranges. Although the level of income polarization is higher in rural areas, the increase in polarization is far more conspicuous in urban areas, suggesting that the risk of social tensions is more pregnant in Chinese cities. The analysis of the sources of income polarization in rural areas shows that the increase in polarization is closely linked to non agricultural opportunities. In urban areas, the emergence of identified groups in middle and upper income classes can be explained both by the sharp decline in subsidies and by the liberalization of the urban labor market and state enterprises.

Keywords: inequality, polarization, middle classes, kernel density, China

JEL Classification: D31, D63, O15, P36, R20

1. Introduction

While there is an extensive literature on income disparities in China using provincial panel data,[1] studies based on household level data are less common. As explained by Benjamin et al. (2005a), these studies tend to examine two main issues: (i) the estimation of the level and evolution of inequality in rural and urban areas and (ii) the identification of the socioeconomic factors governing these trends. First, although microeconomic studies on income inequality are based on a range of household level data sources and produce results that are not fully comparable, there is a rough consensus concerning the continuous increase in inequality since the late 1970s. Furthermore, this increase has concerned both rural areas (Bramall, 2001; Benjamin et al. 2005a, 2005b; Wan and Zhou, 2005) and urban areas (Bramall, 2001; Benjamin et al. 2005a; Démurger et al. 2006). However, depending on the data used, some studies have qualified this trend when examining the 1990s (Khan and Riskin, 2005; Démurger et al., 2006; Ravallion and Chen, 2007; Gao and Riskin, 2009). For instance, Khan and Riskin (2005) showed that between 1995 and 2002, income inequality declined significantly in rural areas and only slightly in cities. However, when examining the most recent period (from the late 1990s to the mid 2000s), the increase in income inequality is clearly more pronounced (Chen and Zhang, 2009). The second point of interest of the literature examining income inequality in China is the identification of socioeconomic factors that account for the increase in inequality. In this perspective, a number of microeconomic studies have analyzed the contribution of various income sources to overall inequality. Studies focusing on rural areas have highlighted the crucial contribution of non agricultural income to the increase in inequality (Hare, 1994; Khan and Riskin, 1998; Tsui, 1998; Benjamin et al., 2005b; Gao and Riskin, 2009; Zhou, 2009). More precisely, the decline in agricultural income (an equalizing component) and the increase in non agricultural income, i.e. wages or business income (a more disequalizing component), account for the largest part of the increase in rural inequality. In urban areas, the explosion of income disparities is related to pronounced changes in household income structures. Gao and Riskin (2009) showed that the relative increase in market income (a disequalizing component of income) compared to social benefits (an equalizing component) is the first contributor to urban inequality. Furthermore, among market income, wages became more disequalizing between the beginning of the reforms and the early 2000s (Benjamin et al., 2005a). Overall, changes in the labor market and the determination of wages are crucial factors for explaining the increase in urban inequality.

The issue of income inequality in China is closely linked to the sustainability of China's economic development. The explosion of inequalities may pose a threat to social cohesion and political stability (Renard, 2002; Knight et al., 2006). Turzy (2008) explained that the explosion of inequality and spatial disparities have resulted in increased social unrest. Every year, the Chinese authorities release information concerning mass incidents such as strikes and demonstrations. The statistics provided by the Chinese authorities show a clear increase in the number of incidents (from 10,000 in 1994 to 87,000 in 2005). This evolution may possibly constitute evidence of rising social tensions and may in turn threaten the stability and durability of economic growth. The Chinese authorities are aware of the potentially harmful impact of inequality. The adoption of the 'Harmonious Society' political doctrine in 2006 aims to shift the focus from economic growth to more societal objectives, such as the reduction of inequality and the emergence of the middle class.

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[1] For a synthesis, see Li and Xu (2008) and Hao and Wei (2010).

The effect of changes in income distribution on social cohesion and political stability can be better understood by considering income polarization rather than income inequality. The phenomenon of polarization can be defined as "the extent to which a population is clustered around a small number of distant poles" (Esteban, 2002: 10) and is "closely linked to the generation of tensions, to the possibilities of articulated rebellion and revolt, and to the existence of social unrest in general" (Esteban and Ray, 1994: 820). In the Chinese context, there have been very few empirical analyses of income polarization. Zhang and Kanbur (2001) showed that income polarization indices do not provide significantly different evidence compared to inequality indices. However, their study highlighted a strong spatial polarization between rural and urban areas and also between coastal and inland provinces. More recently, Araar (2008) provided evidence of income polarization in China. However, the chief focus of Araar's paper is methodological rather than contextual. As argued by Chen and Zhang (2009), the analysis of income polarization should become a new focus of interest in the literature on inequality in China. The purpose of this paper is to investigate income polarization in rural and urban China by analyzing China Health and Nutrition Survey (CHNS) data over seven years between 1989 and 2006. To address China's polarization issues, the most recent methods are used – mainly kernel densities and the DER (Duclos-Esteban-Ray) index.

The paper is divided into four sections. Section one presents the methodological choices made in the paper. Section two presents the CHNS data. Section three discusses the extent and evolution of income polarization in rural and urban areas. Section four identifies the main sources of income polarization by identifying the contribution to overall polarization of the various components of income.

2. Concepts and methods

2.1. Kernel density

The Kernel density estimator is the continuous alternative to histograms and a non-parametric tool aimed at estimating the probability density function of a random variable. Suppose that $(x_1, x_2,…, x_N)$ is a sample from X, where X has an unknown density function f(x). The expression of kernel density estimation at point x is given by:

$$\hat{f}(x) = \frac{1}{n}\sum_{i=1}^{N} K\left(\frac{x - x_i}{h}\right) \quad (1)$$

Where K denotes the kernel function[2] and h is a bandwidth parameter. The main advantage of a kernel density approach compared to inequality indices is that it provides a picture of total income distribution. As explained by Jenkins (1995: 408), "the basic idea [of the kernel density approach] is that one slides a viewing window along the income scale, and the estimate of the density depends on the number of observations that happen to fall within the window as it passes". The degree of smoothing of the kernel density function depends on bandwidth h. A high level of h can produce an over-smoothed distribution, whereas a low level may result in an under-smoothed distribution. Many criteria have been proposed to determine optimal bandwidths.[3] Most procedures approximate the optimal bandwidth by minimizing an error measurement component under specific conditions. Among the available

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[2] In this paper, Gaussian kernel densities are used.
[3] For a synthesis, see Jones et al. (1996).

methods, this paper is based on the method developed by Sheather and Jones (1991).[4] The method involves an iterative approach which, as noted by Salgado-Ugarte (2003), has many excellent properties. In order to take into account the variability of densities between urban and rural areas and across years, a pooled bandwidth is also used, as suggested by Marron and Schmitz (1992). The pooled bandwidth is simply defined as the weighted mean of the initial bandwidths.

2.2. The concept of polarization

The concept of polarization was initially developed in sociology and political science in the 19th century. While Alexis de Tocqueville wrote about the rising equality of social conditions and the emergence of a middle class in industrial society, Karl Marx raised concerns about the growing disparities between the bourgeoisie and the proletariat. According to Marx, the polarization (or bipolarization) of society would inevitably lead to social conflict.

In economics, it was not until the early 1990s that the notion of polarization was formally analyzed, in Foster and Wolfson (1992), Wolfson (1994) and Esteban and Ray (1994). The specific objectives of these pioneer studies were to provide analytical tools for measuring the degree of income polarization and for testing the hypothesis of a declining middle class in industrialized countries. More recently, Duclos et al. (2004) developed a new methodology for improving the measurement of polarization. As explained by Gradin (2000: 457), the concept of polarization "is closely related to inequality; however its development emerged as a result of some dissatisfaction in the use of standard inequality measurement to deal with the formation of groups in a society".

Esteban and Ray (1994: 824) note that a polarized society is characterized by three features: (i) a small number of groups; (ii) a high degree of homogeneity within each group; and (iii) a strong degree of heterogeneity between groups. On this basis, they provide an analysis of polarization founded on an *alienation / identification* framework. Given a specific attribute (e.g. income), the identification component refers to homogeneity within groups, whereas the alienation component captures the extent of disparities between groups in terms of the specific attribute. Both elements, combined with the size of groups, produce significant antagonism among the population that may be harmful to social cohesion and lead to conflict.

2.3. Polarization indices

Gasparini et al. (2006) explain that income polarization can be classified into two distinct categories. In the first category, i.e. *polarization by characteristics*, groups are identified on the basis of a discrete characteristic (e.g. region, ethnic group, religion). In the second category, i.e. *pure income polarization*, groups are determined solely on the basis of income. The idea is that group members feel identification only with individuals of similar income levels. In this paper, we will refer to the second category and use three distinct indices.

Wolfson index (W)

The first pure polarization index was proposed by Foster and Wolfson (1992) and Wolfson (1994) and focuses on bipolarization. More precisely, the Wolfson index (W) is

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[4] This procedure was implemented using Xplore software: http://fedc.wiwi.hu-berlin.de/xplore.php.

derived from the Lorenz curve and measures twice the area between the Lorenz curve and the tangent line at the median point. Where f represents income distribution and L the Lorenz curve, the Wolfson index is expressed as follows:

$$W(f) = 2\frac{\mu}{m}\big[2[0,5 - L(0,5)] - G(f)\big] \quad (2)$$

Where L(0.5) is the income share of the bottom half of the population, μ and m are the median and mean incomes respectively, and G is the Gini index. The main drawback of the Wolfson index is that it captures only bipolarization around the median point, and therefore focuses on two groups of equal size.

Esteban-Gradin-Ray index (EGR)

Unlike the Wolfson index, the ER (Esteban-Ray) index allows K groups of potentially different sizes and is based on the identification / alienation framework (Esteban and Ray, 1994). It is given by:

$$ER = \sum_{i=1}^{K}\sum_{j=1}^{K}\pi_i^{1+\alpha}\pi_j\big|y_i - y_j\big| \quad (3)$$

With y_i the income of group i, π_i the share of group i in total population and α a parameter of sensitivity to polarization. When alpha = 0, the ER index is equivalent to the Gini index. The main drawback of the ER index is that it results in a loss of information about intra-group income distribution. This explains why Esteban et al. (2007) opted to extend the ER index by incorporating information concerning intra-group dispersion. Given a continuous income distribution f and a discrete income distribution ρ^* resulting from the partition, the EGR (Esteban-Gradin-Ray) index is expressed as follows:

$$EGR(f, \alpha, \rho^*, \beta) = ER(\alpha, \rho^*) - \beta\big[G(f) - G(\rho^*)\big] \quad (4)$$

It is equal to the ER index minus the gap between the Gini index measured for the initial continuous income distribution f and the Gini index calculated for the discrete distribution induced by the K-group partition (ρ^*). The main idea behind the correction is that there is a gap between the true Lorenz curve and the discrete Lorenz curve. In this paper, the EGR index is calculated by considering a two-group partition. The EGR methodology implies some drawbacks, mainly because of the arbitrary choice of the number of groups.

Duclos-Esteban-Ray index (DER)

Duclos et al. (2004) proposed a new measure of polarization. The advantages of the DER (Duclos-Esteban-Ray) index compared to the EGR index are that it is defined in a continuous form of income and does not require an arbitrary definition of the number of groups. Following Esteban and Ray (1994), the DER index analyzes polarization by referring to the identification / alienation framework. For an individual with income x, identification depends on the density function f(x). When considering two individuals with income x and y respectively, alienation is measured by the distance $|y - x|$. The interaction between the two components characterizes the antagonism from x to y, which can be represented by the following function:

$$T(I, A) \quad (5)$$

Where $I = f(x)$, $A = |y - x|$ and T is a continuous and non decreasing function such as $T(I, 0) = T(0, A) = 0$. A general polarization index can thus be defined as the sum of all antagonisms characterizing income distribution:

$$P(f) = \iint T(I, A) f(x) f(y) dy dx \quad (6)$$

Taking into account several axioms to determine the functional form of T, Duclos et al. (2004) proposed the following polarization index:

$$DER(f, \alpha) = \iint f(x)^{1+\alpha} f(y) |y - x| dy dx \quad (7)$$

The parameter α captures the degree of aversion to polarization and belongs to the interval [0.25; 1]. If $\alpha = 0$, the polarization index equals the Gini coefficient and ignores population clusters. For increasing values of α, the DER index emphasizes the growing importance of the formation of income groups in society.

Using this methodology, changes in polarization can be analyzed based on the contribution of alienation and identification and their correlation (joint co-movements). On the one hand, an increase in alienation will be associated with a rise in income distances (inequality). On the other hand, an increase in identification will imply a sharper definition of income groups, e.g. if the biggest clusters become even more populated. These two elements interact, and may reinforce or counterbalance each other.

For empirical purposes, Duclos et al. (2004) define a natural estimator for DER as follows:

$$DER(\hat{f}, \alpha) = \frac{1}{N} \sum_{i=1}^{N} \hat{f}(y_i)^{\alpha} \hat{a}(y_i) \quad (8)$$

Where $\hat{f}(y_i)^{\alpha}$ is the non-parametric estimation of $f(y_i)^{\alpha}$ derived from a Gaussian kernel density approach and where $\hat{a}(y_i)$ is given by:

$$\hat{a}(y_i) = \hat{\mu} + y_i \left(\frac{2i - 1}{N} - 1 \right) - \frac{1}{N} \left(2 \sum_{j=1}^{i-1} y_j + y_i \right) \quad (9)$$

$\hat{\mu}$ is the mean sample.

2.4. Decomposing the DER index

Decomposition by groups

Suppose that we are able to identify distinct groups (e.g. urban / rural). The objective of a group-based decomposition is to assess the proportion of overall polarization linked to within-group polarization and between-group polarization respectively. Let us denote by

ϕ_m the population share of group m and by ψ_m the income share of group m. Araar (2008) shows that the DER index can be decomposed as follows:

$$DER = \sum_m \phi_m^{1+\alpha} \psi_m^{1-\alpha} R_m DER_m + DER* \quad (10)$$

The first term is the within-group component. If a(x) is the alienation component and π(x) is the local proportion of households belonging to group m and earning income x, we have:[5]

$$R_m = \frac{\int a_m(x)\pi_m(x)f(x)^{1+\alpha} dx}{\phi_m \int a_m(x)f_g(x)^{1+\alpha} dx} \quad (11)$$

The second term (DER*) measures the between-group component. It is equivalent to the DER index when the within-group polarization is ignored, that is to say when we assume that every household earns the mean income of its group:

$$DER* = \sum_m \phi_m^{1+\alpha} a(\dot{\mu}_m) \quad (12)$$

With $\dot{\mu}_m = \mu_m / \mu$.

Decomposition by income components

The decomposition of the DER index by income components provided by Araar (2008) is derived from the Gini decomposition proposed by Rao (1969). Let us suppose that total income can be decomposed by several income sources and that ψ_k is the share of source k in total income. Following Araar (2008), the DER index is given by:

$$DER = \sum_k \psi_k CP_k \quad (13)$$

Where CP_k is the pseudo-polarization index of income source k. Araar (2008: 14) explains that this pseudo-polarization index "is similar to the concentration index except for its sensitivity to income identification component, $f(x)^\alpha$ ".

3. Data

Chen and Zhang (2009) emphasize the great variety of household level data in China. While the wide range of household data may represent a significant advantage, it may also cause problems of comparability between various empirical studies on income inequality. The most popular household data are those provided by the National Bureau of Statistics (NBS), the Research Centre on the Rural Economy (RCRE), the China Household Income Project (CHIP) and the China Health and Nutrition Survey (CHNS). Although NBS surveys constitute official Chinese data, they present many drawbacks (Bramall, 2001). Firstly, they

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[5] Araar (2008) explains that if income groups do not overlap, $\pi_m(x) = 1$ and consequently $R_m = 1$.

are based on a narrow definition of household income, since NBS data leave out crucial elements of income, such as various kinds of subsidies (Gao and Riskin, 2009). Secondly, the sampling scheme is based on the household registration system (i.e. the hukou system)[6] rather than a population census. Rural migrants in cities are therefore not included in the sample (Bramall, 2001; Benjamin et al., 2005a; Ravallion and Chen, 2007). Thirdly, as explained by Ravallion and Chen (2007), there is an underrepresentation of poor households living in remote rural areas. In view of these weaknesses (largely addressed in the literature), this research uses alternative data sources. RCRE data are specific to rural areas, whereas CHIP and CHNS data cover both urban and rural areas. Many studies on income inequality are based on CHIP data. However, the most recent year for which CHIP are available is 2002, which is not recent enough for providing relevant information on the recent evolution of Chinese income distribution. This explains why CHNS data were used, since data are available for 2006.

The CHNS is a longitudinal survey conducted by an international collaborative project involving the Carolina Population Centre at the University of North Carolina, the National Institute of Nutrition and Food Safety, and the Chinese Centre for Disease Control and Prevention. CHNS data cover a wide range of topics. Although the main aim of the survey is to analyze health, nutrition and family planning in rural and urban China, other information concerning income, the labor market and education is also collected. The survey includes seven waves (1989, 1991, 1993, 1997, 2000, 2004 and 2006). The period covered is therefore long enough to provide a long-term view of the impact of Chinese reforms on income distribution. The population size for 1989, 1991, 1993, 1997, 2000, 2004 and 2006 is respectively 3,743, 3,586, 3,410, 3,805, 4,300, 4,318, and 4,359 households. This means that approximately 14,000 individuals were surveyed during each wave. CHNS data cover nine provinces, including Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Liaoning and Shandong.[7] Although the survey is not nationally representative, provinces are selected to provide a highly diversified picture of geographic and socioeconomic characteristics. For instance, the survey covers both coastal and mainland provinces, but also rich provinces (Jiangsu and Shandong) and poorer provinces (Guizhou). CHNS data are representative of rural and urban areas and of each province. The main drawback of CHNS data is that major Chinese cities such as Beijing, Shanghai, Guangzhou, Shenzhen, Tianjin or Hong Kong are not covered.

CHNS household income includes wages, retirement income, business income, agricultural income, subsidies and other income (private transfers and rents). In this paper, annual per capita household income expressed at 2006 prices was used. One advantage of CHNS data is that they provide a consumer price index that is specific to rural and urban areas but also to the different provinces included in the sample. Therefore, the income measure provided in this paper incorporates both temporal and spatial prices differences.

Table 1 summarizes descriptive statistics for global, rural and urban per capita household income. Over the period 1989-2006, the mean income increased by 181 %, reaching 7,371 Yuan in 2006. All in all, the mean urban household income is higher than the mean rural household income, but the distribution of income appears to be more heterogeneous in urban areas. For instance, in 2006, the coefficient of variation was 1.32 for

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[6] The hukou system involves a household registration system that categorizes individuals as urban or rural residents.
[7] A number of changes concerning the provinces covered by the survey were made between 1989 and 2006. For instance, in 1989, only eight provinces (Heilongjiang excluded) were covered.

urban incomes and only 1.26 in the case of rural incomes. Furthermore, the mean urban household income increased faster than the mean rural household income (+194% against +147%). The ratio of urban to rural mean income has increased, especially since the beginning of the 2000s. The discrepancy of income growth rates may have the effect of increasing the gap between urban and rural areas.

Table 1: Key figures on annual per capita household income (Yuan, 2006 prices).

	Total			**Rural**			**Urban**			**Urban to rural ratio**
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.	
1989	3743	2622.48	2628.83	2493	2339.09	2513.62	1250	3187.65	2760.15	1.36
1991	3586	2559.60	1913.57	2420	2347.71	1957.51	1166	2999.37	1739.22	1.28
1993	3410	2955.11	2552.89	2368	2723.62	2378.51	1042	3481.18	2842.52	1.28
1997	3805	3702.15	3100.10	2548	3479.72	3026.37	1257	4153.04	3198.52	1.19
2000	4300	4785.22	4989.58	2915	4298.59	4601.16	1385	5809.43	5586.48	1.35
2004	4318	6371.11	6691.68	2940	5570.92	5984.01	1378	8078.32	7724.82	1.45
2006	4359	7371.00	9791.70	2959	6417.23	8084.17	1400	9386.84	12429.53	1.46

Source: CHNS.

4. Extent and evolution of income polarization

4.1 Overall inequality and polarization

Table 2 presents trends in inequality and polarization from 1989 to 2006. There are two distinct phases in the evolution of inequality and polarization indices. Inequality decreased in the early 1990s before stagnating until the end of the decade. In 1989 and 1997, the inequality level remained almost the same irrespective of the index considered. The late 1990s represent a turning point in income disparity trends. From 1997 to 2006, household income inequality soared, with the Gini and Theil indices increasing from 0.401 to 0.513 (+27.9%) and from 0.273 to 0.480 (+75.8%) respectively.

Table 2: Inequality and polarization indices, all households.

	Gini	**Theil**	**W**	**EGR**[1]	**DER**[2]			
					Total	Alienation	Identification	Correlation
1989	0.391	0.286	0.170	0.137	0.232	0.391	0.687	-0.137
1991	0.372	0.234	0.169	0.132	0.225	0.372	0.689	-0.121
1993	0.413	0.291	0.199	0.148	0.241	0.413	0.679	-0.139
1997	0.401	0.273	0.185	0.143	0.235	0.401	0.679	-0.137
2000	0.448	0.356	0.202	0.159	0.252	0.448	0.669	-0.158
2004	0.483	0.395	0.239	0.175	0.269	0.483	0.666	-0.165
2006	0.513	0.480	0.253	0.185	0.283	0.513	0.679	-0.187

Notes: (1) Based on a two-group partition; (2) For α =0.5.
Source: CHNS.

Polarization indices do not highlight significantly different trends, although the overall trend is significantly more attenuated.[8] The FW and EGR indices – both hypothesizing two income groups in the present case – suggest that income bipolarization increased by 48.8 % and 35 % respectively between 1989 and 2006. However, the majority of the increase occurred between 1997 and 2006. The DER polarization index followed a similar evolution. For $\alpha = 0.5$,[9] the DER polarization index remained relatively stable between 1989 and 1997 (at approximately 0.23). Between 1997 and 2006, the DER index increased continuously (+20.4 %), reaching 0.283 in 2006. This indicates that household income is relatively polarized in China. As a comparison, Duclos et al. (2004) found that Russia and Mexico recorded high income polarization levels in the mid-1990s, with a DER index of 0.257 and 0.283 respectively.

Based on kernel densities (Figure 1), the increase of polarization implies a significant shift of household income distribution between 1989 and 2006. In 1989, household income distribution has a unimodal shape, with a modal value at around 2,000 Yuan. In 2006, income distribution differed significantly and became clearly multimodal. The highest peak is still at around 2,000 Yuan, but three local modes appear in the right tail, at approximately 4,000, 6,500 and 9,000 Yuan. A bump close to 15,500 Yuan is also found. In fact, the emergence of local modes reveals the constitution of population clusters, especially in the middle and upper income classes. There is also a reduction in the thickness of the tail relative to the lowest income ranges. This can be explained by the significant decline in poverty since the beginning of economic reforms.[10] Overall, between 1989 and 2006, the dramatic shift in density curves confirms the view that household income in China is becoming ever more polarized.

The distinction between alienation and identification components can be used to extend the analysis. Table 2 shows that the increase in polarization is mainly due to the hugely significant rise in the alienation component (i.e. the rise of inequality). However, this increase is counterbalanced and attenuated by the relative stability (or even slight decrease) of the identification component. Therefore, we may conclude that social tensions have increased in Chinese society as a result of exacerbated differences between income groups (i.e. increasing alienation). Nevertheless, the risk of social unrest is probably still limited since individuals do not identify more than before with their income group.

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[8] Zhang and Kanbur (2001) also found that inequality and polarization measures increased at a substantially different rate over the period 1983-1995.

[9] Only the trends in DER index for $\alpha = 0.5$ are reported since values close to 0.25 and 1 may conflict with some axioms (Duclos et al., 2004: 1744 and 1758). The estimation of DER indices with $\alpha = 0.25$ and $\alpha = 0.75$ are reported in the annexes (Table A1).

[10] As an illustration, Ravallion and Chen (2007) showed that the proportion of Chinese people living in poverty dropped from 53 % to 8 % between 1981 and 2001.

Figure 1: Kernel density for income distribution, all households.
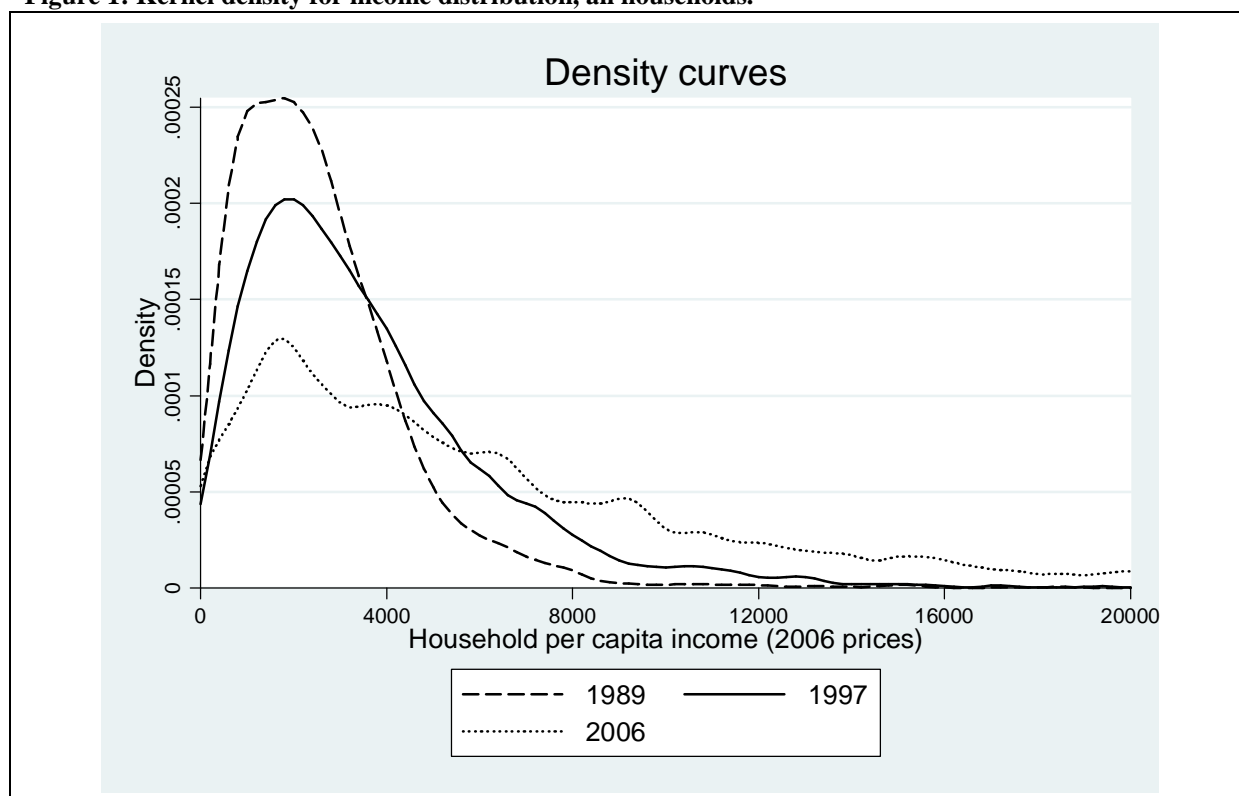
Note: Optimal bandwidth = 307.881 Yuan.
Source: CHNS.

4.2 Decomposition by group

To complete the analysis, this subsection focuses on rural-urban income disparities. Decomposition procedures are used to assess the contribution of between-group and within-group disparities to overall inequality and polarization. The between-group component measures the contribution of the urban-rural income gap to inequality and polarization, whereas the within-group component accounts for income disparities within rural and urban areas. The results are presented in Table 3.

Table 3: Inequality and polarization indices decomposition by groups (rural-urban). Relative contributions of within-group and between-group components.

	Gini			**Theil**		**DER**[1]	
	Within	Between	Overlap	Within	Between	Intra-group	Inter-group
1989	0.536	0.184	0.280	0.960	0.039	0.538	0.462
1991	0.549	0.150	0.301	0.971	0.030	0.549	0.451
1993	0.557	0.132	0.311	0.977	0.023	0.562	0.438
1997	0.547	0.100	0.353	0.987	0.013	0.550	0.450
2000	0.538	0.154	0.308	0.971	0.030	0.545	0.455
2004	0.528	0.177	0.295	0.958	0.041	0.537	0.463
2006	0.527	0.171	0.302	0.962	0.035	0.535	0.465

Note: (1) For α =0.5.
Source: CHNS.

The rural-urban decomposition of Theil and Gini indices indicates that the between component decreased from 1989 to 1997,[11] before increasing slightly between 2000 and 2006. But the contribution of the between-group component to overall inequality is very limited (on average less than 4 % for the Theil index and 16 % for the Gini index). This may suggest that, based on CHNS data, the urban-rural gap is not as considerable as previous studies had found (e.g. Gustafsson and Li, 2001; Sicular et al., 2007). However, this finding is consistent with the study by Benjamin et al. (2005a), which also reports a similar counter-result. Benjamin et al. found that the urban-rural gap only accounts for a small part of the overall inequality and that rural income follows the urban income trend. In fact, the low contribution of the rural-urban gap to overall inequality is likely compensated by a significant contribution of regional disparities, especially between coastal and inland provinces.[12] In the rural-urban decomposition used in this paper, the coastal-inland gap is included in the within component and therefore explains the significant contribution of intra-group inequality.

Strikingly, the decomposition of the DER index is far more balanced. Income polarization is slightly more influenced by the within component, the relative contribution of which (53.5 % in 2006) suggests the existence of income divergences in rural and urban areas. Nevertheless, the non-negligible contribution of between-group variations (46.5 % in 2006) implies that there are significant differences between rural and urban income polarization.

4.3 Rural and urban income polarization

In view of the significant contribution of within-group inequality and polarization, the level and evolution of disparities within rural and urban areas will now be examined. Tables 4 and 5 report inequality and polarization indices for both areas.

Table 4: Inequality and polarization indices, rural households.

	Gini	Theil	W	EGR[1]	DER[2] Total	Alienation	Identification	Correlation
1989	0.424	0.325	0.201	0.152	0.247	0.424	0.651	-0.103
1991	0.401	0.274	0.188	0.143	0.237	0.401	0.663	-0.106
1993	0.426	0.305	0.207	0.154	0.248	0.426	0.658	-0.114
1997	0.414	0.289	0.200	0.149	0.242	0.414	0.663	-0.117
2000	0.457	0.368	0.217	0.163	0.257	0.457	0.643	-0.123
2004	0.485	0.402	0.238	0.175	0.269	0.485	0.637	-0.125
2006	0.516	0.477	0.253	0.187	0.283	0.516	0.646	-0.147

Notes: (1) Based on a two-group partition; (2) For α =0.5.
Source: CHNS.

Rural inequality remained relatively stable until 1997, whereas urban inequality began to increase from 1993. Furthermore, the rise in inequality was more substantial in urban areas, where the Gini coefficient increased by 56.1 % between 1989 and 2006, compared to just 21.7 % in rural areas. As a result, income inequality was still higher in rural areas than in urban areas in 2006, but the gap has narrowed since urban disparities increased faster than rural disparities. The DER index suggests that income polarization is also higher for rural

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[11] Using household data from 1978 to 1997, Yang and Fang (2003) calculated income and consumption ratios and also reported a decline in the rural-urban gap since 1993.

[12] In this respect, Kanbur and Zhang (1999), and Zhang and Yao (2001) used provincial data and found that the inland-coastal gap increased sharply throughout the 1990s and became the major component of overall inequality.

households, as noted previously by Zhang and Kanbur (2001). However, in addition to inequality, the increase in polarization is far more striking in urban areas, where the DER index increased from 0.201 to 0.266 (+32.3 % compared to just +14.6 % in rural areas).

**Table 5: Inequality and polarization indices, urban households.**

	Gini	Theil	W	EGR[1]	DER[2]			
					Total	Alienation	Identification	Correlation
1989	0.310	0.202	0.115	0.105	0.201	0.310	0.722	-0.097
1991	0.297	0.152	0.118	0.102	0.194	0.297	0.715	-0.080
1993	0.373	0.249	0.161	0.131	0.223	0.373	0.707	-0.145
1997	0.370	0.238	0.149	0.128	0.220	0.370	0.700	-0.142
2000	0.413	0.311	0.168	0.143	0.236	0.413	0.704	-0.179
2004	0.455	0.345	0.214	0.162	0.253	0.455	0.701	-0.197
2006	0.484	0.441	0.214	0.170	0.266	0.484	0.713	-0.215

Notes: (1) Based on a two-group partition; (2) For $\alpha = 0.5$.
Source: CHNS.

The analysis of density curves sheds light on the underlying phenomena associated with the surge in rural and urban polarization. Figure 2 shows that in 1989, the kernel density curve for rural areas is unimodal, with a modal value of approximately 1,000 Yuan. In 2006, this mode rises to 1,600 Yuan, but the income distribution also becomes multimodal. Several local modes emerge at around 4,500, 6,000 and 9,000 Yuan. The left tail of the distribution thins down considerably, indicating a decline in the concentration at the lowest income levels. This shift can be related to the significant decline in poverty in rural areas. As an illustration, Ravallion and Chen (2007) found that approximately 75-80 % of the decline in national poverty incidence is due to poverty reduction in rural sectors. There is also evidence of a change in density toward middle and upper income levels, which become more concentrated. This suggests that some individuals are becoming clustered around local modes in the middle-upper income ranges. The shift in density curves is even more striking in urban areas, as shown in Figure 3. Whereas the shape of the distribution is leptokurtic and unimodal in 1989, it becomes nearly platykurtik in 2006. The former modal value (at around 2,500 Yuan) turns into a slight bump, and two modal values appear at approximately 3,500 and 6,500 Yuan. Note also the emergence of two other local modes, at around 9,000 and 15,000 Yuan. These local modes provide evidence of a considerable shift of density toward middle and upper income ranges and support the idea of an emerging urban middle class.[13] Furthermore, and contrary to rural areas, we may also note that the very left tail of the distribution thickens significantly. Following Wang (2004), this may lend support to the idea of a "new urban poverty" in China. The new urban poverty and the emergence of middle and upper income classes are the main phenomena associated with the surge in urban polarization. From our point of view, these factors suggest that the risk of social unrest is more prevalent in Chinese cities than in rural areas.

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[13] By identifying the middle classes in developing countries as people belonging to households with a per capita consumption above the median poverty line and below the US poverty line, Ravallion (2010) showed that the middle class increased by 1.2 billion of people between 1990 and 2005, and that half of this surge can be attributed to China.

Figure 2: Kernel density for income distribution, rural households.
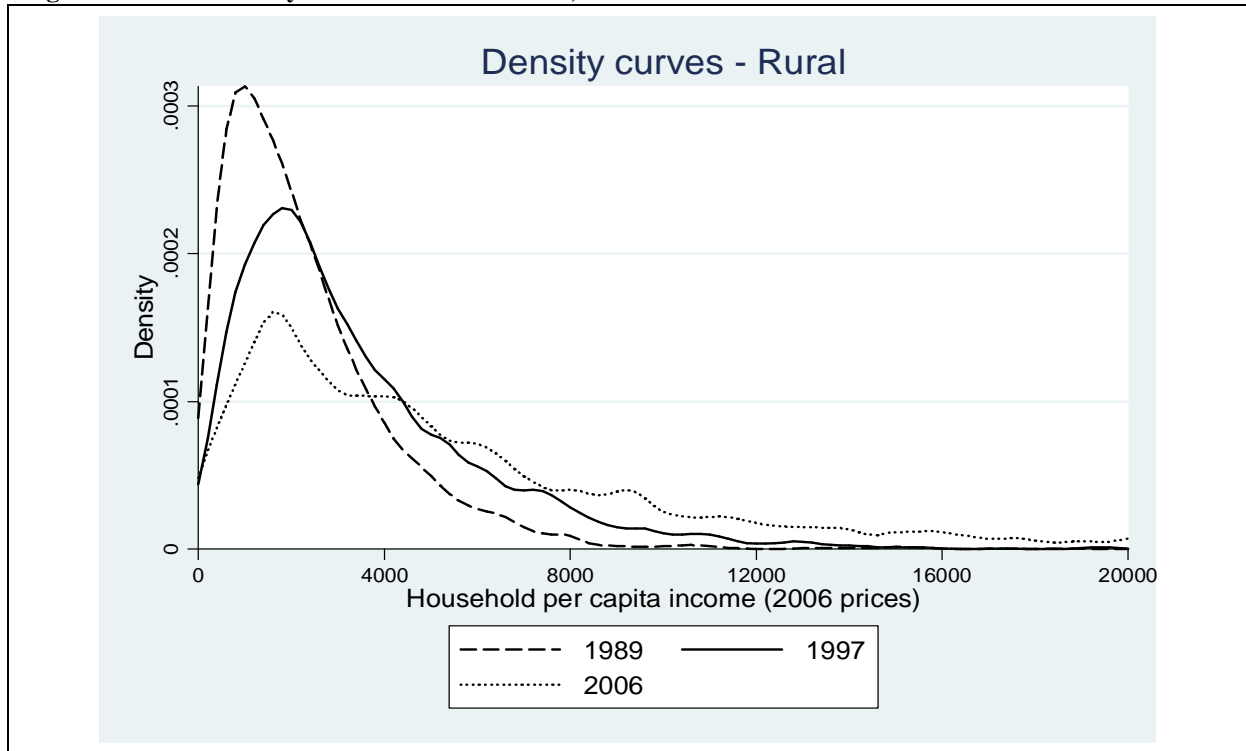
Note: Optimal bandwidth = 288.693 Yuan.
Source: CHNS.

Figure 3: Kernel density for income distribution, urban households.
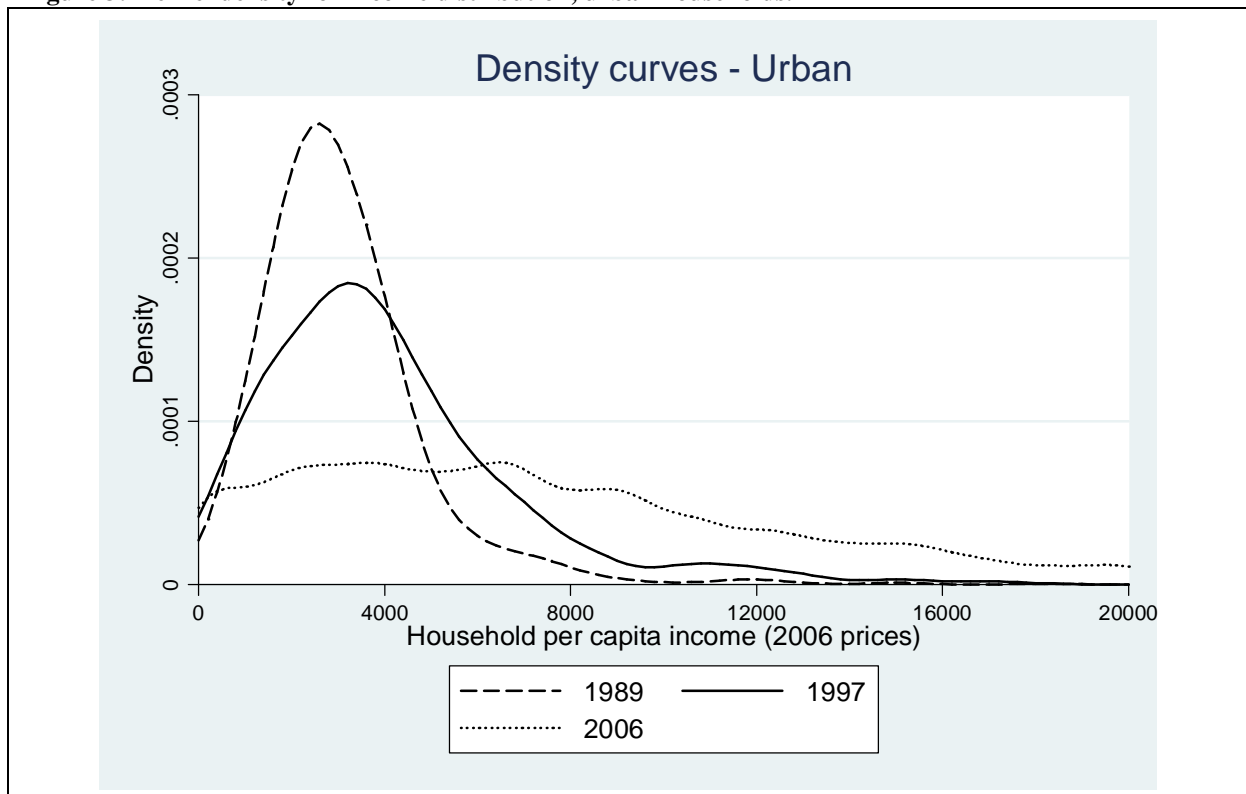
Note: Optimal bandwidth = 577.49 Yuan.
Source: CHNS.

To provide a more detailed analysis, rural-urban differences can be further clarified and explored in the light of the decomposition of DER indices into alienation and identification components, as shown in Tables 4 and 5. Despite the rise in the alienation component for rural households, the increase in rural income polarization is moderate since the identification component has stagnated and even slightly decreased since 2000. In other words, income disparities between rural households are accentuated but rural households become a little more scattered around the mean income of their group. The decrease in the identification component in rural areas suggests that households in the same range of income are less and less similar and so are less aware of sharing common interests. In urban areas, the trend of alienation and identification components is relatively similar, but the increase in polarization was more significant since the rise in the alienation component is associated with a relative stability of the identification component. Furthermore, the level of identification is significantly higher in cities than in rural areas, thus confirming the idea that social tensions are more likely to occur in urban areas than in rural areas. The rural-urban gap concerning the identification component also serves to explain the non-negligible share of the between-group component in the DER index (compared to the inequality indices).

5. The sources of income polarization

Based on CHNS data, household income can be broken down into six components: wages, business income, agricultural income, subsidies, retirement income and other income. Agricultural income includes farming, fishing, gardening and livestock incomes. Other income includes a range of components such as rents from leased land and non-land assets, money from family, friends or relatives (including remittances from rural migrants in Chinese cities), the value of in-kind gifts from family, friends or relatives and enterprises. Following Gao and Riskin (2009), these components are also aggregated to distinguish market income (wages, business income and agricultural income), social benefits (retirement income and subsidies) and other income.

Tables 6 and 7 present the results of the DER decomposition by income components, for rural and urban households respectively in 1989, 1997 and 2006.[14] Three elements are reported: the share of different components in total income, the concentration index associated with each component (pseudo-polarization), and the contribution of each component to overall polarization. On this basis, an income source may be considered to be depolarizing (polarizing) if its contribution to polarization is lower (greater) than its share in total income or if the concentration index of the component is lower (greater) than the overall DER index.

5.1. Rural areas

As previously noted, Table 6 indicates a stability of income polarization between 1989 and 1997 and a significant increase from 1997 to 2006. While the share of social benefits is relatively constant between 1989 and 2006, a decrease in the proportion of market income in total income and an increase in other income is observed. Nevertheless, market income is still predominant in 2006, representing roughly 75% of total income.[15] In 2006, other income accounts for 16% of total income (compared to just 5% in 1989).[16] This trend provides evidence of the increasing role of remittances from rural migrants to cities. The loosening of

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[14] The results of the decomposition for the whole sample are reported in table A2 in the annex.

[15] Using CHIP data, Gao and Riskin (2009) also highlight the predominance of market income in rural areas.

[16] The impact of other income on polarization is neutral insofar as its contribution to polarization is equal to its share in total income.

the constraints imposed by the hukou system[17] on rural-urban migration facilitated mass migration flows during the 1990s and the 2000s. According to Li (2008), the number of rural out-migrant workers increased from 2 million in 1978 to 30 million in 1989 and to over 130 million in 2006.

For market income, the results indicate a decline of agricultural income compared to non agricultural income (wages and business income). The comparison of the share of both components in total income with their contribution to polarization indicates that a disequalizing income component (i.e. non agricultural income) replaced an equalizing income component (i.e. agricultural income). The change in the structure of market income explains why market income was a polarizing component in 2006, whereas it was relatively depolarizing in 1989. The role of non-farm income in the increase of rural income inequality has already been largely documented (Hare, 1994; Benjamin et al., 2005a, 2005b; Chen and Zhang, 2009; Gao and Riskin, 2009).

The depolarizing effect of agricultural income is linked to a relatively egalitarian land distribution. For instance, Wan and Zhou (2005) show that among capital endowments and geographic factors, the only determinant that contributes negatively to inequality is land. In 1989, agricultural income accounted for almost 50% of the total income of rural households. As suggested by Benjamin et al. (2005a), this is a reflection of the fact that nearly all rural households in China had been allocated land. However, the structure of rural market income had changed drastically by the end of the period. In 2006, agricultural income accounted for just 26% of total income, whereas the proportion of non agricultural income (wages and business income) reached 47%. According to Benjamin et al. (2005a), the expansion of Township and Village Enterprises (TVEs) in the 1980s and 1990s contributed significantly to the development of off-farm opportunities in some rural areas. TVEs are economic units located in rural areas, which are not involved in agriculture but in industry or services (Fu and Balasubramanyam, 2003). They consist of the former commune and brigade enterprises, which were renamed township enterprises and village enterprises respectively in 1984. In a broad sense, TVEs also include farmers' cooperatives and individual or family businesses. Based on this broader definition, official statistics show that between 1978 and 2003, the number of TVEs was multiplied by 4.8, increasing from 28.3 to 135.7 million (Yang, 2005). The main point is that non-farm income is clearly polarizing whereas agricultural income is still depolarizing. The 2006 values of the concentration indices provide clear evidence of this gap. The concentration or pseudo-polarization index for agricultural income is under 0.16, whereas it is above 0.3 for wages and business income. We suggest that the capacity of some rural households to benefit from non-farm opportunities probably accounts for the constitution of identified clusters in the middle (middle class?) of the 2006 rural income distribution, as highlighted by kernel densities. In other words, the increase in income polarization in rural areas is closely linked to the inequality of opportunities for non-farm activities.

The proportion of social benefits in total income remained relatively stable between 1989 and 2006 and was extremely low (around 10%). Nonetheless, a rise in the share of retirement income from 1% in 1989 to 9% is observed in 2006. However, retirement income in rural China is limited compared to urban areas, where it reaches 33% of total income (Table 7). Moreover, retirement income is a polarizing component since its contribution to the

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[17] The hukou system was established as a permanent system in 1958 to control migration from rural to urban areas. Under this system, rural migrants to cities had at best a temporary permit of residency and were deemed more often to be clandestine. The system has created strong barriers between rural areas and cities but was relaxed from the mid 1990s. For further information about the hukou system, see Chan and Buckingham (2008).

DER index is higher than its share in total income. Several studies examining the Chinese pension system have emphasized the marginal role of the social benefits system (particularly pensions) in rural areas (Hu, 2006; Gao, 2008). As explained by Gao (2008: 345), "only a very small privileged group of rural residents has had access to pensions due to their prior employment in state-owned or collective enterprises". The 'five guarantees' program was designed to assist the most vulnerable elderly people in rural areas by providing food, clothing, housing, medical assistance and burial expenses. Eligible individuals include those with no family members to support them, no ability to work and no source of income. These restrictive conditions explain why only a minority of Chinese rural elders have been able to benefit from this system (Lowry, 2009; Shen and Williamson, 2010).[18] The assistance provided to beneficiaries is not adequate in many rural areas (Gao, 2008). The introduction of a pension scheme in rural areas is a major task for the objective of poverty reduction in rural areas and may contribute to the reduction of the degree of income polarization in rural China.[19]

Overall, the results concerning income polarization tend to confirm the findings highlighted in the literature dealing with inequality: the rise of rural polarization and inequality is closely linked to non agricultural opportunities in rural areas.

5.2. Urban areas

The results of the decomposition of the DER index by income components point to a relative stability of the three main components of income (market income, social benefits and other income) in urban areas, if we compare 1989 and 2006. While a predominance of market income (74% in 2006) was found in rural areas, the income structure appears to be more balanced in cities: 56% for market income, 34% for social benefits and 10% for other income. Despite this relative inertia, the share of other income increased significantly over the period, from 4% in 1989 to 10% in 2006. This component is relatively depolarizing since its contribution to polarization is lower than its share in total income. This is indicative of the increasing role of private transfers and social networks in mitigating inequality and polarization.

When considering market income, the main result concerns the polarizing effect of wages, irrespective of the year considered. For instance, in 2006, the share of wages in total income was 47%, whereas its contribution to the DER index reached 52% and the gap was far more pronounced in 1989 (49% compared to 58%). The disequalizing effect of wages has already been emphasized in the literature and is closely linked to the gradual transition to market mechanisms (Gustafsson and Li, 2001; Khan and Riskin, 2005; Benjamin et al., 2005a; Knight and Song, 2006; Gustafsson et al., 2008). First, the liberalization of the urban labor market, even within the state sector, has resulted in increased wage inequality since the method of wage determination takes better account of differences in productivity. Second, the restructuring of State enterprises (particularly their increased freedom to hire or lay off workers) has resulted in significant unemployment and has consequently increased inequalities in access to employment.

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[18] In 2007, 5.3 million rural elderly people benefited from the five guarantees system, while 3.9 million people benefited from the old pension scheme. Given that there are 100 million elders in rural areas, the coverage rate is less than 10% (Shen and Williamson, 2010).

[19] In 2009, the Chinese authorities began to implement a new rural pension reform articulated around four principles: (i) a guaranteed basic benefit; (ii) wide coverage; (iii) regional flexibility; and (iv) sustainability (Shen and Williamson, 2010).

Table 6: DER index decomposition by income components (α = 0.5), rural households.

	1989			1997			2006		
	Income share	Concentration index	Contribution to polarization	Income share	Concentration index	Contribution to polarization	Income share	Concentration index	Contribution to polarization
Market income	**0.84**	**0.233**	**0.80**	**0.85**	**0.240**	**0.85**	**0.74**	**0.273**	**0.71**
Agricultural income	0.47	0.156	0.30	0.39	0.135	0.22	0.26	0.157	0.15
Business income	0.07	0.289	0.08	0.15	0.305	0.19	0.12	0.315	0.13
Wages	0.30	0.340	0.42	0.31	0.342	0.44	0.35	0.345	0.43
Social benefits	**0.11**	**0.340**	**0.16**	**0.05**	**0.345**	**0.07**	**0.10**	**0.366**	**0.13**
Subsidies	0.10	0.339	0.14	0.02	0.344	0.02	0.01	0.359	0.02
Retirement	0.01	0.354	0.02	0.03	0.345	0.05	0.09	0.367	0.11
Other income	**0.05**	**0.242**	**0.04**	**0.10**	**0.198**	**0.08**	**0.16**	**0.275**	**0.16**
DER index		**0.247**			**0.242**			**0.283**	

Source: CHNS.

Table 7: DER index decomposition by income components (α = 0.5), urban households.

	1989			1997			2006		
	Income share	Concentration index	Contribution to polarization	Income share	Concentration index	Contribution to polarization	Income share	Concentration index	Contribution to polarization
Market income	**0.59**	**0.235**	**0.69**	**0.70**	**0.232**	**0.74**	**0.56**	**0.272**	**0.57**
Agricultural income	0.04	0.145	0.03	0.02	0.169	0.02	0.01	0.080	0.00
Business income	0.06	0.263	0.08	0.13	0.212	0.13	0.08	0.173	0.05
Wages	0.49	0.238	0.58	0.55	0.239	0.59	0.47	0.292	0.52
Social benefits	**0.37**	**0.146**	**0.27**	**0.21**	**0.206**	**0.20**	**0.34**	**0.288**	**0.37**
Subsidies	0.30	0.129	0.19	0.08	0.255	0.09	0.03	0.322	0.04
Retirement	0.07	0.219	0.08	0.13	0.177	0.11	0.31	0.284	0.33
Other income	**0.04**	**0.216**	**0.04**	**0.09**	**0.158**	**0.06**	**0.10**	**0.159**	**0.06**
DER index		**0.201**			**0.220**			**0.266**	

Source: CHNS.

The main significant evolution of the urban income structure concerns social benefits. A significant decrease in the share of social benefits is observed, particularly between 1989 and 1997.[20] This decline is explained primarily by the decrease in the share of subsidies from 30% to 8%. The declining role of subsidies has already been addressed in previous studies (Khan et al. 1999; Benjamin et al., 2005a). During the pre-reform period, subsidies on food, housing and transport services were publicly funded and relatively equally allocated by work units. Subsidies were slashed in the 1990s, thereby removing the main inequality-attenuating component of income.

The decline in subsidies was compensated by a significant increase in the proportion of retirement income between 1997 and 2006. The expansion of retirement income is linked to the urban pension reform introduced in 1997. In 1997, the State Council promulgated a *Decision on establishing a uniform basic old age insurance system for enterprise employee*s aimed at establishing a multi-pillar system combining a public mandatory pension and a private voluntary pension.[21] Contrary to subsidies, retirement income exerts a polarizing effect since its contribution to polarization is stronger than its share in total income in 2006. Wage differentials created by the liberalization of the urban labor market are now reproduced at retirement age. This explains why the substitution of retirement income for subsidies resulted in a polarizing effect of social benefits in 2006, whereas they were relatively depolarizing in 1989.

The study by Benjamin et al. (2005a) draws a distinction between transition process and development process to explain the rise of inequality in China. The development process describes a pure scale effect by which economic growth improves the standard of living. The transition process captures the effect of institutional change and in particular the shift toward market mechanisms for the valuation of productive endowments. Although it is impossible to clearly identify both effects, the distinction helps to explain the rise in polarization in urban China. In the previous section, the analysis of kernel densities served to highlight a shift from a leptokurtic and unimodal income distribution in 1989 to a platykurtik and multimodal distribution in 2006. In other words, two underlying phenomena are associated with increased polarization: (i) a decrease in the density of low income levels resulting in the quasi-disappearance of the mode in the bottom of distribution and (ii) the emergence of middle and upper income classes characterized by the appearance of several local modes. The decrease in the proportion of households with low incomes is likely related to the development effect and to the continuous increase in mean income induced by economic growth. The emergence of local modes in the 2006 distribution is more strongly related to the transition process. The liberalization of the urban labor market and state enterprises has resulted in inequalities of access to employment and wage disparities. This paper suggests that these inequalities account for the clustering of population around intermediate and high income levels.

6. Conclusion

The purpose of this article was to contribute to the analysis of Chinese income inequality by focusing more specifically on income polarization. As suggested by Esteban and Ray (1994), the risk of social tensions is better addressed by polarization than inequality since polarization focuses on the formation of groups and captures both alienation (i.e. the degree of heterogeneity between groups) and identification (i.e. the degree of homogeneity within

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[20] The decrease in subsidies resulted in a relative increase of market income, particularly wages.

[21] This program has been followed by other decisions. For a discussion, see Hu (2006).

groups). The analysis of income polarization conducted in this paper was based on CHNS household level data from 1989 to 2006 and relied primarily on the DER (Duclos-Esteban-Ray) index, its decompositions (by groups and by income sources) and kernel densities.

Six main results can be drawn from the various investigations conducted as part of this study. First, two phases can be identified in the evolution of income inequality and polarization: (i) a period of stagnation between 1989 and 1997 and (ii) a period of increase from 1997 to 2006. It is important to note that the rise in polarization is more moderate than the increase of inequality. In fact, the increase in the alienation component is attenuated by the relative stability of the identification component. Nonetheless, the level of polarization in 2006 is high and comparable to the level prevailing in highly-polarized countries such as Russia and Mexico (Duclos et al., 2004). Second, the increase in polarization conceals dramatic shifts in the income distribution, as indicated by kernel densities. More precisely, the income distribution moved from a leptokurtic and unimodal shape in 1989 to a more platykurtik and multimodal shape in 2006. This provides evidence of the emergence of middle and upper income classes in both rural and urban areas. Third, the share of the between-group (rural-urban) component in overall polarization is higher than the share of the between-group component in overall inequality. This indicates a significant degree of rural-urban polarization, as emphasized by Zhang and Kanbur (2001). Fourth, even if the level of income polarization is higher in rural areas, the increase in polarization is far more conspicuous in urban areas, suggesting that the risk of social tensions is more pregnant in Chinese cities. Fifth, the analysis of the sources of income polarization in rural areas shows that the increase in polarization is closely linked to non agricultural opportunities issued from Township and Village Enterprises (TVEs). Sixth, in urban areas, the emergence of identified groups in middle and upper income classes, characterizing the rise in polarization, can be explained by two phenomena: (i) the sharp decline in subsidies, which were a depolarizing income component, and (ii) the liberalization of the urban labor market and state enterprises, resulting in inequalities in access to employment and wage disparities.

To a great extent, the increase in inequality and polarization in China is linked to the development strategy implemented since the 1980s. Based on Deng Xiaoping's decision to 'let some people get rich first', the first stage of economic reforms has clearly favored coastal provinces and cities. The implemented policies have enabled China to grow rapidly, but have also resulted in increased social and regional disparities. The risk of social unrest associated with an increasingly divided society has recently raised concerns among Chinese authorities. Contrary to previous governments, Hu Jintao's administration recognizes that China needs to move toward a new stage of development based on 'common prosperity'. In this respect, the Chinese Communist Party adopted the concept of 'harmonious society' in 2006 aimed at achieving a fairer and more balanced development. The 11th Five-Year Plan (2006-2010), which emphasizes the issues of distribution and sustainability, shows that the promotion of a 'harmonious society' has become a new priority (Fan, 2006). The shift toward societal objectives appears to be even more obvious following the recent adoption of the 12th Five-Year Plan (2011-2015) in March 2011. The Chinese authorities have identified several threats to ongoing development and have proposed guidelines aimed at addressing these challenges. Among these objectives, some directly concern issues related to inequality and polarization. Improving people's livelihoods to ensure the transition toward a 'happier society' is at the heart of the latest Five-Year Plan.[22] The government plans to increase per capita income and

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[22] See: "The 12th Five-Year Plan: Making China a Better Place", speech delivered by Ambassador Liu Xiaoming on 4th April 2011 at the Monday Luncheon Club, The Reform Club, London. Available on: http://www.chinese-embassy.org.uk/eng/ambassador/dsjhjcf/t812461.htm.

the minimum wage at an annual rate of 7 % and 13 % respectively. A comprehensive public social welfare system is also due to be introduced to provide government benefit programs. For instance, within the next five years, pension schemes should cover all rural residents and 357 million people in urban areas. The criteria for acquiring urban *hukou* will also be relaxed to accelerate urbanization, particularly in medium-sized and small cities.

It now seems essential for China to tackle the issues of income inequality and polarization to ensure the transformation of its economic development model and to reduce the risk of social unrest. Since the global economic crisis in 2007-2008, China has attempted to refocus on its internal market to move from export-led growth to domestic-led growth. From this perspective, narrowing the income gap is considered to be necessary for stimulating the consumption of the many Chinese households with low and middle incomes.

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Appendix

Table A1: DER polarization indices for different values of parameter α.

	DER α = 0.25					DER α = 0.75			
	Total	Alienation	Identification	Correlation		Total	Alienation	Identification	Correlation
1989	0.290	0.391	0.818	-0.095		0.194	0.391	0.589	-0.160
1991	0.281	0.372	0.820	-0.079		0.187	0.372	0.588	-0.145
1993	0.305	0.413	0.811	-0.091		0.200	0.413	0.580	-0.166
1997	0.297	0.401	0.812	-0.090		0.194	0.401	0.579	-0.164
2000	0.322	0.448	0.806	-0.108		0.207	0.448	0.567	-0.183
2004	0.344	0.483	0.801	-0.111		0.221	0.483	0.567	-0.193
2006	0.359	0.513	0.806	-0.132		0.240	0.513	0.593	-0.213

Source: CHNS.

Table A2: DER index decomposition by income components (α = 0.5), all households.

	1989			1997			2006		
	Income share	Concentration index	Contribution to polarization	Income share	Concentration index	Contribution to polarization	Income share	Concentration index	Contribution to polarization
Market income	**0.74**	**0.218**	**0.70**	**0.80**	**0.234**	**0.80**	**0.66**	**0.271**	**0.63**
Agricultural income	0.30	0.090	0.11	0.26	0.099	0.11	0.16	0.107	0.06
Business income	0.06	0.268	0.08	0.14	0.272	0.17	0.10	0.275	0.10
Wages	0.38	0.311	0.51	0.40	0.307	0.52	0.40	0.335	0.47
Social benefits	**0.22**	**0.278**	**0.26**	**0.11**	**0.283**	**0.13**	**0.20**	**0.354**	**0.25**
Subsidies	0.18	0.271	0.21	0.04	0.311	0.05	0.02	0.364	0.03
Retirement	0.04	0.314	0.05	0.07	0.268	0.08	0.18	0.353	0.22
Other income	**0.04**	**0.228**	**0.04**	**0.09**	**0.181**	**0.07**	**0.14**	**0.246**	**0.12**
DER index		**0.232**			**0.235**			**0.283**	

Source: CHNS.