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Exploring Multidimensional Poverty in China: 2010 to 2014

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Abstract
Most poverty research has explored monetary poverty. This paper presents and analyses the Global Multidimensional Poverty Index (MPI) estimations for China. Using China Family Panel Studies (CFPS), we find China's global MPI is 0.035 in 2010, and decreases significantly to 0.017 in 2014. The dimensional composition of MPI suggests that nutrition, education, safe drinking water and cooking fuel contribute most to overall non-monetary poverty in China. Such analysis is also applied to sub-groups including geographic areas (rural/urban, east/central/west, provinces), as well as social characteristics such as gender of the household heads, age, education level, marital status, household size, migration status, ethnicity, and religion. We find the level and composition of poverty differs significantly across certain subgroups. We also find high levels of mismatch between monetary and multidimensional poverty at the household level, which highlights the importance of using both complementary measures to track progress in eradicating poverty.

Keywords: China, multidimensional poverty, poverty disaggregation, mismatch

JEL classification: I3, I32

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1. Motivation and literature review

1.1 Motivation

When the People of Republic of China was founded in 1949, China was one of the poorest countries in the world. According to the U.N. Economic and Social Commission for Asia and the Pacific (ESCAP), China's national income per capita was 27 dollars in 1949, which was less than 2/3 of the average percapita income in Asia which was 44 dollars, and less than half of Indian's per capita income of 57 dollars. Before China's reform and opening (1979), 250 million people (30.7% of the population)[1] were living in severe income poverty. But this tide turned after the 1980s. During 1978-2010, 250 million people moved out of monetary poverty by national definitions; 439 million people moved out of extreme income poverty from 1990 to 2011 using the $1.25/day standard (Millennium Development Goals Report 2015). In 2015, the official published rural poverty national headcount ratio is 5.7%[2].

Many studies have explored how China achieved this? Economic growth is no doubt one factor[3]. At the same time, China's development-oriented anti-poverty policy played an important role. Impact evaluation[4] and analyses of causal relationships[5] are also being done. However, these explore the dramatic changes in monetary poverty. This paper has a different focus. We consider poverty to be multidimensional and explore the evolution of multidimensional poverty in non-monetary dimensions. While we cannot go back to 1978 to find out how many million people China has lifted from multidimensional poverty, we can and do rigorously explore the evolution of multidimensional poverty from 2010-2014.

Theoretically, our paper follows Amartya Sen's capability approach (Sen, 1999a), according to which poverty is multidimensional. Empirically, there is agreement that economic growth does not necessarily lead to the improvement of welfare ((Bourguignon et al., 2010), (Ahluwalia, 2011)), and that monetary poverty measurement is not a sufficient proxy for poverty in all its dimensions (Ravallion, 2011b). A key motivation is that the Chinese traditional concept of poverty is multidimensional[6], and this concept has shaped China's anti-poverty policies since the 1980s. For example, the recent document "Outline of China's Rural Poverty Alleviation of 2011-2020" takes a multidimensional view and articulates the general target of anti-poverty policies as removing two worries – those related to food and clothing – and providing"three guarantees" – for basic health care, housing, and access to compulsory education. China is thus a pioneer in

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1 Source: director Xiaojian Fan's report for the State Council Leading Group Office of Poverty Alleviation and Development [in Chinese].

2 Appendix-A provides the poverty results in China; for related studies see: (Ravallion & Jalan, 1999), (Chen & Ravallion, 2004), (Chen & Ravallion, 2008) and (UNDP, 2013).

3 (Yao, 2000), (林伯强, 2003)[in Chinese], (王祖祥, 范传强, & 何耀, 2006) [in Chinese], (万广华 & 张茵, 2006) [in Chinese], (Ravallion, 2011a), (Montalvo & Ravallion, 2010), (沈扬扬, 2012a, 2012b) [in Chinese]) studied the relationship between economic growth and income inequality to poverty, and in general made conclusion of economic growth reduces poverty but inequality increases poverty.

4 See (Rozelle, 1998), (Park, Wang, & Wu, 2002), (Chen, Ravallion, Galasso, Piazza, & Tidrick, 2005), (Meng, 2013), (Li & Sicular, 2014).

5 See (Ravallion & Jalan, 2000), (Jalan & Ravallion, 2002), (Brown & Park, 2002), (Ravallion & Chen, 2007), (万广华 & 张藕香, 2008) [in Chinese], (罗楚亮, 2010) [in Chinese].

6 "Poverty" in Chinese can be written as "贫困", which combines two characters that can be divided into "Pin" and "Kun" with different meanings. "Pin" means "deficient", while "Kun" means "being trapped" from getting development related resources (see (X. Wang, Feng, Xia, & Alkire, 2016)).

implementing multidimensional poverty alleviation policies, but has not yet applied the multidimensional poverty measurement. This paper uses the AF methodology fill the gap.

1.2 Literature review

This paper is not the first study of multidimensional poverty in China. Multiple poverty concepts emerged in 1990s with dashboards of indicators. For instance, 吴国宝 (1997) used indicators of education, assets, caloric intake, clean drinking water, housing, health condition, time use and health to explore the characteristics of poor people; 李小云 et al. (2005) designed a participatory multiple poverty index with eight dimensions including production, living standard, education, etc. The beginning of 21st century was a period of introducing multidimensional poverty concepts from the outside world[7]. The pioneering empirical study using AF method is 王小林 & Alkire (2009). They found that nearly 20% of the households in both rural and urban China were experiencing deprivations in at least 3 out of non-income 8 dimensions. Since then, many studies applied the AF method for empirical analyses. For instance, 邹薇 & 方迎风 (2011), 蒋翠侠 et al. (2011) and 张全红 (2015) analyse dynamic changes in poverty; 方迎风 (2012) compares the TFR and AF method; 蒋翠侠 et al. (2011) and 张全红 (2015) explore un-equal weighting structures; Wang (2016) explores the relationship between income and multidimensional poverty. But none of the existing papers use nationally representative datasets, making it impossible for the existing academic literature to state how multidimensional poverty has evolved in China.

In contrast with the existing papers, our results use nationally representative data. Additionally, the MPI we compute is global comparable, and can be compared across three time periods. Moreover, this paper explores poverty by regions and social characters, by dimensions, and investigates the relationship between monetary and multidimensional poverty. It provides the first definitive national picture of poverty and its change over time according to the Global MPI.

While we are very pleased to offer this new study, and grateful for the CFPS dataset that makes it possible, we would like to acknowledge two shortcomings from the beginning of this paper. The first is that the Global MPI standard, while being very useful as a tool by which to compare China to other countries across the developing world, is actually inappropriate for nowadays' China because it reflects a degree of 'acute' poverty which is has largely been resolved in China – so for purposes of national policy, China would probably wish to build an improved national MPI. Second, despite the great benefits of the CFPS dataset, its sample size is relatively small compared to China's population and this results in estimations with high standard errors, and weakens disaggregated comparisons.

The paper unfolds as follows: we present the methodology, data and indicators in the second and third sections respectively. Section four presents China's national poverty results from 2010 to 2014; Detailed disaggregated analyses are shared in section five; the relationship between

[7] For instance, the Watts multidimensional poverty index (陈立中, 2008a, 2008b); the fuzzy sets method ((候卉, 王娜, & 王丹青, 2012) and (方迎风, 2012)); principle factor and cluster analysis (叶初升 & 赵锐, 2012); Rasch model (范晨辉, 薛东前, & 马蓓蓓, 2015), etc. Others see: (尚卫平 & 姚智谋, 2005)[in Chinese], (洪兴建, 2005) [in Chinese], (叶普万, 2005, 2006) [in Chinese], (张建华 & 陈立中, 2006) [in Chinese], (陈立中, 2008a) [in Chinese], (叶初升 & 王红霞, 2010) [in Chinese], (刘泽琴, 2012) [in Chinese], (邹薇 & 方迎风, 2012) [in Chinese], (丁建军, 2014).

monetary and multidimensional poverty is explored in section six; then we conclude.

2. Methodology

We use AF methodology proposed by (Alkire and Foster, 2011) due to its intuitive and policy-relevant properties (Alkire et al., 2015) [8].

2.1 Adjusted Headcount Ratio

Suppose there are n people in China and their well-being is evaluated by d indicators. We denote each person i's achievement in each indicator j by $x_{ij} \in \mathbb{R}$ for all $i = 1, \dots, n$ and $j = 1, \dots, d$. Matrix X with a size of $n \times d$ dimensions contains the achievements of n persons in d indicators. The rows denote persons and columns denote indicators.

The AF method is based on a counting approach. It identifies who is poor using two cutoffs: a deprivation cutoff for each indicator and a cross-dimensional poverty cutoff . We denote the deprivation cutoff for indicator j by z_j in vector z. If any person i's achievement in any indicator j falls below the deprivation cutoff – that is, if $x_{ij} < z_j$ - then the person is deprived in that indicator. Otherwise they are non-deprived. Then, a deprivation status score g_{ij} is assigned to denote each person's deprivation status in each indicator based on z_j. In this case, person i is deprived in indicator j,$g_{ij} = 1$; if non-deprived, $g_{ij} = 0$. The deprivation cutoffs for China's Global MPI are presented in section 3.

Each indicator is assigned a weight based on the value of that deprivation relative to other indicator deprivations. Thus a weighting vector w is attached to each indicator j. We denote each indicator's weight to be w_j, such that $w_j > 0$ and $\sum_{j=1}^{d} w_j = 1$.Next, an overall deprivation score $c_i \in [0,1]$ of each person i is computed by summing the deprivation status of all d indicators, each multiplied by the corresponding weights w_j, such that $c_i = \sum_{j=1}^{d} w_j \, g_{ij}$. The deprivation scores of all n persons are summarized by vector c. The Global MPI gives equal weights to each dimension; then equal weights for each indicator within dimension, and China's weights follow this structure as outlined in section 3.

A person is identified as multidimensionally poor if their deprivation score is greater than or equal to the value of the poverty cutoff denoted k – thus if $c_i \geq k$, where $k \in (0,1]$; and non-poor if $c_i < k$. The case in which $k = 1$, is called the intersection approach; when $0 < k \leq min_j\{w_1, \dots, w_d\}$, it is referred to as the union approach; and for $min_j\{w_1, \dots, w_d\} < k < 1$, it is referred to as the intermediate approach. Clearly, the appraisal of poverty is sensitive to cutoff k. The Global MPI uses a poverty cutoff k of one-third or 33.33%, and so this is the value we apply.

Having identified the set of poor and their deprivation scores, we obtain the MPI, which is also called the adjusted headcount ratio M_0. Considering the focus axioms[9], we obtain the censored

[8] Alkire et al. (Ch 6) give some modifying related criteria for poverty measurement, a well-being measure might be presumed to be generated not only to satisfy curiosity – as important and vital as that is-but also and perhaps primarily to guide policy.

[9] In the multidimensional context, two types of focus axioms are needed: one related to deprivations, say any increase in non-deprived achievements should not affect poverty measurement; the other relates to non-poor person, saying that any increase in the achievement of non-poor persons should not affect poverty results. See (Bourguignon, 2003) and (Alkire & Foster, 2011).

deprivation score vector $c(k)$ from vector c, such that $c_i(k) = c_i$ if $c_i \geq k$ and $c_i(k) = 0$ if $c_i < k$. In other words, we only consider the deprivations of persons who have been identified as poor, following Sen 1976. The MPI or adjusted headcount ratio M_0 is equal to the average of the censored deprivation scores:

$$MPI = M_0 = \frac{1}{n}\sum_{j=1}^{d} c_i(k) \quad (1)$$

2.2 Properties of MPI

As mentioned, M_0 has good properties for analysis with strong policy implications. Firstly, M_0 can reflect the incidence, intensity of multidimensional poverty, as it can be expressed as a product of two components:

$$MPI = M_0 = \frac{q}{n} \times \frac{1}{q}\sum_{j=1}^{d} c_i\,(k) = H \times A \quad (2)$$

where q is the number of poor. H is the share of the population who are multidimensionally poor or headcount ratio (incidence). A is the average proportion of deprivations in which the poor are deprived (intensity). We can see transparently that either a decrease in H or A could reduce M_0. In this sense, H and A give us more information on how poverty changed: if M_0 reduced only by decreasing H, then poor people exited poverty – although if A increases we know that mainly the marginally poor left poverty. On the other hand, if a reduction in M_0 occurs by reducing the deprivation of the poorest of the poor, then A certainly decreases, but H might or might not change[10].

Secondly, if the entire population can be divided into g mutually exclusive and collectively exhaustive groups, then the overall M_0 can be expressed as a weighted average of the M_0 values of g subgroups, where the weights are the respective population shares. Let the subscript $l = 1, \ldots, g$ denote the particular subpopulation with $\sum_{l=1}^{g} n_l = n$, the population share is $\frac{n_l}{n}$, n_l is the subgroup population, and $M_0(n_l)$ denotes the subgroups' adjusted headcount ratio. Formally, M_0 can be expressed as:

$$MPI = M_0 = \sum_{l=1}^{g} \frac{n_l}{n} M_0(n_l) \quad (3)$$

This feature is called subgroup decomposability. It helps us understand each group's poverty level, and the contribution of different subgroups to the overall poverty.

Thirdly, the adjusted headcount ratio can also be broken down to show the contribution of each indicator to overall poverty (dimensional breakdown). The statistic of censored headcount ratio will be introduced first. The censored headcount ratio is the proportion of the population that is multidimensionally poor and simultaneously deprived in that particular indicator. We denote the censored headcount ratio of indicator j by h_j. The MPI or M_0 can be expressed as the weighted sum of the censored headcount ratios of each of the component indicators:

$$MPI = M_0 = \sum_{j=1}^{d} w_j h_j = \sum_{j=1}^{d} w_j \left[\frac{1}{n}\sum_{i=1}^{n} g_{ij}(k)\right] \quad (4)$$

[10] (Apablaza & Yalonetzky, 2013) Shows the change in M_0 can be expressed as $\Delta M_0 = \Delta H + \Delta A + \Delta M \times \Delta A$.

The statistic of 'percentage contribution' allows us to assess the dimensional deprivations that contribute the most to poverty for any given group or overall, given the weighting structure. We denote the weighted contribution of indicator j to M_0 by ϕ_j. Then, the percentage contribution of indicator j to M_0 is:

$$\phi_j = w_j \frac{h_j}{M_0} \tag{5}$$

3. Data and Indicators

3.1 Data

To estimate China's global MPI, we use the China Family Panel Studies (CFPS), which was conducted by the Institute of Social Science Survey (ISSS) at Peking University. The CFPS is a national longitudinal general social survey project which began in 2010, and which aims to elucidate economic and non-economic well-being aspects of the Chinese people. Now it has three waves: 2010, 2012 and 2014. This paper will present the results for all the waves. The survey is drawn from 25 provinces/cities/autonomous regions in Mainland China (excluding Xinjiang, Qinghai, Inner Mongolia, Ningxia, Tibet, and Hainan, Hong Kong, Macao, Taiwan)[11], and the weighted samples are designed to be nationally representative.[12] Each year's sample on average contains over 40,000 eligible individuals in over 13,000 households.In particular, this paper uses the newest version of CFPS-2010; version 6.0 of CFPS-2012 dataset, and the newest version of CFPS-2014 published in June 2016. The eligible sample size for multidimensional poverty calculation in this paper is 40,844, 43,532, and 44,230 persons in 2010, 2012 and 2014 respectively.

Sample design: CFPS uses a complex multistage, implicit stratification and probability sampling procedure for survey design. The sampling procedure has three stages. First, primary sampling unit (PSU) are selected at the administrative districts/counties level. Next second–stage sampling units (SSU) are drawn at the administrative villages/neighborhood communities level, and finally, the third-stage (ultimate) sampling unit (TSU) are selected at the household level. Following (Ren & Treiman, 2013), we specified the village/neighborhood as the cluster variable. In terms of the sample representativeness, six strata were initially specified: five "large provinces" (including Gansu, Guangdong, Henan, Liaoning and a provincial-level city of Shanghai) were treated as separate strata, each of these subsamples are provincially representative. The sixth stratum consists of the remaining half of the households (drawn from the remaining 20 provinces sampled) without provincial representativeness. Together all of the six strata, the whole dataset creates the nationally representative sample.

Sampling weights:

In 2012 and 2014, CFPS divided household members into two types. "Gene members" are those who were followed from the initial 2010 wave. Their next generation (e.g. newly born babies, adoption children) are also considered to be gene members. "Core members" are those who did not exist in the initial year of 2010, but are living together with the gene members and have

[11] Tibet, Qinghai, Xinjiang, Ningxia, Inner Mongolia, and Hainan were excluded from the sample to reduce costs, but together they make up only 5% of the population (Xie, 2012, p. 14).

[12] According to Xie et al (2012), "CFPS chooses 25 provinces which include 94.5% of the population in Mainland China… could be considered to be national representative". The Manual of CFPS-2010 states, "After weighting, the complete national sample represents the national population".

marriage or blood connections to the gene members in the following years. Once they no longer live with the gene members, the core members will not be tracked any more. CFPS does not apply weights for core members [13], but obviously they are important household members that affect the household level poverty situation. In order to take the core members into account, we constructed individual weights (re-weight[14]) for them.

3.2 Global MPI Indicators for China

The indicators we are using are elaborated in Table 3-1. There are two main differences compared to the standard Global MPI. First, China's MPI estimations draw on nine out of the ten Global MPI indicators because flooring is not available. Secondly, we have to change the indicator definition for certain indicators, as described below.

Table 3-1 Dimensions, indicators, deprivation thresholds and weights

Dimension	Indicator	Deprived if…	Relative Weight
Education	Years of Schooling	No School going household member has completed five years of schooling and no member has completed primary school.	1/6
	Child School Attendance	Any child aged 7-15 is not attending school up the age at which they would complete class 8.	1/6
Health	Child Mortality	Any child has died in the family.	1/6
	Nutrition	Any person under 70 years of age is malnourished.	1/6
Living Standard	Electricity	The household has no electricity.	1/15
	Improved Sanitation	The household does not have a private toilet whether indoor or out door, flush, or non-flush.	1/15
	Improved Drinking Water	The household does not have access to improved drinking water, here defined as well/spring water, tap water, or mineral/purified/filtered water.	1/15
	Cooking Fuel	The household cooks with dung, wood or charcoal.	1/15
	Assets Ownership*	The household does not own more than one of the following: TV, mobile telephone, bike (motorized), motorbike or refrigerator, and does not own a car or similar vehicle.	1/15

Note: In 2010, the dataset has no fridge and similar vehicle.

A. Education

Years of schooling: Like the Global MPI, this indicator considers people who aged 10 years and above to be eligible. The entire household (members) is (are) considered deprived if no household member has completed five years of education[15].

Child school attendance: Like the Global MPI, the entire household is considered deprived if any school-aged child is not attending school up to the age at which they would complete class 8. For China, the difficulty is how to decide the starting age of primary school. According to the Compulsory Education Law of People's Republic of China, "any child who has attained to the age of 6, his/her parents or other statutory guardians shall have him/her enrolled in school to finish compulsory education." But the Law also says "for the Children in those areas where the conditions are not satisfied, the initial time of schooling may be postponed to 7 years old".

[13] For more details see 谢宇 et, al (2014) in chapter 9 "weight" [in Chinese].

[14] We are grateful to Cecilia Calderon from UNDP helps us construct the individual weight for the core members. We did it based on the gene member's weight as well as the rural/urban, province, age and gender information. For instance, in 2012, we get an around 1.2 billion population by only adding the gene members' weight, which is less than the total population of 1.35 billion population. After the re-weighting, we have a result of 1.31 billion people by considering all eligible members.

[15] If all household members reported their education less than 5 years or gave a missing value, we use a further constraint, and only consider eligible those households in which at least two-thirds of members' information is not missing.

Meanwhile, authoritative information from UNESCO[16] suggests China's compulsory schooling age is 7. Based on these materials, either 6 or 7 could be the possible starting age. How to make the decision? Empirically, only 27% of 6 year old children are attending primary school in 2012, while 75% of children are attending primary school at the age of 7. We thus set 7 years as the primary school starting age, and set the schooling age range as 7-15.

B. Health

Child mortality: According to the Global MPI, if any child has died in the household within the last five years, the household considered to be deprived. However, CFPS only asks "if any of your child/children died in your family" and does not provide information on the date of the depth. A similar issue happens in some of the MICS surveys. As in those cases, we include all child deaths that are reported by women under 49 years of age and men under 59 years of age.

Nutrition: Like to the Global MPI, we consider the whole household as deprived if at least one eligible number is malnourished[17]. However, there are two issues to raise: First, usually, scales and a ruler are needed in order to collect accurate anthropometric weight and height information. However, CFPS only used the recall process to collect the information. In this sense, we have to recognize that self-reported nutrition results are likely to have higher non-sampling measurement error. Second, we only take into account person younger than 70 years old. The Global MPI ordinarily only considers women under 49 and men under 59 years of age, but the CFPS dataset has nutrition information available for all age cohorts. However we restrict consideration to those under 70 years of age because of concrns that the18.5 BMI standard may not accurately capture the nutrition status for the older people[18].

C. Living Standard

Electricity: Electricity options in CFPS's questionnaires are as follows: 1) no electricity, 2) frequent power outage, 3) occasional power outage, 4) almost no power outage at all. If the household chooses the first option, the whole family will be considered as deprived.

Improved sanitation: Toilet classification in CFPS is different from the MDG goals[19]. The categories in CFPS questionnaire are as follows: 1) indoor flush toilet, 2) outdoor private flush toilet, 3) outdoor public flush toilet, 4) indoor non-flush toilet, 5) outdoor private non-flush toilet, 6) outdoor public non-flush toilet, 7) other. The classification "non-flush" toilets (option 4 and 5) is too broad to distinguish some adequate toilets such as protected pit latrines from inadequate

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16 See http://stats.uis.unesco.org/unesco/TableViewer/tableView.aspx?ReportId=163.

17 More specifically, we use "igrowup" underweight for children aged 0-60 months, "who2007" BMI-for-age & sex for adolescents aged 61-179 months, BMI for 15-69 years old. The methodologies are according to World Health Organization (WHO).

18 In Appendix-C we present the malnourished (18.5 BMI as standard) condition changes for different age groups. We can clearly find that within 15-19 years old group and above 70 years old group, the proportions of malnourished are higher. For the adolescent group, WHO has already developed a specific nutrition calculation method, but for older group, there is no relative method for now. We exclude those 70 and above because a low BMI could reflect the decrease in bone density that affects this age bracket, as well as their nutritional status.

19 Members of the household are considered as deprived if the household's sanitation facility is not improved according to MDG guidelines, or if it is improved but shared with other household. Following the definition of the MDG indicators, "A household is considered to have access to improved sanitation if it uses: Flush or pour flush to piped sewer system; septic tank or pit, latrine; Pit latrine with slab; Composting toilet; Ventilated improved pit latrine. And the excreta disposal system is considered improved if it is private or shared by a reasonable number of households". Source: The Challenge of Slums: Global Report on Human Settlements 2003 (Revised version, April 2010).

toilets. According to statistical results in the 2013 Health Yearbook of China, the prevalence of adequate toilets in rural China is 72% at the end of 2012. If, using the CFPS-2012 data, we sum options 1, 2, 4 and 5, we get a slightly larger number of 88%[20]. This gives us an idea that 1,2,4,5 should be considered as non-deprived; other options are considered deprived. We recognize that this may underestimate deprivation in sanitation but it appears to provide the best match possible using the dataset

Improved drinking water: Following the MDG guidelines for drinking water, we consider categories in CFPS of "tap water", "mineral/purified/filtered water" and "rainwater" as non-deprived; and we consider "river/lake water", "well/spring water", "cellar water", "pond water" and "others" as deprived. The difficult identification category is "well/spring water", because the MDG categories make it very clear that protected well/spring water is non-deprived, whereas unprotected sources are deprived. However, CFPS does not distinguish them. Again, we seek for other justifications. Referring to the Chinese government's commitment in 2012 to "arrange a 22 billion RMB budget to make sure 8 million rural students and teachers can drink safe drinking water; make sure the prevalence for rural resident's safety drinking water up to 81%[21]", and considering the ratio of "tapped water" (60%) and "well/spring water" (35%) added up to a significantly higher number of 95%, we consider "well/spring" to be non-safe/unprotected and identify it as deprived. Of course, this is not a completely accurate definition because it has the risk of overestimating water deprivation. In terms of distance to reach water, we did not take it into account because CFPS does not have relevant information.

Flooring: CFPS does not collect flooring information. We drop this indicator and re-weight the other five indicators from 1/18 to 1/15 within 'living standard' dimension.

Cooking fuel: According to the MDGs, we consider households to be deprived if they cook with firewood/straw, coal, and "other", and consider households using gas/liquid/natural gas, methane, and electricity to be non-deprived.

Assets ownership: We consider a household who does not own more than one of the followings assets to be deprived: TV, mobile telephone, bike (motorized), motorbike or refrigerator and does not own a car or similar vehicle. Compare to the Global MPI, the assets indicator does not include a radio or landline telephone; and motorized bicycle is used instead of bicycle. In addition, there is no information for fridge and similar vehicle in CFPS-2010 data, so we only consider the rest of the assets.

Advantages & limitations of the dataset:

The CFPS is a high quality nationally representative survey with sufficient information to compute a Global MPI and to undertake basic decomposition and disaggregation. The limitation as mentioned above is that due to the sample size being relatively small: we are not able to decompose by all provinces, but only by five provinces, and also obtain relatively high standard errors. In terms of the indicators for the Global MPI, no flooring variable is available, so we drop

[20] According to China Health Statistics Yearbook 2013, the definition of "sanitation toilet" in the Yearbook is: "have walls around the toilet, have a roof, the toilet pit and septic tank do not leak, clean inside the toilet, no maggots, basically not smelly. The septic tank is closed and covered, the feces/dejects/excrement and urine/night soil/ordure pellet can be cleaned up in time with harmless treatment". This means "sanitation toilet" belongs to the type of pit latrine with slab, composting toilet, or ventilated improved pit latrine groups. Most of the non-flush toilets belong to the improved sets according to MDG goals.

[21] http://www.eeo.com.cn/2012/0607/227786.shtml [in Chinese in 2012-June].

that indicator. Furthermore, nutrition is self-reported rather than anthropometric which will increase non-sampling measurement errors; it also is available for a much larger age range than in other Global MPI datasets, which affects cross-national comparisons. Other indicators have some differences from the Global MPI computed in other countries' datasets as mentioned and justified above. Despite these features, the dataset of CFPS opens a new and significant window to undertake the first definitive nationally representative study of the reduction of multidimensional poverty in China, and that is the aim of this paper.

4. China's Global MPI

4.1 Basic Results

In general, we found China's multidimensional poverty is not high according to the Global MPI standard. Furthermore, poverty has decreased strongly over time. China's Global MPI had the value of 0.035 in 2010, then it decreased to 0.023 in 2012, to 0.017 in 2014. In terms of the standard errors, from 2010 to 2012 there is absolute annualized change of 0.006 with statistically significance at α=0.05. From 2010 to 2014, the absolute annualized change is 0.05 with statistical significance at α=0.05[22]. In terms of the headcount ratio (H), it reduced from 8.2% in 2010 to 4.0% in 2014 and the change is statistically significant. Though the incidence of multidimensional poverty in China is not high, acute multidimensional poverty still affects more than 70 million people, which is a large number of people. The intensity (A) showing the average weighted deprivations among the poor was 42.4% in 2010, 43.0% in 2012 and 41.3% in 2014 (table 4-1) respectively, but the annualized changes are not statistically significant. We do not see much decrease in the average intensity of poverty *A*. In general, the intensity is equivalent to being deprived in, for example, roughly one health indicator, one education indicator and one or two living standard indicators.

Following the full analyses of the Global MPI, we explore two subsets of the MPI poor – those who experience 'severe poverty' and those living in 'destitution'. The first can be defined as those who are deprived in 50% or more indicators (k>=50%). In 2010, around 1.3% of the populations are severely poor; this number significantly decreases to 0.3% in 2014. We also calculated the levels of 'destitution'. The destitution measure uses different deprivation thresholds for eight indicators, and we identify those who are deprived in at least one third of these extreme indicators to be destitute (listed in Appendix-C[23]). Basically, there are not many people in destitution. By 2014, destitution affected only about 0.4% of the population.

Table 4-1 China's national MPI results: 2010, 2012, and 2014

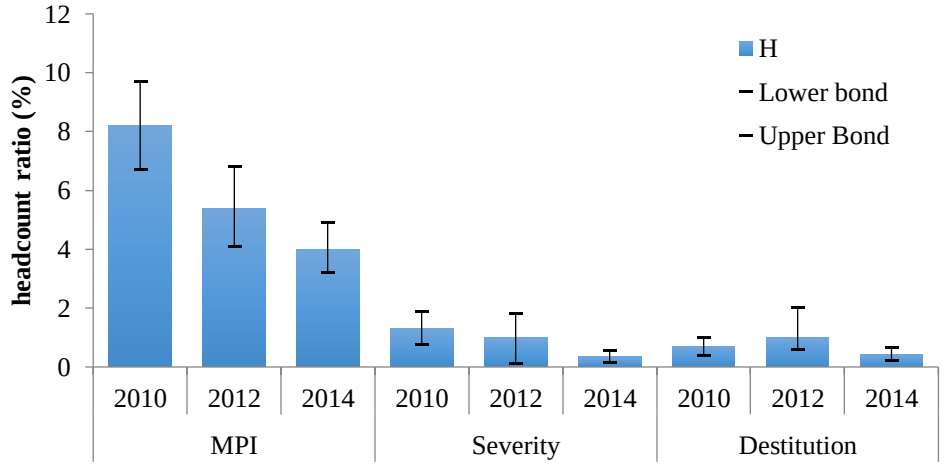
	M0	Confidence Interval (95%)	H (%)	Confidence Interval (95%)	A (%)	Confidence Interval (95%)
2010						
MPI	0.035	[0.027, 0.042]	8.2	[6.7, 9.7]	42.4	[41.3, 43.5]
Severity	0.007	[0.004, 0.011]	1.3	[0.8, 1.9]	57.2	[56.0, 58.4]
Destitution	0.003	[0.002, 0.004]	0.7	[0.4, 1.0]	41.6	[40.1, 43.1]
2012						
MPI	0.023	[0.016, 0.030]	5.4	[4.1, 6.8]	43.0	[40.2, 45.8]
Severity	0.006	[0.001, 0.011]	1.0	[0.1, 1.8]	58.8	[56.6, 61.0]
Destitution	0.055	[0.002, 0.009]	1.3	[0.6, 2.0]	42.0	[39.0, 45.1]
2014						
MPI	0.017	[0.013, 0.020]	4.0	[3.2, 4.9]	41.3	[40.1, 42.5]
Severity	0.569	[0.544, 0.594]	0.3	[0.1, 0.5]	56.9	[54.4, 59.4]

[22] MPI's annualized change results and the relative statistically significance test, please see Appendix-F.
[23] Also see: (Seth, 2014) and (Alkire, 2016).

Destitution	0.409	[0.380, 0.437]	0.4	[0.2, 0.6]	40.9	[38.0, 43.7]

Note: 1. YS denotes 'years of schooling', SA denotes 'school attendance', CM denotes 'child mortality', N denotes 'nutrition', E denotes 'electricity', S denotes 'sanitation', W denotes 'water', CF denotes 'cooking fuel' and A denotes 'assets'. 2. In square brackets are results at 95% confidence interval. 3. Source: CFPS dataset.

Figure 4-1 Multidimensional Poverty eadcount ratios (*H*)



4.2 Composition of the MPI: Indicator Analysis

Figure 4-2 shows the raw headcount ratio (RHR) and censored headcount ratio (CHR) respectively. RHR shows the percentage of the population who are deprived in each indicator; the CHR shows the percentage of the population who are poor and at the same time are deprived in each indicator. In terms of RHR, "cooking fuel" and "safe drinking water" are indicators having the highest levels fo deprivation in each year, followed by "nutrition" and "sanitation". Slightly differently, the CHR suggests besides the indicators just mentioned, the poor are also likely to be deprived in "years of schooling"'[24]. China is unusual in having very striking differences between its raw and censored headcount ratios for nutrition. This may be partly explained by the data issues mentioned above.

According to the changes of the incidence over time, from 2010 to 2014, there are statistically significant annualized decreases of 0.8 percentage points in the censored headcount ratio for "years of schooling", 0.6 for "nutrition", 1.9 for "sanitation", 2.6 for "water", and 1.6 for "cooking fuel", implying improvements on those indicators[25]. On the other hand, there is not much improvement on "school attendance", "child mortality" and "electricity", partly because censored headcount ratios of these indicators are already very low already. But they are also something should be drawn attention.

Figure 4-2 Raw and censored headcount ratios of people deprived in each indicator

[24] This as well reflects unbalanced development in China from uni-dimension point of view, and those indicators should be considered even they are not affecting every multidimensional poor people.

[25] MPI's annualized change results and the relative statistically significance tests, please see Appendix-F.

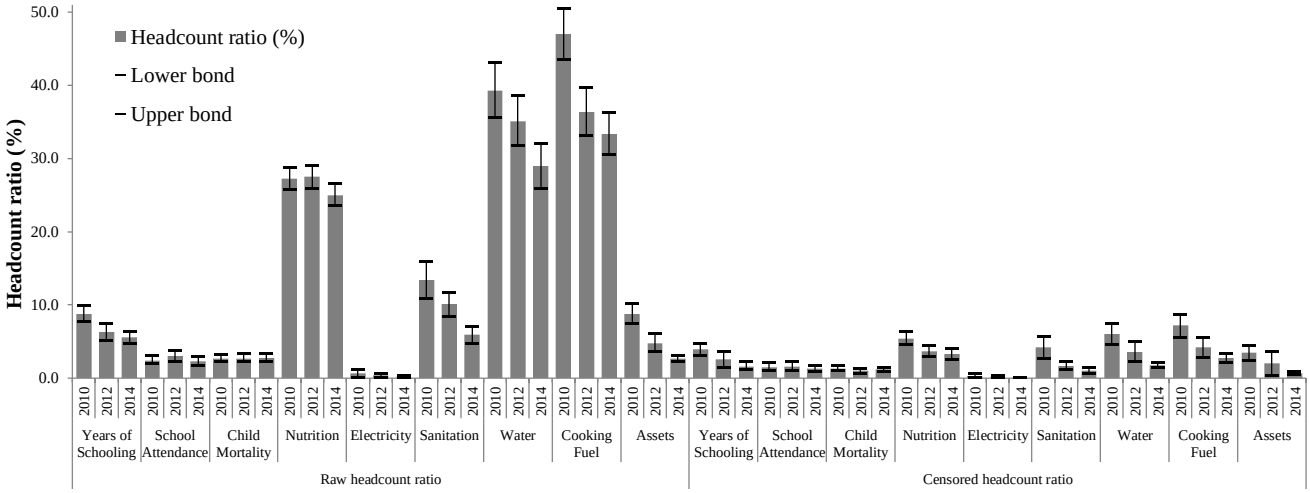
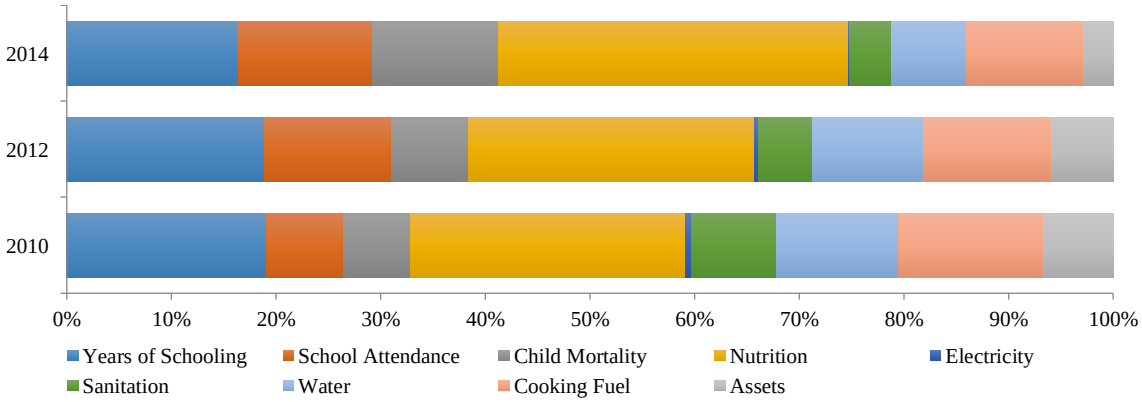


Figure 4-3 shows indicators' percentage contribution (PCB for short) to MPI. Because indicators are not equally weighted, it is different from the incidence result. The PCB suggests that "nutrition" contributes most to MPI, followed by "years of schooling", "school attendance", "safe drinking water" and "cooking fuel". "Electricity" contributes only 1% to MPI, which reflects the reality of of the electricity grid infrastructure in China. According to the changes, the relative contribution of "nutrition", "school attendance" and "child mortality" are decreasing From the policy point of view, the conclusions suggest anti-poverty policies should sustain their emphasis on nutrition and so on, and increase support for adult learning as well as for "water" and "cooking fuel" in "living standard" dimension.

Figure 4-3 Percentage contribution of each indicator to MPI



5. Disaggregated Analysis of MPI

5.1 MPI in Geographic Areas

Rural & Urban[26]**:** As is known that most of poor are living in rural areas in China, we expect rural residents to be poorer. The results tell the same story (table 5-1): people who are living in

[26] CFPS-2012 includes four type of variables for distinguishing rural-urban areas: 1) Rural-urban division standard defined by the National Bureau of Statistics (NBS) of China; 2) Division by the type of village/neighborhood community; 3) Rural/urban division by *hukou* of the household head; and 4) Communities type: city, town, village and suburb. We use the first one.

rural areas are more likely to be poor compare to people who are living in urban. For instance, in 2010 12.6% of the populations are MPI poor in rural area, while the headcount ratio is only 3.5% in urban. The intensity (A) in rural areas is also higher than urban. Considering the CHR, the incidence of deprivation in all indicators in urban areas are lower than rural. In rural areas, "cooking fuel", "safe drinking water" and "nutrition" are the indicators with the highest deprivation rates[27].

In terms of the changes, poverty is decreasing in both areas over time. The MPI in rural area decreased from 0.054 in 2010 to 0.028 in 2014 which is statistically significant, the headcount ratio decreased from 12.6% to 6.7% during the same period. Meanwhile, the MPI in urban areas decreased from 0.014 in 2010 to 0.007 in 2014.

Table 5-1 Poverty in rural and urban areas

			Composition (censored headcount ratio, %)											
		Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
Rural	2010	51.2%	0.054 [0.041,0.067]	12.6 [9.9,15.3]	43.1 [41.9,44.3]	6.4 [4.8,7.9]	2.3 [1.4,3.3]	1.8 [1.3,2.3]	8.0 [6.5,9.5]	0.6 [0.0,1.3]	7.2 [4.4,9.9]	9.8 [7.3,12.4]	11.7 [8.9,14.4]	5.8 [3.9,7.7]
	2012	49.9%	0.038 [0.024,0.052]	8.6 [6.1,11.2]	44.0 [40.7,47.2]	4.2 [2.1,6.3]	2.9 [1.5,4.2]	1.4 [0.9,2.0]	6.1 [4.7,7.6]	0.3 [0.0,0.9]	3.1 [2.0,4.2]	6.2 [3.8,8.7]	7.3 [4.8,9.8]	3.4 [1.3,5.5]
	2014	44.70%	0.028 [0.022,0.035]	6.7 [5.3,8.2]	42.1 [40.8,43.5]	3.1 [1.9,4.2]	1.8 [1.1,2.6]	2.0 [1.3,2.6]	5.4 [4.3,6.6]	0.1 [0.0,0.1]	1.9 [1.0,2.8]	3.2 [2.6,3.9]	5.2 [3.9,6.5]	1.3 [0.9,1.8]
Urban	2010	48.8%	0.014 [0.010,0.018]	3.5 [2.6,4.5]	39.6 [38.3,41.0]	1.4 [0.9,1.9]	0.7 [0.4,1.0]	0.8 [0.5,1.2]	2.8 [2.0,3.6]	0.0 [0.0,0.0]	1.1 [0.6,1.6]	2.1 [1.4,2.8]	2.4 [1.6,3.3]	1.0 [0.6,1.4]
	2012	50.1%	0.009 [0.007,0.011]	2.3 [1.7,2.9]	39.2 [37.9,40.4]	0.7 [0.5,0.9]	0.8 [0.4,1.1]	0.6 [0.3,0.9]	1.9 [1.4,2.5]	0.0 [0.0,0.0]	0.4 [0.2,0.7]	1.2 [0.7,1.7]	1.2 [0.8,1.7]	0.6 [0.4,0.9]
	2014	55.30%	0.007 [0.004,0.011]	1.9 [1.0,2.7]	38.9 [37.6,40.2]	0.5 [0.3,0.7]	0.8 [0.2,1.4]	0.6 [0.3,0.9]	1.7 [0.8,2.5]	0.0 [0.0,0.0]	0.3 [0.1,0.5]	0.6 [0.4,0.9]	0.9 [0.5,1.3]	0.2 [0.1,0.3]

Annualized absolute Changes of MPI								
	2010-2012			2012-2014		2010-2014		
	Absolute	t-statistics		Absolute	t-statistics	Absolute	t-statistics	
Rural	.007	3.62	***	.005	1.21	.009	1.82	*
Urban	.002	2.56	**	.001	0.83	.002	2.11	**
Annualized absolute changes of H								
Rural	2.1	2.21	**	0.9	1.23	1.5	3.84	***
Urban	0.6	2.14	**	0.2	0.80	0.4	2.55	**

Note: *** statistically significant at α=0.01, ** statistically significant at α=0.05, * statistically significant at α=0.10

Three regions: China's provinces are customarily divided into three major regions: the East, the Central, and the West (NSB of China, 2015)[28]. The East is the most developed region for its advantage of geographic position and the national development strategy; followed by central region. The West is the poorest region covered by mountains, hills and plateaus where leads to low agriculture production and inconvenient traffic. More than 70% of the rural residents, and most of the minority people are living in the West.

According to our results, the West is significantly poorer than in the East and Central. In terms of the CHR, we find the west's composition results are similar to rural areas. While in the East, "cooking fuel" and "safe drinking water" contribute less to MPI, nutrition contributes relatively

[27] According to (J. Zhang & Smith, 2005), 420 thousand people died because of the indoor air pollution in China. Another report published by the World Bank (世界银行, Ald, & ASTAE, 2013) mentioned that solid fuel is still the main cooking and heating sources in rural China. Since the cost for clean fuel source is high for the rural residents, in a short term they will not change the cooking fuel sources by themselves.

[28] **Eastern** provinces (municipalities) include: Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, and Guangdong; **Central** provinces include: Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei and Hunan; **Western** provinces (autonomous regions and municipalities) include: Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Shaanxi, and Gansu (NBS of China, 2015). The definition dose not only follow the geographic location, but also associates with each province's economic development level.

more. Multidimensional poverty keeps decreasing from 2010 to 2014 in all three regions, but the decrease is not statistically significant in the East from 2012 to 2014, nor in the West from 2010/2012 and 2012/2014. "Years of schooling", "nutrition", "cooking fuel" and "water" are the indicators that decrease most in each area in general.

Table 5-2 Poverty in three regions

			Composition (censored headcount ratio, %)											
		Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
East	2010	37.2%	0.018 [0.015,0.022]	4.6 [3.7,5.6]	39.8 [38.9,40.7]	2.0 [1.4,2.6]	0.8 [0.6,1.1]	1.0 [0.5,1.5]	3.5 [2.7,4.3]	0.0 [0.0,0.0]	1.4 [0.9,1.9]	3.0 [2.2,3.9]	3.3 [2.4,4.1]	1.4 [0.9,1.9]
	2012	39.5%	0.011 [0.008,0.014]	2.8 [2.1,3.5]	39.1 [37.8,40.4]	1.1 [0.7,1.4]	0.8 [0.4,1.2]	0.5 [0.3,0.8]	2.3 [1.6,2.9]	0.0 [0.0,0.0]	0.7 [0.3,1.1]	1.6 [1.0,2.1]	1.8 [1.2,2.4]	0.8 [0.5,1.1]
	2014	39.9%	0.008 [0.006,0.010]	1.9 [1.5,2.4]	40.6 [39.4,41.8]	0.9 [0.6,1.1]	0.6 [0.3,0.9]	0.4 [0.2,0.7]	1.7 [1.2,2.1]	0.0 [0.0,0.1]	0.3 [0.1,0.5]	1.1 [0.7,1.5]	1.2 [0.8,1.6]	0.4 [0.2,0.5]
Central	2010	34.6%	0.024 [0.019,0.030]	6.1 [4.8,7.4]	40.2 [39.4,41.0]	2.4 [1.8,2.9]	0.9 [0.5,1.2]	1.0 [0.6,1.4]	4.3 [3.2,5.3]	0.2 [0.1,0.5]	2.6 [1.6,3.7]	5.0 [3.7,6.3]	5.5 [4.2,6.7]	2.1 [1.6,2.6]
	2012	39.5%	0.015 [0.011,0.018]	3.6 [2.7,4.5]	41.1 [40.0,42.3]	1.4 [1.0,1.8]	0.8 [0.4,1.1]	0.8 [0.4,1.2]	2.9 [2.1,3.7]	0.0 [0.0,0.0]	1.2 [0.6,1.8]	2.6 [1.8,3.5]	2.9 [2.1,3.8]	0.8 [0.5,1.2]
	2014	33.2%	0.013 [0.010,0.016]	3.2 [2.5,4.0]	40.5 [39.3,41.7]	0.9 [0.5,1.3]	1.0 [0.6,1.4]	1.0 [0.5,1.4]	2.8 [2.1,3.6]	0.0 [0.0,0.1]	0.6 [0.2,0.9]	2.0 [1.3,2.6]	2.3 [1.6,3.0]	0.5 [0.2,0.7]
West	2010	28.2%	0.068 [0.046,0.090]	15.4 [10.8,20.0]	44.4 [43.0,45.8]	8.4 [5.8,11.1]	3.3 [1.6,4.9]	2.1 [1.3,2.9]	9.5 [7.1,11.8]	0.8 [0.0,2.0]	9.8 [5.1,14.6]	11.4 [7.0,15.7]	14.4 [9.7,19.1]	7.8 [4.6,11.1]
	2012	26.7%	0.052 [0.028,0.076]	11.6 [7.1,16.1]	45.1 [41.0,49.2]	5.8 [2.0,9.6]	4.6 [2.2,6.9]	2.0 [1.1,2.9]	8.0 [5.6,10.5]	0.6 [0.0,1.6]	4.0 [2.1,5.8]	8.1 [3.7,12.5]	9.4 [4.9,14.0]	5.2 [1.5,9.0]
	2014	26.9%	0.034 [0.023,0.046]	8.1 [5.5,10.7]	41.9 [39.9,43.9]	3.7 [1.9,5.5]	2.7 [1.1,4.2]	2.6 [1.6,3.6]	6.4 [4.2,8.7]	0.1 [0.0,0.2]	2.7 [1.2,4.1]	2.6 [1.8,3.5]	5.8 [3.7,7.9]	1.5 [0.7,2.3]

	Annualized absolute Changes of M0								
	2010-2012			2012-2014			2010-2014		
	Absolute	t-statistics		Absolute	t-statistics		Absolute	t-statistics	
East	.005	3.11	***	.001	0.68		.003	3.81	***
Central	.004	3.20	***	.002	1.86	*	.003	4.94	***
West	.008	0.97		.009	1.32		.007	3.62	***
	Annualized absolute changes of H								
East	1.3	3.21	***	0.2	0.59		0.7	3.85	***
Central	0.9	3.10	***	0.4	2.11	**	.07	5.04	***
West	1.9	1.16		1.7	1.31		1.5	3.84	***

5.2 MPI in Five Provinces

As introduced, there are five "large provinces" (Liaoning, Shanghai, Guangdong, Henan and Gansu) for which the CFPS data are representative at provincial level. We use them to provide provincial comparisons.

The results show Gansu is the poorest province, but its MPI is not significantly higher than the other provinces except Liaoning and Shanghai. The least poor is Liaoning and Shanghai, follows by Henan and Guangdong in general. This is quite unexpected because the ranking by GDP per capita for these provinces is rather different[29]. However, it also reflects economic growth does not necessarily lead to poverty reduction[30]. The ranking by incidence (H) follows the ranking by MPI across provinces.

In terms of composition, while "cooking fuel", "nutrition" and "water" are main indicators that being deprived most for all provinces, different provinces are facing different problems. For

[29] In general, Shanghai has much higher GDP per capital than Liaoning and Guangdong; Liaoning and Guangdong have much higher GDP per capita than Henan and Gansu. More details see http://data.stats.gov.cn/english/easyquery.htm?cn=E0105

[30] Likewise, we observe similar ranking in terms of provincial income poverty, Shanghai is the least poor (with statistical significance), follows by Liaoning, Guangdong and Henan, Gansu is the poorest (with statistical significance).

instance, for the poorest province of Gansu, although all indicators have larger CHRs compared to other provinces, "cooking fuel", "nutrition", "safe drinking water" and "years of schooling" are particularly high. For Guangdong and Shanghai, "nutrition" has the highest incidence among the poor. Although "education" deprivations are common in almost all provinces, Shanghai is an exception. This shows that the composition of multidimensional poverty varies considerably across different provinces, illuminating the importance of considering local conditions, because different compositions require different policy responses.

Table 5-3 The composition of poverty in large-provinces

		Composition[censored headcount ratio, %]											
	Sample size	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
2010													
Liaoning	3639	0.011	2.7	41.5	1.2	0.8	0.4	1.7	0.0	0.6	2.0	2.1	1.4
		[0.007,0.015]	[1.7,3.7]	[39.1,43.9]	[0.7,1.8]	[0.1,1.5]	[0.0,0.8]	[1.0,2.5]	[0.0,0.0]	[0.0,1.2]	[1.1,2.8]	[1.2,3.1]	[0.7,2.0]
Shanghai	3475	0.003	0.8	36.1	0.1	0.4	0.3	0.8	0.0	0.1	0.1	0.1	0.0
		[0.001,0.005]	[0.3,1.3]	[33.4,38.7]	[0.0,0.2]	[0.0,0.8]	[0.0,0.7]	[0.3,1.3]	[0.0,0.0]	[0.0,0.4]	[0.0,0.3]	[0.0,0.2]	[0.0,0.1]
Henan	4973	0.026	6.3	41.1	2.5	0.9	1.9	4.2	0.0	2.4	5.4	5.7	1.6
		[0.017,0.035]	[4.3,8.3]	[39.1,43.1]	[1.6,3.4]	[0.3,1.5]	[0.7,3.0]	[2.5,5.9]	[0.0,0.1]	[1.0,3.9]	[3.3,7.4]	[3.7,7.6]	[1.0,2.3]
Guangdong	4128	0.034	8.6	39.9	2.9	2.2	1.3	7.3	0.1	3.9	5.8	5.6	1.6
		[0.024,0.044]	[6.1,11.0]	[38.4,41.5]	[1.7,4.2]	[1.3,3.1]	[0.3,2.2]	[5.1,9.5]	[0.0,0.1]	[2.1,5.8]	[3.4,8.2]	[3.4,7.9]	[0.9,2.3]
Gansu	4853	0.052	12.6	41.4	6.3	2.5	1.4	9.2	0.2	5.7	9.3	12.0	2.3
		[0.035,0.069]	[8.5,16.6]	[40.3,42.6]	[3.9,8.8]	[0.8,4.1]	[0.6,2.3]	[6.3,12.1]	[0.0,0.5]	[2.7,8.6]	[5.9,12.8]	[8.1,15.9]	[1.3,3.2]
2012													
Liaoning	3538	0.005	1.3	0.5	0.8	0.3	0.0	1.0	0.0	0.0	0.9	1.1	0.8
		[0.002,0.008]	[0.6,2.0]	[39.7,43.2]	[0.4,1.3]	[0.0,0.6]	[0,0.1]	[0.4,1.6]	[0.0,0.0]	[0.0,0.0]	[0.3,1.5]	[0.5,1.8]	[0.3,1.3]
Shanghai	2666	0.009	2.1	0.9	0.0	0.1	0.2	2.1	0.0	1.8	1.8	1.8	1.8
		[0.000,0.024]	[0.0, 5.5]	[39.3,44.5]	[0.0,0.0]	[0.0,0.2]	[0,0.5]	[0.0,5.5]	[0.0,0.0]	[0.0,5.2]	[0.0,5.2]	[0.0,5.2]	[0.0,5.2]
Henan	5631	0.020	4.6	2.0	1.6	1.6	1.7	3.4	0.0	0.9	4.0	3.3	0.9
		[0.012,0.028]	[2.8,6.4]	[41.2,45.1]	[0.9,2.3]	[0.6,2.5]	[0.5,2.8]	[1.8,5.0]	[0.0,0.0]	[0.0,1.9]	[2.2,5.7]	[1.8,4.9]	[0.5,1.3]
Guangdong	4520	0.022	5.3	2.2	1.7	1.6	1.3	4.7	0.0	1.3	3.6	3.5	1.1
		[0.013,0.03]	[3.4,7.2]	[38.5,43.4]	[0.8,2.6]	[0.4,2.9]	[0.6,1.9]	[2.8,6.5]	[0.0,0.1]	[0.3,2.3]	[1.7,5.4]	[1.8,5.2]	[0.4,1.8]
Gansu	5768	0.029	7.0	2.9	3.5	1.1	1.0	5.7	0.0	2.5	4.5	6.3	1.5
		[0.018,0.039]	[4.5,9.5]	[39.4,42.6]	[2.0,5.0]	[0.4,1.8]	[0.4,1.5]	[3.5,8.2]	[0.0,0.0]	[0.8,4.3]	[2.5,6.6]	[4.1,8.5]	[0.8,2.1]
2014													
Liaoning	3616	0.004	0.9	42.3	0.7	0.2	0.3	0.5	0.0	0.0	0.5	0.7	0.3
		[0.001,0.006]	[0.3,1.5]	[38.6,46.0]	[0.2,1.1]	[0.0,0.5]	[0.0,0.6]	[0.1,0.9]	[0.0,0.0]	[0.0,0.1]	[0.1,0.8]	[0.3,1.1]	[0.1,0.4]
Shanghai	2477	0.001	0.4	34.6	0.1	0.0	0.3	0.3	0.0	0.0	0.0	0.1	0.0
		[0.000,0.003]	[0.0,0.7]	[32.2,37.1]	[0.0,0.2]	[0.0,0.0]	[0.0,0.6]	[0.0,0.7]	[0.0,0.0]	[0.0,0.1]	[0.0,0.1]	[0.0,0.2]	[0.0,0.1]
Henan	5819	0.013	3.1	41.3	0.6	1.6	1.4	2.6	0.0	0.1	1.4	2.0	0.5
		[0.008,0.018]	[1.9,4.3]	[38.8,43.7]	[0.3,0.8]	[0.7,2.6]	[0.7,2.1]	[1.4,3.7]	[0.0,0.0]	[0.0,0.2]	[0.6,2.2]	[1.0,3.0]	[0.1,0.8]
Guangdong	4280	0.017	4.2	41.7	1.2	1.9	1.5	3.9	0.0	0.5	2	2.2	0.4
		[0.011,0.024]	[2.7,5.7]	[39.8,43.7]	[0.5,1.9]	[0.9,2.9]	[0.6,2.4]	[2.4,5.3]	[0.0,0.0]	[0.1,0.8]	[1.0,2.9]	[1.0,3.3]	[0.1,0.7]
Gansu	5739	0.023	5.3	43.1	3.1	1.3	0.9	4.4	0.0	2.0	2.6	5.0	0.6
		[0.012,0.034]	[2.8,7.9]	[41.2,45.0]	[1.3,4.8]	[0.2,2.4]	[0.4,1.4]	[2.3,6.5]	[0.0,0.0]	[0.5,3.4]	[1.2,4.1]	[2.5,7.4]	[0.1,1.1]

5.3 MPI by Social Groups

In this section, we disaggregate MPI by population subgroups that vary according to household characteristics/socioeconomic status. The subgroups selected are usually studied for income poverty. Given that household heads usually tend to be decision makers (Bilenkisi et al., 2015), we consider the household head as unit of analysis in most cases. Part of the analysis presented should be considered illustrative because the standard errors are high, but they indicate relationships worth exploring.

Gender of household head[31]: Intuitively, female-headed households are considered as poorer due to female's disadvantage in the labor market, discrimination, low productivity or low

[31] CFPS dose not directly have household head in the questionnaire. In order to get this information, we following the rules of firstly, traditionally in China the male should be the household head. At the same time, we take into account the economic status, if the female has significant higher income, then we consider female to be the household head.

education[32]. But in our dataset, there is no statistically significant difference in poverty between genders. The absolute change of MPI and H from 2010 to 2014 are similar. Inspired by (Buvinić & Gupta, 1997), we did other explorations -- to explore the heads' marriage status (e.g. "female - maintained", "female-led", "single-parent", "male-absent"), gender and marriage status (see appendix-D), or gender difference among migration actions (see appendix-E)[33]. Again, there are no statistically significant differences.

Does this mean there is no gender difference at all? We cannot support such a statement since our analysis does not focus on the individual level. In most of the developing countries, women may head a house for two possible reasons: either they have the means to live independently, or males are absent but sending remittances -- women in such households would show lower poverty rates (World Bank, 2016).

Table 5-4 Poverty comparison: gender of the household head

			Composition (censored headcount ratio, %)											
		Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
Female	2010	25.9%	0.031 [0.025,0.036]	7.4 [6.1,8.7]	41.4 [40.0,42.8]	4.3 [3.4,5.3]	1.0 [0.6,1.5]	0.7 [0.3,1.1]	4.8 [3.7,5.8]	0.3 [0.0,0.7]	3.1 [2.1,4.0]	5.5 [4.3,6.7]	6.5 [5.2,7.8]	3.4 [2.6,4.2]
	2012	24.8%	0.021 [0.016,0.025]	5.0 [3.9,6.1]	41.4 [39.9,43.0]	2.2 [1.6,2.9]	1.4 [0.8,2.0]	1.0 [0.5,1.5]	3.7 [2.8,4.7]	0.0 [0.0,0.0]	1.6 [1.0,2.2]	3.1 [2.3,4.0]	3.8 [2.9,4.8]	1.7 [1.1,2.4]
	2014	23.7%	0.015 [0.011,0.019]	3.6 [2.6,4.7]	41.1 [39.8,42.5]	1.7 [1.1,2.3]	1.1 [0.3,1.8]	0.8 [0.3,1.3]	2.9 [2.0,3.9]	0.0 [0.0,0.1]	1.0 [0.4,1.7]	1.6 [1.1,2.2]	2.4 [1.6,3.2]	1.0 [0.6,1.3]
Male	2010	74.1%	0.036 [0.027,0.045]	8.4 [6.6,10.3]	42.7 [41.5,43.8]	3.8 [2.8,4.8]	1.7 [1.1,2.3]	1.5 [1.1,2.0]	5.7 [4.7,6.7]	0.3 [0.0,0.8]	4.6 [2.8,6.4]	6.2 [4.5,7.9]	7.4 [5.5,9.2]	3.5 [2.2,4.7]
	2012	75.2%	0.024 [0.016,0.033]	5.6 [4.0,7.2]	43.4 [40.1,46.7]	2.5 [1.2,3.8]	1.9 [1.1,2.7]	1.0 [0.7,1.4]	4.1 [3.2,5.1]	0.2 [0.0,0.6]	1.8 [1.1,2.5]	3.9 [2.3,5.4]	4.4 [2.8,5.9]	2.1 [0.8,3.3]
	2014	76.3%	0.017 [0.013,0.022]	4.2 [3.3,5.1]	41.3 [39.9,42.8]	1.7 [1.0,2.3]	1.4 [0.9,1.9]	1.3 [0.9,1.7]	3.5 [2.7,4.3]	0.0 [0.0,0.1]	1.0 [0.5,1.5]	1.9 [1.5,2.3]	3.0 [2.2,3.7]	0.6 [0.4,0.9]

	Annualized absolute Changes of M0								
	2010-2012			2012-2014			2010-2014		
	Absolute	t-statistics		Absolute	t-statistics		Absolute	t-statistics	
Female	.005	2.70	***	.003	1.78	*	.004	4.36	***
Male	.006	1.97	**	.003	1.46		.005	3.95	***
	Annualized absolute changes of H								
Female	1.2	2.79	***	.7	1.80	*	1.0	4.46	***
Male	1.5	2.36	**	.7	1.50		1.1	4.14	***

In terms of **marrital status**, out results suggest divorced or widowed families are statistically significantly poorer, suggesting "male/female-absent" families are poorer. Especially, we find that most of the divorce/widowed families are female headed, and they are more likely to be deprived in "years of schooling", "school attendance", "nutrition", "water", "cooking fuel" and "assets". At last, poverty is decreasing from 2010 to 2014 for all subgroups, but the reduction is fastest for single or divorced/widowed families'. However again note that the population share of these groups is too small for us to claim that the data are representative of them; we merely indicate topics for future study.

Table 5-5 Poverty level and composition: marital status of household heads

	Composition (censored headcount ratio, %)											
	Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A

[32] See (Pearce, 1978), (McLanahan, 1985), (Smith, 1988), (Sen, 1989), (Appleton, 1996), (Okojie, 2002), (Deutsch & Silber, 2005).

[33] Another argument is women who are working outside tend to send a higher proportion of income, although their salaries might lower than men. What is more, female migrants often send remittances to the person (often a woman) taking care of her children (UN-INSTRAW, 2007) or the household (UN-INSTRAW, 2008a).

Single	2010	2.2%	0.050 [0.027,0.074]	11.9 [6.8,17.0]	42.5 [38.3,46.7]	7.5 [4.0,11.0]	1.4 [0.0,4.1]	2.9 [0.5,5.3]	4.5 [0.6,8.4]	1.1 [0.0,2.8]	5.4 [1.8,9.0]	10.1 [5.7,14.4]	11.1 [6.1,16.1]	7.3 [3.8,10.9]
	2012	2.0%	0.027 [0.011,0.042]	5.9 [2.7,9.1]	45.2 [39.8,50.6]	3.4 [1.1,5.8]	0.0 [0.0,0.0]	1.7 [0.1,3.3]	4.0 [1.2,6.9]	0.2 [0.1,0.5]	2.6 [0.2,5.0]	5.5 [2.3,8.7]	5.5 [2.3,8.7]	3.2 [0.9,5.5]
	2014	3.4%	0.018 [0.009,0.027]	4.3 [2.2,6.3]	42.0 [39.4,44.7]	2.5 [0.9,4.2]	0.4 [0.0,1.1]	0.6 [0.0,1.3]	3.2 [1.3,5.1]	0.2 [0.1,0.6]	0.9 [0.1,1.9]	2.9 [1.2,4.6]	3.9 [1.9,5.8]	2.2 [0.8,3.6]
Married or Cohabi-tation	2010	92.3%	0.032 [0.025,0.039]	7.6 [6.1,9.2]	42.3 [41.2,43.4]	3.5 [2.7,4.4]	1.5 [1.0,1.9]	1.2 [0.9,1.6]	5.3 [4.4,6.2]	0.3 [0.1,0.7]	4.0 [2.6,5.5]	5.6 [4.2,6.9]	6.7 [5.1,8.2]	3.0 [2.0,4.0]
	2012	91.6%	0.022 [0.015,0.029]	5.1 [3.8,6.5]	43.1 [40.2,45.9]	2.2 [1.2,3.2]	1.8 [1.2,2.5]	0.9 [0.6,1.2]	3.9 [3.1,4.7]	0.1 [0.1,0.4]	1.7 [1.1,2.2]	3.4 [2.2,4.7]	3.9 [2.6,5.2]	1.7 [0.7,2.7]
	2014	89.9%	0.016 [0.012,0.019]	3.8 [3.0,4.7]	41.3 [40.0,42.6]	1.4 [0.9,1.9]	1.3 [0.8,1.9]	1.2 [0.9,1.6]	3.2 [2.5,3.9]	0.0 [0.0,0.1]	0.9 [0.5,1.4]	1.6 [1.3,2.0]	2.6 [1.9,3.2]	0.6 [0.3,0.8]
Divorced or Widowed	2010	5.6%	0.066 [0.049,0.082]	15.4 [11.8,19.0]	42.5 [40.9,44.2]	9.1 [6.8,11.3]	2.9 [0.8,5.0]	2.3 [0.5,4.1]	7.8 [5.2,10.4]	0.3 [0.3,1.0]	6.8 [3.7,9.9]	12.6 [9.3,15.8]	14.0 [10.6,17.5]	9.3 [6.7,11.9]
	2012	6.5%	0.040 [0.028,0.052]	9.6 [6.9,12.2]	41.8 [38.8,44.8]	5.5 [3.4,7.5]	1.7 [0.3,3.0]	2.0 [0.8,3.1]	5.5 [3.6,7.4]	0.2 [0.0,0.7]	2.8 [1.4,4.3]	6.6 [4.2,9.0]	8.1 [5.5,10.6]	5.8 [3.5,8.0]
	2014	6.8%	0.031 [0.021,0.041]	7.4 [5.1,9.8]	41.3 [39.3,43.4]	4.3 [2.6,6.0]	1.4 [0.3,2.4]	1.4 [0.7,2.2]	5.8 [3.6,7.9]	0.0 [0.0,0.1]	2.3 [0.8,3.8]	4.1 [2.3,5.9]	5.7 [3.5,7.9]	1.8 [1.1,2.5]

Annualized absolute Changes of M0									
	2010-2012			2012-2014			2010-2014		
	Absolute	t-statistics		Absolute	t-statistics		Absolute	t-statistics	
Single	0.013	1.74	*	0.004	0.93		0.008	2.64	***
Married or Cohabitation	0.005	2.09	**	0.003	1.63		0.004	4.24	***
Divorced or Widowed	0.013	2.48	**	0.005	1.15		0.009	3.61	***
Annualized absolute changes of H									
Single	2.9	2.59	***	0.8	0.82		2.0	2.83	***
Married or Cohabitation	1.3	2.49	**	0.7	1.68	*	1.0	4.43	***
Divorced or Widowed	3.2	2.06	**	1.1	1.19		2.0	3.67	***

Education of household head: As expected, there is inverse relation between MPI and the education level of household heads. The results suggest that people who are living with illiterate household heads are the poorest. Poverty tends to decrease as the educational level of the head of household increases. Though the highest education group has the lowest poverty rate, but the "7-9" and "9 & above" groups are not significantly different from each other. The policy implication could be that education is important in helping people get out of poverty; education for children is also important due to it will help to reduce the intergenerational transmission of poverty.

In terms of the changes, the proportion of the people who are living with illiterate household heads are decreasing; their poverty are decreasing across time mainly due to decreased deprivations in of "years of schooling", "electricity", "sanitation", "cooking fuel" and "assets". For the higher level education subgroups, because their censored headcount ratios are already quite low, we cannot find significant reduction for indicators. Furthermore, higher educated groups are less likely to be deprived in 'school attendance' or in health related indicators. Maybe because household heads with higher education tend to invest in human capital for themselves and their children.

Table 5-6 Poverty level and composition: education level of the household head

			Composition (censored headcount ratio, %)											
		Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
No education	2010	17.6%	0.104 [0.083,0.125]	23.7 [19.5,28.0]	43.7 [42.2,45.3]	18.7 [15.4,22.1]	3.5 [1.5,5.5]	2.0 [1.2,2.8]	11.6 [9.6,13.6]	0.8 [0.1,1.6]	12.1 [7.5,16.6]	17.7 [13.7,21.7]	22.0 [17.7,26.3]	13.5 [10.4,16.6]
	2012	17.1%	0.077 [0.044,0.111]	16.8 [10.9,22.8]	46.0 [41.9,50.0]	11.8 [6.7,17.0]	4.5 [1.1,7.9]	2.2 [1.1,3.2]	10.5 [7.4,13.7]	0.7 [0.0,2.1]	6.1 [3.6,8.6]	12.1 [6.1,18.2]	15.2 [9.1,21.3]	9.1 [3.9,14.3]
	2014	16.4%	0.058 [0.043,0.072]	13.5 [10.4,16.7]	42.6 [41.0,44.2]	8.6 [5.8,11.4]	3.6 [1.9,5.4]	2.9 [1.8,4.0]	10.1 [7.6,12.7]	0.2 [0.0,0.4]	3.7 [1.8,5.7]	5.8 [4.4,7.1]	10.4 [7.6,13.2]	3.2 [2.1,4.3]
1-6			0.038	9.0	41.9	2.3	1.8	2.1	7.5	0.5	4.7	6.8	7.6	2.9

years	2010	28.6%	[0.028,0.047]	[6.8,11.2]	[40.7,43.1]	[1.5,3.0]	[1.2,2.5]	[1.3,2.9]	[5.9,9.1]	[0.0,1.1]	[2.5,6.8]	[4.8,8.7]	[5.4,9.8]	[1.5,4.3]
	2012	30.4%	0.021 [0.017,0.026]	5.3 [4.1,6.4]	40.6 [39.7,41.6]	1.4 [0.8,1.9]	2.1 [1.4,2.8]	1.0 [0.5,1.4]	4.3 [3.3,5.3]	0.1 [0.1,0.2]	1.5 [0.9,2.1]	3.5 [2.5,4.5]	3.8 [2.8,4.8]	1.2 [0.7,1.7]
	2014	29.7%	0.014 [0.011,0.018]	3.5 [2.7,4.3]	41.0 [39.7,42.3]	0.8 [0.5,1.1]	1.2 [0.7,1.7]	1.3 [0.8,1.8]	3.0 [2.2,3.8]	0.0 [0.0,0.0]	0.9 [0.5,1.4]	1.8 [1.2,2.4]	2.6 [1.8,3.3]	0.4 [0.2,0.7]
7-9 years	2010	32.3%	0.013 [0.010,0.017]	3.3 [2.4,4.2]	39.4 [38.3,40.5]	0.0 [0.0,0.0]	1.0 [0.6,1.4]	0.7 [0.3,1.1]	3.0 [2.2,3.7]	0.1 [0.0,0.3]	1.9 [1.2,2.6]	2.4 [1.6,3.1]	2.9 [2.1,3.8]	0.6 [0.3,1.0]
	2012	31.0%	0.007 [0.004,0.009]	1.8 [1.2,2.5]	37.7 [36.0,39.4]	0.0 [0.0,0.0]	0.6 [0.2,1.1]	0.8 [0.3,1.2]	1.7 [1.0,2.3]	0.0 [0.0,0.0]	0.5 [0.2,0.8]	1.0 [0.6,1.5]	1.0 [0.5,1.4]	0.2 [0.0,0.3]
	2014	30.8%	0.008 [0.004,0.011]	2.0 [1.1,2.9]	38.4 [36.8,40.1]	0.0 [0.0,0.0]	0.9 [0.1,1.7]	0.7 [0.3,1.2]	2.0 [1.1,2.9]	0.0 [0.0,0.0]	0.4 [0.1,0.8]	0.7 [0.4,1.1]	0.9 [0.4,1.4]	0.2 [0.0,0.4]
9 years above	2010	21.5%	0.006 [0.003,0.008]	1.5 [0.9,2.2]	38.5 [36.0,41.0]	0.0 [0.0,0.0]	0.3 [0.0,0.6]	0.7 [0.2,1.1]	1.5 [0.8,2.1]	0.0 [0.0,0.0]	0.6 [0.3,1.0]	1.0 [0.5,1.5]	0.9 [0.4,1.3]	0.2 [0.1,0.4]
	2012	21.5%	0.007 [0.004,0.009]	1.7 [1.0,2.5]	37.6 [35.0,40.3]	0.0 [0.0,0.0]	0.9 [0.3,1.4]	0.5 [0.1,0.9]	1.7 [1.0,2.5]	0.0 [0.0,0.0]	0.5 [0.1,0.8]	0.9 [0.4,1.4]	0.7 [0.3,1.2]	0.1 [0.0,0.3]
	2014	23.0%	0.003 [0.001,0.005]	0.9 [0.4,1.4]	37.7 [34.7,40.7]	0.0 [0.0,0.0]	0.2 [0.0,0.5]	0.6 [0.1,1.0]	0.9 [0.4,1.4]	0.0 [0.0,0.0]	0.0 [-0.0,0.0]	0.4 [0.1,0.8]	0.3 [0.0,0.5]	0.1 [0.0,0.1]

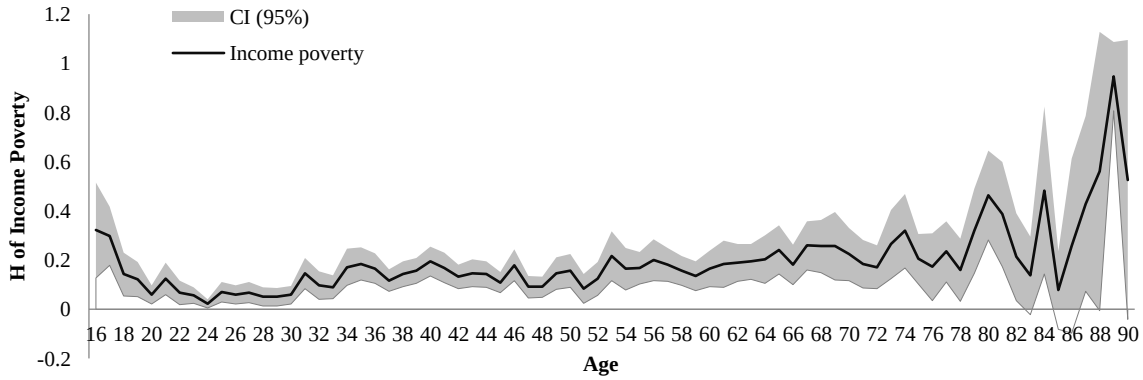
	Annualized absolute Changes of M0								
	2010-2012			2012-2014			2010-2014		
	Absolute	t-statistics		Absolute	t-statistics		Absolute	t-statistics	
No education	0.003	2.92	***	0.000	0.31		0.001	2.29	**
1-6 years	0.000	0.26		0.002	1.82	*	0.001	1.66	*
7-9 years	0.013	1.34		0.012	1.36		0.013	4.08	***
9 years above	0.008	3.05	***	0.003	2.39	**	0.006	4.55	***
	Annualized absolute changes of H								
No education	0.8	2.72	***	-0.1	0.24		0.4	2.16	**
1-6 years	-0.1	0.34		0.4	1.83	*	0.2	1.64	
7-9 years	3.5	1.89	*	2.3	1.34		2.9	4.43	***
9 years above	1.9	3.06	***	0.9	2.48	**	1.4	4.71	***

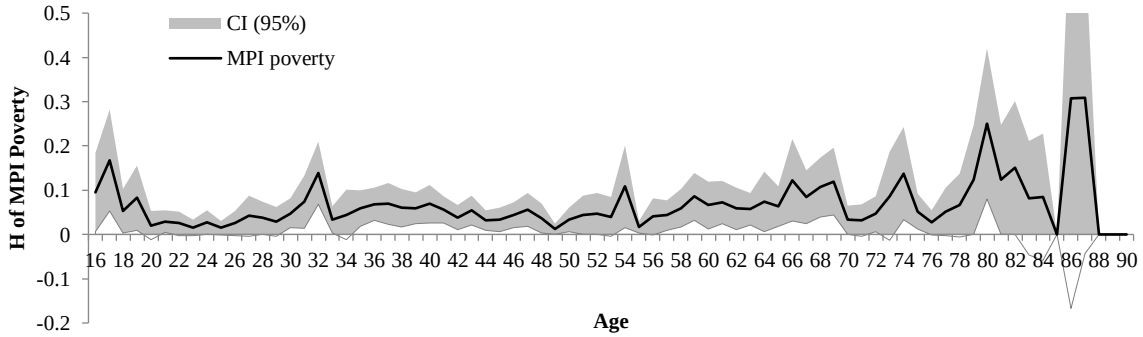
Age of household head: According to (Okojie, 2002), the age of the household head influences household welfare with an inverse U shaped relationship. Welfare firstly goes up with age due to the fact that the labor force can acquire more human capital (education and experience) when they grow older; subsequently due to retirement or productivity decline, income and welfare may fall .

In order to test this relationship, we draw the poverty distribution graphs for monetary poverty and MPI according to the age of the household head (again recall the small sample size but see Figure 5.2). The relationship also follows the inverse-U logic. The youngest household heads (mainly between 16 to 18 years old) are quite poor in both poverty measurements[34]. Then poverty goes down to 24 years old to reach the lowest point till 35 years old, and arrived to a stable level. Between the ages of 36 and 60, poverty stays in fixed range with fluctuation. After 60 years old, poverty rises again. Based on this, we set up three age groups for the heads: 16-35 years old, 36-60 years old, and 61 years old and above.

Figure 5-2: Poverty headcount ratios in terms of monetary poor and MPI

[34] According to Marriage Law of the People's Republic of China, No marriage may be contracted before the man has reached 22 years of age and the woman 20 years of age. Early marriages are illegal and mostly come from bad customs. We consider the young heads might come from poorer families, or do not have necessary abilities to raise the families yet.





According to the results, people living with 36 to 60 years old household heads are the least likely to be poor. The poorest is the elderly group. As expected, the oldest group is highly deprived in almost all the indicators. They are rarely deprived in "school attendance" due to the fact that older people usually do not live with their grandchildren. But they are consistently deprived in "years of schooling", "nutrition" and "living standard". This generation was born before China's liberation with scarce economic and social welfare resources. In terms of the composition results, households with elderly head of households' improvement has been as fast as other groups especially on living standards, which provides a good sign of the equal coverage of the social anti-poverty projects. Compare the annualized absolute changes of MPI and H for each subgroup, all the groups' poverty are decreasing from 2010 to 2014, especially the oldest group.

Table 5.7 Poverty comparison: age of the household head

			Composition (censored headcount ratio, %)											
		Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
16-35 years old	2010	16.4%	3.6 [1.8,5.4]	8.1 [4.4,11.8]	44.8 [42.1,47.5]	3.8 [1.8,5.7]	1.9 [0.6,3.2]	1.3 [0.3,2.2]	5.4 [3.3,7.4]	1.0 [0.0,2.3]	5.5 [1.9,9.1]	6.0 [2.5,9.4]	7.7 [4.1,11.4]	3.5 [0.6,6.4]
	2012	14.5%	3.2 [1.0,5.4]	6.8 [3.0,10.7]	46.6 [39.7,53.6]	4.4 [0.7,8.1]	2.4 [0.4,4.4]	1.6 [0.4,2.8]	4.8 [2.7,7.0]	0.5 [0.0,1.4]	1.9 [0.5,3.3]	4.5 [0.8,8.2]	5.2 [1.4,9.0]	2.6 [0.0,5.5]
	2014	14.7%	1.8 [0.9,2.8]	4.4 [2.1,6.8]	41.7 [39.6,43.7]	2.2 [0.6,3.9]	1.8 [0.3,3.3]	0.9 [0.3,1.6]	3.5 [1.5,5.5]	0.1 [0.1,0.3]	1.2 [0.3,2.0]	1.8 [0.9,2.7]	2.6 [1.0,4.2]	0.9 [0.2,1.6]
36-60 years old	2010	66.9%	2.8 [2.2,3.4]	6.6 [5.3,7.9]	42.1 [41.1,43.1]	2.8 [2.1,3.5]	1.5 [1.0,2.0]	1.0 [0.7,1.4]	4.7 [3.9,5.6]	0.1 [0.0,0.3]	3.6 [2.4,4.8]	5.0 [3.8,6.2]	5.7 [4.4,6.9]	2.1 [1.4,2.8]
	2012	68.3%	1.8 [1.3,2.3]	4.1 [3.1,5.2]	43.1 [40.9,45.2]	1.4 [0.7,2.0]	1.6 [1.1,2.2]	0.8 [0.5,1.1]	3.3 [2.6,4.1]	0.1 [0.0,0.2]	1.4 [0.9,2.0]	2.7 [1.8,3.7]	3.1 [2.1,4.1]	1.3 [0.4,2.1]
	2014	66.0%	1.3 [1.0,1.6]	3.1 [2.4,3.8]	41.5 [39.7,43.3]	0.9 [0.5,1.3]	1.2 [0.7,1.6]	1.1 [0.7,1.5]	2.7 [2.1,3.3]	0.0 [0.0,0.0]	0.7 [0.4,1.1]	1.4 [1.0,1.8]	2.1 [1.5,2.7]	0.3 [0.1,0.4]
61 years old & above	2010	16.7%	5.9 [4.9,7.0]	14.3 [12.0,16.7]	41.5 [40.3,42.7]	8.7 [6.8,10.5]	1.3 [0.6,2.0]	2.5 [1.4,3.6]	8.3 [6.6,10.0]	0.2 [0.1,0.6]	5.3 [3.6,6.9]	10.3 [8.3,12.3]	12.6 [10.3,14.9]	8.7 [6.7,10.6]
	2012	17.1%	3.9 [3.1,4.6]	9.5 [7.7,11.3]	40.6 [39.5,41.6]	5.1 [4.0,6.2]	1.9 [0.9,2.9]	1.3 [0.7,1.9]	6.0 [4.5,7.5]	0.2 [0.0,0.4]	2.9 [1.8,3.9]	6.8 [5.2,8.4]	7.9 [6.2,9.6]	4.5 [3.4,5.6]
	2014	19.4%	3.0	7.3	40.8	3.8	1.4	1.8	5.6	0.1	1.9	3.4	5.6	2.1

	[2.3,3.6]	[5.8,8.8]	[39.6,42.0]	[2.9,4.7]	[0.7,2.1]	[1.0,2.6]	[4.2,6.9]	[0.0,0.2]	[0.9,2.9]	[2.5,4.3]	[4.2,6.9]	[1.5,2.8]	
Annualized absolute Changes of M0													
	2010-2012				2012-2014				2010-2014				
	Absolute		t-statistics		Absolute		t-statistics		Absolute		t-statistics		
16-35 years old	0.002		0.31		0.007		1.09		0.004		1.72		*
36-60 years old	0.005		2.69	***	0.003		1.67	*	0.004		4.70		***
61 years old & above	0.010		3.24	***	0.004		1.78	*	0.007		4.83		***
Annualized absolute changes of H													
16-35 years old	0.6		0.47		1.2		1.04		0.9		1.65		*
36-60 years old	1.3		3.07	***	0.5		1.69	*	0.9		4.92		***
61 years old & above	2.4		3.19	***	1.1		1.85	*	1.8		4.95		***

Migrant status: Hukou system[35] is often regarded a caste system in China (Chan & Zhang, 1999), (Young, 2013). It causes issues of discrimination (Kuang & Liu, 2012), inequality and monetary poverty (Park & Wang, 2010), (Zhang et, al., 2015).

How dose *hukou* affect multidimensional poverty? Out data suggests people living with rural *hukou* household heads are more likely to be poor. If we compare rural and urban composition results, rural *hukou* group is less deprived in living standard dimensions compared to people who live in rural areas (retrospect to Table 5-1), and rural migration could be one of the possible explanations for this. Compare the poverty changes from 2010 to 2014, the rural *hukou* group has a statistically significant decrease, but the urban *hukou* group's improvement is not significant.

Table 5.8 Poverty comparison: *hukou* status of the household head

			Composition (censored headcount ratio, %)											
		Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
Rural *hukou*	2010	72.30%	0.045 [0.036,0.055]	10.6 [8.6,12.6]	42.6 [41.5,43.7]	5.3 [4.1,6.4]	2.0 [1.3,2.7]	1.6 [1.2,2.0]	6.9 [5.8,8.1]	0.4 [0.0,0.9]	5.5 [3.5,7.5]	8.1 [6.2,10.0]	9.5 [7.5,11.6]	4.6 [3.2,6.0]
	2012	71.40%	0.030 [0.021,0.040]	7.0 [5.2,8.8]	43.6 [40.7,46.5]	3.3 [1.9,4.8]	2.3 [1.3,3.2]	1.2 [0.8,1.6]	5.1 [4.1,6.1]	0.2 [0.0,0.6]	2.3 [1.5,3.1]	4.9 [3.2,6.7]	5.7 [3.9,7.5]	2.7 [1.3,4.2]
	2014	72.30%	0.021 [0.016,0.026]	5.0 [4.0,6.1]	41.5 [40.2,42.8]	2.2 [1.4,2.9]	1.6 [1.0,2.1]	1.5 [1.0,1.9]	4.1 [3.2,5.0]	0.0 [0.0,0.1]	1.3 [0.7,1.9]	2.3 [1.9,2.8]	3.6 [2.8,4.5]	0.9 [0.6,1.2]
Urban *hukou*	2010	27.70%	0.007 [0.005,0.009]	1.8 [1.2,2.4]	38.5 [36.7,40.3]	0.5 [0.3,0.8]	0.3 [0.1,0.5]	0.7 [0.3,1.0]	1.5 [1.0,2.1]	0.0 [0.0,0.1]	0.8 [0.4,1.3]	0.7 [0.3,1.0]	1.0 [0.5,1.5]	0.4 [0.2,0.7]
	2012	28.60%	0.006 [0.004,0.008]	1.6 [1.0,2.2]	36.0 [34.6,37.4]	0.2 [0.1,0.4]	0.6 [0.2,1.1]	0.6 [0.2,1.0]	1.4 [0.8,2.0]	0.0 [0.0,0.0]	0.4 [0.1,0.7]	0.5 [0.2,0.8]	0.6 [0.3,0.9]	0.2 [0.1,0.3]
	2014	27.70%	0.005 [0.003,0.008]	1.4 [0.7,2.1]	39.2 [37.2,41.2]	0.3 [0.1,0.5]	0.6 [0.0,1.1]	0.5 [0.2,0.9]	1.3 [0.7,2.0]	0.0 [0.0,0.1]	0.3 [0.0,0.5]	0.4 [0.1,0.7]	0.6 [0.2,0.9]	0.1 [0.0,0.2]
Annualized absolute Changes of M0														
			2010-2012				2012-2014				2010-2014			
			Absolute		t-statistics		Absolute		t-statistics		Absolute		t-statistics	
Rural *hukou*			0.008		2.21	**	0.005		1.74	*	0.006		4.59	***
Urban *hukou*			0.001		0.70		0.000		0.16		0.000		0.80	
Annualized absolute changes of H														
Rural *hukou*			1.9		2.70	***	1.0		1.81	*	1.4		4.88	***
Urban *hukou*			0.1		0.44		0.1		0.44		0.1		0.89	

In terms of **rural migrants**, over the past 30 years, China has experienced massive internal migration[36]. Though rural migrants are able to get rid of income poverty (罗楚亮, 2010), (Du, Park, & Wang, 2005), but arguments lie in non-monetary dimensions. Because the informal migrant workers could not register in the city, they are not able to enjoy proper social benefits.

[35] *Hukou* in is record in the system of household registration required by law in China. It is an institution controlling population movement.

[36] According to National Bureau of Statistics, there are more than 263 million migrants (approximately 20% of the population) in 2012. See http://www.stats.gov.cn/tjsj/zxfb/201305/t20130527_12978.html [Chinese].

This leads to difficulties for children's school enrolment and medical care; indirectly, the left-behind children in rural area are suffering emotional well-being problems[37]. All in all, there might be a different story from the multidimensional point of view.

According to NSB's definition of migrants[38], we divide the whole population into four groups: ***1. Whole-family-moved-out*** -- the whole family have moved out from rural to urban areas. ***2. Rural households with partial migrants*** --some of the members are working outside, while the rest remain in rural area. ***3. Rural non-migrants*** -- rural residents without migration. ***4. Urban non-migrants*** – urban residents.

The results show that group-3 is the poorest, followed by group-2. Group-4 is the least poor group among all. We deduce that migration has a strong effect in reducing multidimensional poverty. Especially, the whole-family-move-out has the strongest effects.

How to understand the possible linkage between migration and low MPI? We are providing three assumptions: a. "*Economic drivers*", suggest that families with higher income levels can easily access multiple resources and reduce multidimensional poverty. b. "*Human capital*", indicates that migrants who can migrate usually already have better education or are healthier, meaning they have lower MPI in advance. c. "*Environmental change*", which assume that changing the living condition from the rural to urban can automatically reduce the MPI. To explore the "*economic drivers"* effect, we compare CHRs on "education" and "living standard" dimensions and focus on the differences between migrants and rural non-migrants. As expected, we find poverty in group-1 is significantly lower than group-3. But quite unexpected, CHRs are higher in group-2 than in group-3. One possible explanation could come from the left-behind children/old people issue, and this calls for the thinking how to reduce poverty in order to avoid polarization. To explore the *"Human capital"* effect, we focus on indicators of 'years of schooling' and 'nutrition', and compare rural migrants and rural non-migrants. The results suggest that "years of schooling" is strongly associated with migration, but this is not the case for 'nutrition'. To test "*Environmental change*", we focus on 'living standard'. We find that group-1 is less likely to be deprived in 'sanitation', 'water', 'cooking fuel' and 'assets' compares to group-2 or group-3, which verified our test. In sum, migration is associated with lower multidimensional poverty, potentially through complicated mechanisms. From the policy point of view, in order to harness migration to reduce multidimensional poverty, policies should reinforce education while creating equal opportunities for migrants to enjoy the social welfare system. Still, the poorest group are the non-migrants, so schemes to stimulate the rural livelihoods and to encourage the return of skilled migrants to rural areas may be explored as well.

In terms of the annualized changes, we only observe statistically significant decreases for non-migrants from 2010-2012 and 2010-2014, but not for the migrants, suggesting the migrants' improvement over time are not statistically significant.

Table 5.9 Poverty comparison: migration action

[37] (UNDP, 2013), (Ren & Treiman, 2013), (Xu & Xie, 2013).

[38] According to NSB, the rural migrants are rural residents holding rural *hukou* who working on non-agriculture locally, or go outside for work for more than 6 months. More specific, rural migrant can be divided into: a. Local migrant, who works within the same village/county he/she registered; b. Outside migrant: who works outside the county he/she registered; c. Whole family move out: whole family leave their families and register place, work and live outside. We put the first and second types together in this paper.

		Composition (censored headcount ratio, %)											
	Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
2010	23.9%	0.023 [0.016,0.030]	5.7 [4.0,7.4]	40.2 [38.7,41.8]	2.5 [1.6,3.4]	1.2 [0.6,1.7]	1.1 [0.5,1.8]	4.3 [2.9,5.7]	0.0 [0.0,0.1]	1.7 [0.7,2.6]	3.8 [2.5,5.1]	4.3 [2.8,5.8]	1.8 [1.2,2.5]
Group-1 2012	24.5%	0.013 [0.010,0.017]	3.3 [2.4,4.2]	40.2 [38.8,41.5]	1.2 [0.8,1.6]	1.0 [0.5,1.5]	0.8 [0.4,1.2]	2.8 [2.0,3.7]	0.0 [0.0,0.0]	0.5 [0.2,0.8]	1.9 [1.2,2.7]	1.9 [1.3,2.6]	1.0 [0.6,1.4]
2014	29.2%	0.010 [0.006,0.014]	2.6 [1.4,3.7]	39.0 [37.2,40.9]	0.7 [0.4,1.1]	1.1 [0.3,1.8]	0.8 [0.3,1.3]	2.2 [1.1,3.3]	0.0 [0.0,0.0]	0.3 [0.0,0.6]	1.0 [0.5,1.4]	1.3 [0.7,1.9]	0.3 [0.1,0.5]
2010	28.5%	0.051 [0.038,0.064]	11.9 [9.2,14.6]	43.0 [41.2,44.9]	6.1 [4.2,8.0]	1.9 [0.8,3.1]	1.8 [1.0,2.7]	8.3 [6.3,10.3]	0.1 [0.0,0.3]	6.1 [3.7,8.5]	8.9 [6.8,11.1]	11.0 [8.3,13.7]	5.0 [2.8,7.2]
Group-2 2012	28.5%	0.033 [0.023,0.044]	7.6 [5.6,9.6]	44.1 [41.0,47.2]	2.4 [0.9,3.9]	3.4 [2.0,4.9]	2.0 [1.2,2.9]	5.7 [4.2,7.1]	0.0 [0.0,0.0]	2.9 [1.6,4.2]	4.7 [3.0,6.4]	6.2 [4.2,8.1]	2.7 [1.3,4.0]
2014	24.9%	0.028 [0.020,0.037]	6.6 [4.6,8.6]	42.7 [41.3,44.1]	1.7 [0.8,2.6]	2.3 [1.3,3.2]	2.4 [1.2,3.5]	5.7 [3.9,7.5]	0.0 [0.0,0.0]	2.7 [1.0,4.3]	3.1 [2.0,4.2]	5.4 [3.5,7.3]	1.2 [0.2,2.2]
2010	32.7%	0.056 [0.040,0.072]	13.0 [9.5,16.4]	43.1 [41.8,44.4]	6.5 [4.7,8.2]	2.5 [1.4,3.6]	1.8 [1.1,2.5]	7.9 [6.2,9.5]	0.9 [0.0,2.0]	7.8 [4.2,11.4]	10.3 [6.8,13.8]	12.1 [8.6,15.6]	6.2 [3.8,8.7]
Group-3 2012	30.9%	0.041 [0.024,0.058]	9.2 [6.0,12.5]	44.1 [40.6,47.6]	5.3 [2.7,7.9]	2.4 [0.9,3.9]	1.1 [0.5,1.6]	6.4 [4.6,8.3]	0.5 [0.0,1.4]	3.3 [2.0,4.5]	7.2 [4.1,10.4]	8.1 [4.8,11.3]	3.9 [1.2,6.7]
2014	29.6%	0.027 [0.020,0.035]	6.5 [4.8,8.2]	41.9 [40.0,43.7]	3.7 [2.3,5.1]	1.6 [0.7,2.6]	1.6 [1.0,2.2]	5.0 [3.7,6.4]	0.1 [0.0,0.2]	1.5 [0.7,2.3]	3.2 [2.4,4.0]	4.9 [3.4,6.4]	1.4 [0.9,1.9]
2010	24.9%	0.005 [0.003,0.008]	1.5 [0.9,2.0]	37.4 [35.6,39.3]	0.4 [0.2,0.6]	0.3 [0.1,0.5]	0.5 [0.2,0.8]	1.3 [0.8,1.8]	0.0 [0.0,0.0]	0.6 [0.2,1.0]	0.5 [0.1,0.8]	0.7 [0.3,1.0]	0.2 [0.1,0.4]
Group-4 2012	26.2%	0.005 [0.003,0.007]	1.4 [0.8,2.0]	35.8 [34.2,37.4]	0.3 [0.1,0.4]	0.7 [0.1,1.2]	0.4 [0.1,0.8]	1.1 [0.5,1.7]	0.0 [0.0,0.0]	0.3 [0.1,0.5]	0.3 [0.1,0.6]	0.5 [0.2,0.7]	0.2 [0.0,0.3]
2014	26.3%	0.006 [0.003,0.008]	1.4 [0.7,2.1]	39.1 [37.1,41.2]	0.3 [0.1,0.5]	0.5 [-0.0,1.1]	0.5 [0.2,0.9]	1.3 [0.7,2.0]	0.0 [0.0,0.1]	0.3 [0.0,0.6]	0.4 [0.1,0.8]	0.6 [0.2,1.0]	0.1 [0.0,0.2]

	Annualized absolute Changes of M0							
	2010-2012			2012-2014		2010-2014		
	Absolute	t-statistics		Absolute	t-statistics	Absolute	t-statistics	
Group-1	0.008	1.31		0.007	1.40	0.007	3.19	***
Group-2	0.000	0.33		0.000	0.32	0.000	0.04	
Group-3	0.005	2.42	**	0.002	1.09	0.003	3.05	***
Group-4	0.009	2.18	**	0.003	0.76	0.006	2.93	***
	Annualized absolute changes of H							
Group-1	1.9	1.59		1.4	1.46	1.6	3.35	***
Group-2	0.0	0.18		0.0	0.06	0.0	0.10	
Group-3	1.2	2.50	**	0.4	0.96	0.8	3.00	***
Group-4	2.2	2.58	***	0.5	0.66	1.3	3.13	***

Note: group-1 whole family move out; group-2 rural households with partial migrants; group-3 rural non-migrants; goupr-4 urban non-migrants.

Household size is another common variable for studying poverty[39]. While the results depend upon the equivalence scale used for monetary poverty, some studies found smaller households often indicate a higher quality of human capital (Gottschalk & Danziger, 1993), (Becker, 1995). Also, smaller household size implies better economic independence and a lower dependency ratio.

The MPI result tells the similar story. Basically, smaller household size goes with less poor situation, except 1-2 member households. This is similar to income poverty[40]. According to the poverty composition, 1-2 member households are mainly deprived in "years of schooling", "assets" and "cooking fuel". They are seldom deprived in child related indicators as this type of household usually has no children. The larger households are more likely to be deprived in "school attendance", "child mortality", "nutrition", "water" and "cooking fuel". Finally, the intensity value shows that households with more than 4 members have higher average deprivation scores compared to the 3 member households; for the 6 members & above, all their CHRs are higher. Finally, in terms of the changes over time, the poverty is decreasing strongly

[39] (Bourguignon, 1989), (Atkinson, 1992), (Gottschalk & Danziger, 1993).

[40] For instance, (罗楚亮, 2010) find the larger household size, the poorer the group in terms of income poverty; but 1-2 members families are also belong to the poorer groups.

for all the subgroups from 2010 to 2014 considering statistical significance.

Poverty 5.10 Poverty comparison: household size

			Composition (censored headcount ratio, %)											
		Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
1-2 members	2010	24.4%	0.036 [0.029,0.042]	8.7 [7.1,10.3]	40.9 [40.1,41.6]	7.5 [6.1,9.0]	0.2 [0.0,0.3]	0.5 [0.3,0.8]	3.2 [2.6,3.9]	0.2 [0.0,0.3]	3.1 [2.0,4.2]	6.9 [5.6,8.1]	8.1 [6.5,9.7]	6.4 [5.1,7.8]
	2012	17.2%	0.024 [0.020,0.028]	5.9 [4.8,7.0]	40.5 [39.6,41.4]	5.1 [4.1,6.0]	0.0 [0.0,0.1]	0.4 [0.1,0.6]	2.9 [2.3,3.6]	0.0 [0.0,0.1]	1.7 [1.1,2.3]	4.4 [3.4,5.4]	5.1 [4.1,6.2]	3.6 [2.8,4.3]
	2014	17.9%	0.016 [0.013,0.019]	3.9 [3.2,4.7]	40.0 [39.1,40.9]	3.5 [2.8,4.2]	0.0 [0.0,0.0]	0.2 [0.1,0.4]	2.5 [1.9,3.0]	0.1 [0.0,0.2]	0.6 [0.3,0.9]	2.4 [1.8,2.9]	3.1 [2.4,3.8]	1.8 [1.3,2.3]
3 members	2010	27.0%	0.019 [0.014,0.023]	4.4 [3.4,5.3]	42.2 [40.7,43.7]	2.2 [1.6,2.9]	0.7 [0.4,1.1]	0.4 [0.2,0.7]	3.4 [2.6,4.1]	0.1 [0.0,0.2]	2.0 [1.3,2.7]	3.4 [2.5,4.3]	3.7 [2.8,4.6]	1.7 [1.0,2.3]
	2012	25.0%	0.010 [0.007,0.012]	2.4 [1.7,3.1]	39.3 [37.8,40.8]	1.1 [0.7,1.5]	0.7 [0.3,1.1]	0.5 [0.2,0.8]	1.8 [1.2,2.4]	0.0 [0.0,0.0]	0.7 [0.3,1.0]	1.2 [0.7,1.7]	1.5 [0.9,2.0]	0.7 [0.3,1.1]
	2014	23.8%	0.007 [0.005,0.009]	1.7 [1.2,2.3]	41.5 [39.9,43.2]	0.8 [0.4,1.1]	0.4 [0.2,0.6]	0.4 [0.2,0.7]	1.5 [1.0,2.1]	0.0 [0.0,0.0]	0.4 [0.1,0.7]	1.0 [0.6,1.5]	1.1 [0.7,1.6]	0.3 [0.1,0.5]
4 members	2010	21.1%	0.031 [0.024,0.039]	7.4 [5.7,9.2]	42.2 [40.6,43.7]	2.8 [1.8,3.9]	1.9 [1.2,2.6]	0.8 [0.4,1.3]	6.0 [4.6,7.4]	0.3 [0.0,0.6]	4.1 [2.6,5.6]	5.5 [3.9,7.0]	6.3 [4.6,8.0]	2.1 [1.0,3.1]
	2012	21.4%	0.020 [0.014,0.027]	4.9 [3.5,6.3]	41.8 [39.1,44.4]	1.9 [0.9,3.0]	1.7 [1.0,2.4]	0.5 [0.1,0.9]	4.1 [3.1,5.2]	0.1 [0.0,0.4]	1.7 [0.9,2.5]	3.3 [2.1,4.5]	3.5 [2.3,4.8]	1.4 [0.4,2.3]
	2014	20.8%	0.010 [0.007,0.013]	2.5 [1.7,3.3]	40.5 [38.5,42.5]	0.9 [0.4,1.4]	0.8 [0.3,1.2]	0.9 [0.4,1.4]	1.9 [1.2,2.6]	0.0 [0.0,0.0]	0.8 [0.3,1.2]	1.3 [0.7,1.9]	1.6 [1.0,2.2]	0.4 [0.1,0.7]
5 members	2010	15.3%	0.040 [0.028,0.053]	9.4 [6.7,12.0]	43.1 [41.0,45.2]	2.7 [1.4,4.0]	2.6 [1.6,3.7]	2.2 [1.3,3.2]	7.5 [5.4,9.6]	0.4 [0.0,1.1]	5.1 [2.9,7.3]	6.2 [4.0,8.4]	7.9 [5.3,10.5]	3.3 [1.4,5.2]
	2012	18.0%	0.021 [0.011,0.031]	4.4 [2.5,6.3]	46.9 [42.4,51.5]	1.5 [0.2,2.8]	2.4 [1.0,3.8]	1.0 [0.4,1.5]	3.6 [2.2,5.0]	0.2 [0.2,0.6]	1.5 [0.6,2.4]	3.1 [1.3,4.8]	3.7 [1.9,5.5]	1.4 [0.1,2.7]
	2014	17.4%	0.017 [0.011,0.022]	4.0 [2.7,5.3]	41.1 [38.9,43.3]	1.2 [0.4,1.9]	1.7 [0.7,2.7]	1.7 [0.9,2.5]	3.4 [2.3,4.5]	0.0 [0.0,0.0]	0.9 [0.2,1.6]	1.5 [0.8,2.1]	2.3 [1.4,3.3]	0.3 [0.0,0.7]
6 members & above	2010	12.0%	0.067 [0.037,0.096]	15.2 [8.9,21.6]	43.8 [41.7,45.9]	4.0 [0.7,7.3]	4.1 [1.6,6.5]	4.8 [2.8,6.7]	11.0 [7.7,14.3]	1.1 [0.0,2.6]	10.5 [3.9,17.1]	11.1 [4.9,17.4]	13.7 [7.2,20.1]	4.1 [0.1,8.1]
	2012	18.4%	0.047 [0.025,0.069]	10.6 [6.5,14.8]	44.4 [40.4,48.4]	3.4 [0.2,6.5]	4.4 [2.3,6.6]	2.9 [1.6,4.2]	8.3 [5.8,10.8]	0.4 [0.0,1.2]	3.6 [1.9,5.2]	7.4 [3.5,11.3]	8.5 [4.4,12.5]	3.6 [0.3,6.8]
	2014	20.2%	0.036 [0.024,0.048]	8.4 [5.7,11.2]	42.1 [40.2,44.1]	2.1 [0.3,4.0]	3.6 [1.9,5.3]	2.9 [1.8,4.1]	7.7 [5.3,10.1]	0.1 [0.0,0.2]	2.4 [0.9,3.8]	3.0 [2.0,4.0]	6.1 [4.0,8.3]	0.9 [0.2,1.6]

Annualized absolute Changes of M0									
	2010-2012			2012-2014			2010-2014		
	Absolute	t-statistics		Absolute	t-statistics		Absolute	t-statistics	
1-2 members	0.006	2.16	**	0.005	2.86	***	0.005	5.00	***
3 members	0.010	2.48	**	0.002	0.72		0.006	3.55	***
4 members	0.010	1.05		0.006	0.92		0.008	1.92	*
5 members	0.006	2.95	***	0.004	3.06	***	0.005	5.41	***
6 members & above	0.005	3.56	***	0.001	1.31		0.003	4.67	***
Annualized absolute changes of H									
1-2 members	1.3	2.28	**	1.2	2.98	***	1.2	5.07	***
3 members	2.5	3.04	***	.2	0.34		1.4	3.62	***
4 members	2.3	1.19		1.1	0.86		1.7	1.92	*
5 members	1.4	2.94	***	1.0	2.98	***	1.2	5.43	***
6 members & above	1.0	3.32	***	0.4	1.53		0.7	4.80	***

In terms of **ethnicity** and **religion**, we put them together mainly because they are both culturally specific. For ethnicity, quite a lot of studies suggest that ethnic minorities have higher levels of income poverty (Hannum & Xie, 1998), (Bhalla & Luo, 2012), (Ravallion & Jalan, 2000). In China there are 55 ethnic minorities groups (or called "non-Han"), and Han is the majority. The minorities comprised 8.5% of the population in Mainland China in 2010[41]. In our dataset, if at least one household member is minority, the whole household is defined as minority. In this case 12-15% of the populations belong to ethnic groups. We use the same definitional method for religion (any religion) and find 18-25% of the populations belong to some religious group depending on the survey year.

[41] See http://news.xinhuanet.com/english2010/china/2011-04/28/c_13849933.htm.

The MPI results show that ethnic minorities are significantly poorer than the majority. Almost all of the indicators show higher deprivation rates among the minorities. Interestingly we do not find differences between religious and non-religious groups in terms of MPI.

Table 5.11 Poverty comparison: ethnicity and religion

			Composition (censored headcount ratio, %)											
		Pop. Share	M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
Han	2010	85.60%	0.025 [0.022,0.029]	6.2 [5.4,7.1]	40.5 [40.0,41.0]	2.7 [2.3,3.2]	0.9 [0.7,1.1]	1.1 [0.8,1.4]	4.5 [3.8,5.2]	0.1 [0.0,0.2]	2.5 [1.9,3.1]	4.7 [3.9,5.5]	5.2 [4.4,6.0]	2.2 [1.8,2.7]
	2012	87.40%	0.014 [0.011,0.017]	3.4 [2.7,4.1]	40.3 [39.2,41.5]	0.8 [0.5,1.0]	1.1 [0.7,1.5]	0.9 [0.6,1.3]	3.0 [2.3,3.7]	0.0 [0.0,0.0]	1.0 [0.6,1.4]	2.2 [1.7,2.8]	2.4 [1.8,3.0]	0.5 [0.3,0.7]
	2014	--	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Minority	2010	14.40%	0.090 [0.053,0.126]	19.5 [11.9,27.2]	45.9 [44.3,47.5]	11.1 [6.7,15.5]	5.2 [2.3,8.2]	2.8 [1.5,4.1]	11.0 [7.4,14.7]	1.6 [0.0,4.0]	14.5 [6.2,22.7]	13.8 [6.3,21.3]	18.6 [10.8,26.4]	10.7 [5.3,16.1]
	2012	12.60%	0.053 [0.032,0.073]	12.8 [7.9,17.6]	41.5 [39.1,43.9]	3.4 [1.1,5.8]	4.8 [2.3,7.3]	2.5 [0.8,4.2]	10.1 [5.9,14.2]	0.0 [0.0,0.0]	4.9 [2.1,7.8]	7.1 [3.2,10.9]	10.2 [5.7,14.7]	5.1 [2.1,8.2]
	2014	--	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Non-religion	2010	--	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
	2012	82.10%	0.023 [0.015,0.032]	5.4 [3.8,6.9]	43.6 [40.3,46.9]	2.7 [1.4,4.0]	1.7 [0.9,2.5]	0.9 [0.6,1.2]	3.8 [2.9,4.7]	0.2 [0.0,0.5]	1.7 [1.1,2.4]	3.6 [2.1,5.1]	4.3 [2.7,5.8]	2.3 [1.0,3.6]
	2014	64.20%	0.016 [0.013,0.019]	3.9 [3.2,4.7]	41.0 [39.7,42.2]	1.4 [1.0,1.8]	1.0 [0.7,1.4]	1.3 [0.9,1.8]	3.4 [2.7,4.1]	0.0 [-0.0,0.0]	1.1 [0.6,1.7]	1.8 [1.4,2.2]	2.6 [2.0,3.3]	0.7 [0.4,1.0]
Religion	2010	--	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
	2012	17.90%	0.023 [0.017,0.030]	5.8 [4.1,7.4]	40.3 [38.7,41.8]	1.3 [0.7,1.9]	2.0 [0.9,3.1]	1.4 [0.6,2.2]	5.0 [3.4,6.5]	0.0 [0.0,0.0]	1.9 [1.0,2.9]	3.9 [2.5,5.2]	4.0 [2.8,5.2]	0.7 [0.3,1.1]
	2014	25.80%	0.018 [0.012,0.024]	4.2 [2.9,5.6]	41.8 [39.9,43.7]	2.0 [1.1,3.0]	1.7 [0.7,2.7]	1.0 [0.6,1.4]	3.3 [2.2,4.4]	0.1 [-0.0,0.2]	0.8 [0.4,1.2]	1.9 [1.2,2.5]	3.1 [2.0,4.2]	0.7 [0.4,1.0]

Note: There are no variable of ethnicity in 2014, no religion in 2010.

6. MPI and Monetary Poverty

6.1 Monetary Poverty with MPI

The CFPS includes income/expenditure aggregate, thus we are able to construct monetary poverty levels. Using the official poverty line (2300 Yuan of per capita net income of rural households based on 2010 constant prices), we obtain an income poverty headcount ratio of 13.1% in 2010[42], and a consumption poverty headcount ratio of 10.7%. Consider the incidence of Multidimensional poverty is 8.2% in the same year; we expect most of the multidimensionally poor people would also be monetary poor. However, in fact the mismatch is surprisingly high. Only 2.8% (with CI from 1.7% to 3.8%) of the population are poor according to both the MPI and income poverty, and only 2.4% (with CI rom 1.5% to 3.4%) are poor according to both MPI and expenditure poverty. For the following years, we see the similar trends.

Table 6-1 Overlap of monetary poverty and MPI

	2010		2012		2014	
	H (%)	CI (95%)	H	CI (95%)	H	CI (95%)

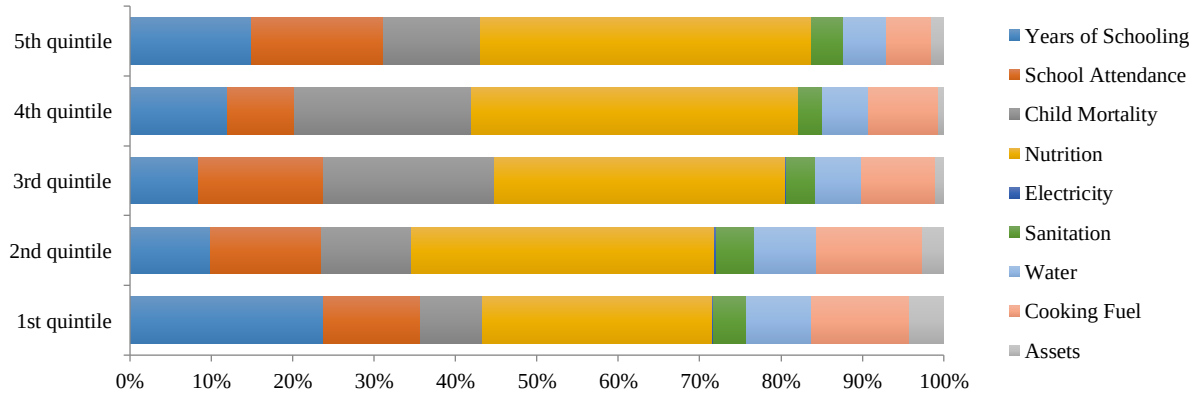
[42] CFPS was found to have higher rates of poverty than the official estimates(C. Zhang, Xu, Zhou, Zhang, & Xie, 2013), (C. Zhang et al., 2013) , (Xie & Zhou, 2014).

MPI poor	8.2	[6.6, 9.7]	5.4	[4.1, 6.8]	4.0	[3.2, 4.9]
Income poor	13.1	[11.5, 14.8]	15.0	[13.5, 16.4]	15.0	[13.6, 16.4]
Expenditure poor	10.7	[9.3, 12.2]	9.9	[8.8, 11.0]	5.8	[4.9, 6.7]
Overlap of income & MPI	2.8	[1.7, 3.8]	2.2	[1.1,3.3]	1.4	[0.9, 1.9]
Overlap of expenditure & MPI	2.4	[1.5, 3.4]	1.3	[0.9, 1.8]	0.8	[0.4, 1.1]
Proportion of overlap in MPI (income measure)	33.9%		40.7%		35.0%	
Proportion of overlap in MPI (expenditure measure)	29.8%		24.4%		19.4%	
Proportion of overlap in income poverty	21.1%		14.7%		9.4%	
Proportion of overlap in expenditure poverty	22.7%		13.3%		13.4%	

To investigate this mismatch further, we divide the population into 5 groups in terms of income/expenditure per capita, called quintiles, each having roughly 20% of the population. The first quintile contains the people who have the lowest income/expenditure. The fifth quintile contains the 20% of the population with the highest income/expenditure. We presume if only 8.2% of the population are MPI poor, all MPI poor people would be found among the 20% of the population that have the lowest income/expenditure in the society. However, they are not. The MPI poor people exist in every quintile groups, even in the top quintile[43]. Although we find highest MPI incidence in the 1st quintile, still, the incidence of multidimensional poverty is less than 20% in 2010 and falls to 10% in 2014 under both monetary poverty measurements. In other words, we find less than half of the MPI poor people belong to the bottom monetary quintile. This finding is surprising, even shocking, but it is not uncommon; for example Tran et al. (2015) found that 16% of the MPI poor in Vietnam were in the top two quintiles of consumption.

If we compare the percentage contribution for each indicator to MPI by quintile (in 2014 for instance, see figure below), we find different from the 1st (poorest) quintile group, indicators with living standard dimension have relatively smaller contribution to the overall poverty in the higher quintiles which makes sense as some members of this group might be able to obtain improvements in these items. Thus "nutrition" and "school attendance" have a relatively larger contrition to the overall poverty for the monetarily richer quintiles. But even for the poorest quintile group, "years of schooling" and "nutrition" have the largest contribution to the overall poverty.

Figure 6-1 Percentage contributions in terms of income quintile



[43] This is also true when we consider destitute and severe poverty.

Another view comes from the government transfer[44]. People who receive subsidies are supposed to be the poorest. So, we again expect most of the multidimensionally poor people would receive subsidies. However, this is not the case. True, the H value in receiving government transfer group is much higher, but considering the population share, actually only a small proportion of the MPI poor people are at the same time receiving government transfers. In other words, less than 30% (depending on the year) of the multidimensionally poor population are receiving subsidies[45]. Again, it shows people who are multidimensioanlly poor are not always belong to the monetary poor group, and that considering multidimensional poverty might improve the targeting of certain subsidies At last, in terms of the percentage contribution, the results suggest only "years of schooling" and "nutrition" have different relative contributions in two groups. We find that "nutrition" has a relatively larger contribution to overall poverty for the poor who are receiving subsidies, while "years of schooling" has relatively larger contribution to the poor who are not receiving subsidies (see figure 6-3).

Figure 6-2 Incidence of MPI (H) by quintiles and subsidy groups

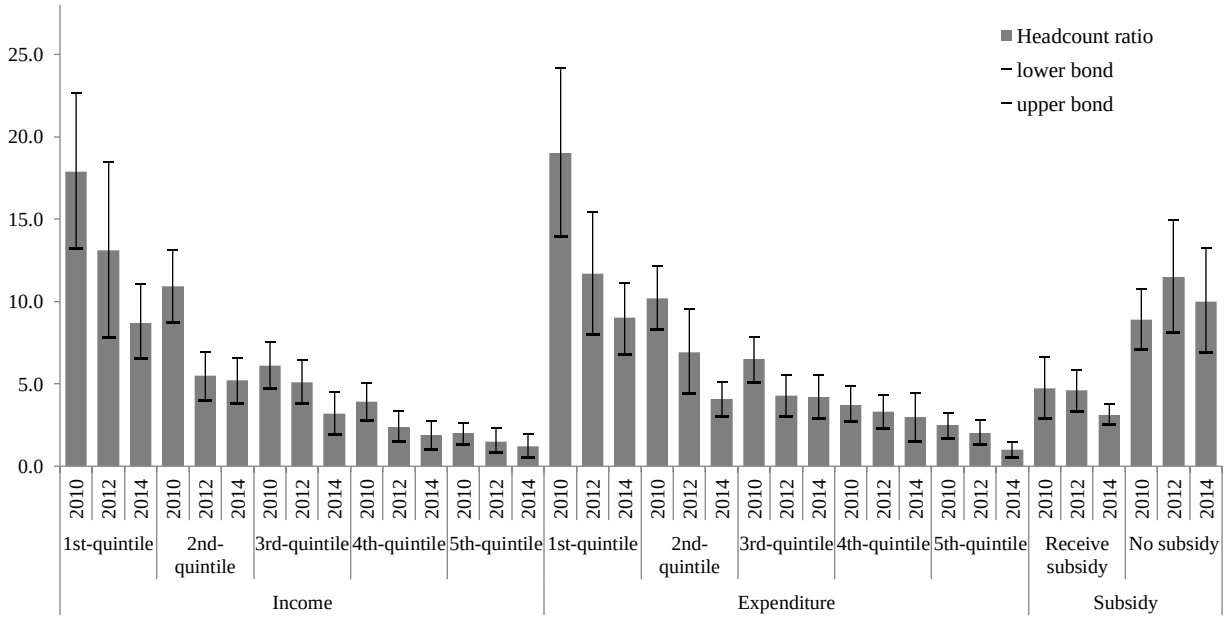
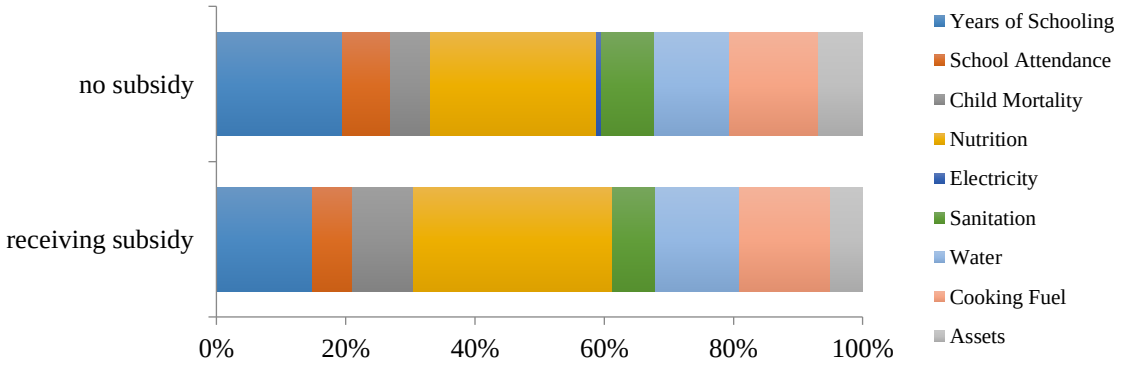


Figure 6-3 Relative contributions for subsidy receiving/not receiving subgroups

[44] Based on questionnaire of CFPS, the transfer payments are including: 1. Minimum living allowance (Dibao); 2. Reforestation subsidy (Tuigeng huanlin); 3. Agricultural subsidy; 4.Wubaohu subsidy (targeted at low-income, blind, disabled, elderly, and youth who cannot support themselves); 5. Tekunhu subsidy, (targeted at very poor family); 6.Work injury subsidies to the linear relatives; 7. Emergency or disaster relief (including material goods); 8. Others; 9. None of the above. We consider 1, 4, 5, 6, 7 as subsidies for the poor define as 'receives subsidy' group.

[45] 'Dibao' supposed to focus on whose disposable income is lower than a certain amount, aiming to guarantee a subsistence life for the poor.



In general, we find a striking mismatch between monetary and MD poverty. How do we understand this? On one hand, it makes sense because non-monetary dimensions may reflect anti-poverty policies focused on infrastructure and social services, while monetary poverty decreases may reflect cash transfers and economic activities. On the other hand, some cases also relate to the fact that someone's unsustainable decisions of chasing money at the cost of sacrificing their (even their next generation's) education, health condition. In this sense for the people who are both MPI and income poor, they are in a severe situation due to they are income poor with low level of development capability. If they do not belong to targeed areas, it will be very difficult for them to exit poverty[46].

7. Conclusions

Using AF methodology with Global MPI standard, we find China's Global MPI value is low and keeps reducing over time. Although the incidence of multidimensional poverty is not high, but it still affects millions of people.

In terms of who are poor, we have found that rural area is poorer than urban, the west region is poorer that the central and east, which implies the imbalance of regional development affects poverty. But at the meantime, the "large provinces" poverty ranking tells us economic growth does not necessary go together with multidimensional poverty reduction.

For the question of which kind of household is less likely to be poor, we have found household heads with higher education, households with smaller size, or migration is often associated with lower multidimensional poverty; while being divorced or widowed, belonging to minority ethnic groups, or holding a rural *hukou* is often associated with a higher likelihood of being poor.

In terms of how the people are poor, at the national level, we have found 'nutrition', 'years of schooling', 'cooking fuel' and 'safe drinking water' are the main contributors to MPI. But the contributors vary according to areas and depend on household characteristics.The MPI thus can play a very useful role in guiding efficient integrated and multisectoral policy design and planning.

At last, we have found a striking mismatch exists between households deprived in monetary and multidimensional poverty, suggesting monetary measure does not tell the whole story of poverty. The importance of using multidimensional poverty methods to evaluate, target and design

[46] We find more than 60% of income and MPI both poor people belong to the Sichuan, Guizhou, Yunnan, Sanxi and Gansu.

policies to fight multidimensional poverty are worthy of attention.

Appendix

Appendix-A China's rural official poverty line and rural poverty: 1980-2014

Year	Official Poverty Line (yuan)	Headcount Ratio (%)	Poverty People (10thousand)
1980	130	26.8	22000
1985	206	14.8	12500
1990	300	9.4	8500
1995	530	7.1	6500
2000	625	3.5	3209
2001	630	3.2	2927
2002	627	3	2820
2003	637	3.1	2900
2004	668	2.8	2610
2005	683	2.5	2360
2006	693	2.3	2148
2007	785	1.6	1479
2008	1196	4.2	4007
2009	1196	3.8	3597
2010	1247	2.8	2688
2010 (new)	2300	17.2	16567
2011	2536	13.8	12238
2012	2673	10.2	9899
2013	2736	8.6	8249
2014	2800	7.2	7017
2015	2855	5.7	5575

Note: a. In 2008, China used "low income poverty line" to replace the previous extreme poverty line. The Official poverty standard increased, so rural poverty increased.

b. At the end of 2011, China adjusted and increased the rural poverty line again. Rural poverty line increased to 2300 yuan (2011 constant price), so the rural poverty increased correspondingly.

Source: China Rural Household Survey Yearbook, 1980-2010 [in Chinese]; China Household Survey Yearbook, 2011-2014 [in Chinese]; Statistical Communiqué of the People's Republic of China on the 2014 National Economic

Appendix-B Nutrition (BMI) distribution among ages for adults

Age Group	Population Share(%)	Percentage of Malnourished (bmi<18.5)
[15, 19)	7.37	0.29
[19,30)	20.1	0.12
[30,40)	16.4	0.06
[40,50)	21.7	0.05
[50,60)	16.3	0.07
[60,70)	11.5	0.12
[70,80)	5.40	0.18
[80,90)	1.20	0.23
[90, 90+]	0.07	0.41

Source: CFPS-2012.

Appendix-C Extreme indicators of destitution poverty and deprivation thresholds

Dimension	Indicator	Deprived if…	Related to…	Weight
Education	Years of schooling	No household member has completed at least one year of schooling (>=1).	MDG2	1/6

	Child School Attendance	No child is attending school up to the age at which they should finish class 6.	MDG2	1/6
Health	Child Mortality	2 or more children have died in the household.	MDG4	1/6
	Nutrition	Severe undernourishment of any adult (BMI<17kg/m^2) or any child (-3 standard deviations from the median).	MDG1	1/6
Living Standard	Electricity	The household has no electricity (no change)		1/15
	Improved Sanitation	There is no facility (open defecation).	MDG7	1/15
	Safe Drinking Water	The household dose not have access to safe drinking water.	MDG7	1/15
	Cooking Fuel	The household cooks with dung or wood (coal/lignite/charcoal are now non-deprived).	MDG7	1/15
	Assets	The household has no assets and no car.	MDG7	1/15

Source: http://www.ophi.org.uk/wp-content/uploads/Poverty-in-China-2015_digital.pdf.

Appendix-D Poverty comparison: gender difference under different marriage status

			Composition (censored headcount ratio, %)										
			M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
Single	2010	female	0.8 [0.0,2.0]	2.2 [0.0,5.5]	37.2 [35.9,38.5]	0.6 [0.0,1.4]	0.1 [0.0,0.4]	0.0 [0.0,0.0]	1.6 [1.5,4.8]	0.0 [0.0,0.0]	2.0 [1.2,5.2]	1.8 [1.3,5.0]	2.2 [1.0,5.5]	0.5 [0.3,1.3]
		male	6.5 [3.5,9.5]	15.3 [8.8,21.8]	42.8 [38.4,47.1]	9.9 [5.3,14.5]	1.9 [0.0,5.5]	3.9 [0.7,7.1]	5.5 [0.5,10.6]	1.5 [0.0,3.7]	6.6 [2.0,11.2]	12.9 [7.4,18.5]	14.2 [7.7,20.6]	9.7 [5.0,14.4]
	2012	female	0.7 [0.4,1.7]	1.7 [0.9,4.4]	39 [37.1,40.9]	0.0 [0.0,0.0]	0.0 [0.0,0.0]	1.7 [0.9,4.3]	1.3 [0.0,3.7]	0.0 [0.0,0.0]	0.5 [0.4,1.5]	1.7 [0.9,4.4]	0.5 [0.4,1.5]	0.0 [0.0,0.0]
		male	3.0 [1.2,4.9]	6.7 [2.9,10.4]	45.5 [39.9,51.1]	4.1 [1.3,6.9]	0.0 [0.0,0.0]	1.7 [0.0,3.5]	4.6 [1.2,7.9]	0.2 [0.1,0.5]	3.0 [0.2,5.8]	6.2 [2.5,9.9]	6.5 [2.7,10.2]	3.8 [1.1,6.5]
	2014	female	1.5 [0.7,3.7]	3.7 [0.0,8.9]	41.3 [37.3,45.3]	0.0 [0.0,0.0]	0.0 [0.0,0.0]	0.0 [0.0,0.0]	3.7 [0.0,8.9]	0.0 [0.0,0.0]	2.6 [0.0,7.4]	3.7 [0.0,8.9]	3.7 [0.0,8.9]	3.7 [0.0,8.9]
		male	1.9 [0.9,2.8]	4.4 [2.1,6.7]	42.1 [39.1,45.2]	3.1 [1.1,5.0]	0.5 [0.0,1.3]	0.7 [0.0,1.6]	3.1 [1.1,5.2]	0.3 [0.0,0.8]	0.5 [0.0,1.2]	2.8 [1.0,4.6]	3.9 [1.8,6.1]	1.9 [0.6,3.2]
Married or cohabitation	2010	female	2.7 [2.1,3.2]	6.6 [5.2,7.9]	40.9 [39.6,42.3]	3.5 [2.7,4.3]	0.9 [0.5,1.4]	0.6 [0.2,1.0]	4.6 [3.4,5.7]	0.3 [0.0,0.8]	2.8 [1.8,3.8]	4.7 [3.6,5.9]	5.8 [4.5,7.1]	2.7 [1.9,3.4]
		male	3.4 [2.6,4.2]	8.0 [6.2,9.8]	42.7 [41.6,43.8]	3.6 [2.5,4.6]	1.6 [1.1,2.2]	1.4 [1.0,1.8]	5.6 [4.6,6.6]	0.3 [0.0,0.7]	4.4 [2.7,6.2]	5.8 [4.2,7.4]	6.9 [5.1,8.7]	3.1 [1.9,4.3]
	2012	female	1.7 [1.3,2.1]	4.1 [3.1,5.1]	41.7 [40.0,43.4]	1.6 [1.0,2.2]	1.4 [0.8,2.0]	0.8 [0.3,1.2]	3.3 [2.4,4.2]	0.0 [0.0,0.0]	1.3 [0.7,1.8]	2.5 [1.7,3.2]	3.1 [2.2,4.0]	1.1 [0.6,1.6]
		male	2.4 [1.5,3.2]	5.4 [3.8,7.0]	43.4 [39.9,46.8]	2.4 [1.1,3.7]	2.0 [1.2,2.8]	1.0 [0.6,1.3]	4.1 [3.1,5.1]	0.2 [0.2,0.5]	1.8 [1.1,2.4]	3.7 [2.2,5.2]	4.2 [2.6,5.7]	1.9 [0.7,3.1]
	2014	female	1.1 [0.7,1.6]	2.8 [1.6,3.9]	41.2 [39.4,43.0]	1.1 [0.6,1.6]	10.0 [0.1,1.9]	0.8 [0.2,1.3]	2.4 [1.2,3.5]	0.0 [0.0,0.1]	0.8 [0.2,1.5]	1.1 [0.5,1.7]	1.6 [0.8,2.4]	0.6 [0.3,0.9]
		male	1.7 [1.3,2.1]	4.1 [3.2,5.0]	41.3 [39.8,42.8]	1.5 [0.9,2.1]	1.4 [0.9,2.0]	1.3 [0.9,1.7]	3.4 [2.7,4.2]	0.0 [0.0,0.1]	1.0 [0.5,1.4]	1.7 [1.3,2.2]	2.8 [2.1,3.6]	0.6 [0.3,0.9]
Divorced or widowed	2010	female	5.8 [4.3,7.3]	13.5 [10.2,16.9]	43.0 [40.6,45.4]	10.1 [7.3,12.9]	2.0 [0.6,3.5]	1.4 [0.0,2.8]	6.7 [4.2,9.1]	0.0 [0.0,0.0]	5.2 [2.9,7.4]	11.1 [7.9,14.3]	11.9 [8.8,15.0]	8.6 [5.9,11.2]
		male	7.7 [5.0,10.4]	18.3 [12.2,24.5]	42.0 [39.8,44.3]	7.4 [4.6,10.2]	4.2 [0.2,8.2]	3.8 [0.0,7.9]	9.6 [4.6,14.6]	0.9 [0.7,2.5]	9.4 [3.7,15.2]	14.8 [9.4,20.2]	17.3 [11.2,23.5]	10.4 [6.3,14.4]
	2012	female	4.1 [2.7,5.5]	10.0 [7.0,13.1]	40.9 [37.4,44.4]	5.7 [3.5,7.9]	1.7 [0.2,3.1]	1.9 [0.4,3.4]	6.2 [3.7,8.7]	0.0 [0.0,0.0]	3.4 [1.4,5.4]	`6.5 [3.8,9.2]	8.1 [5.3,11.0]	4.9 [2.7,7.0]
		male	3.8 [2.0,5.7]	8.8 [4.8,12.9]	43.3 [39.1,47.6]	5.1 [2.1,8.0]	1.6 [0.0,3.9]	2.0 [0.2,3.9]	4.4 [1.4,7.4]	0.6 [0.0,1.9]	1.9 [0.2,3.6]	6.8 [3.1,10.4]	8.0 [4.0,12.0]	7.3 [3.3,11.2]
	2014	female	3.2 [2.0,4.3]	7.7 [4.9,10.5]	41.1 [38.7,43.4]	4.7 [2.6,6.9]	1.5 [0.2,2.8]	1.3 [0.3,2.2]	5.7 [3.2,8.2]	0.0 [0.0,0.1]	1.9 [0.4,3.3]	3.9 [2.0,5.8]	6.0 [3.4,8.6]	2.5 [1.5,3.5]
		male	3.0 [1.5,4.5]	7.1 [3.6,10.6]	41.7 [38.5,45.0]	3.7 [1.1,6.2]	1.2 [0.0,2.6]	1.7 [0.4,3.1]	5.8 [2.4,9.3]	0.0 [0.0,0.0]	2.9 [0.6,5.2]	4.4 [1.3,7.6]	5.3 [2.0,8.6]	0.8 [0.2,1.4]

Appendix-E Poverty comparison: gender difference under different migration actions

			Composition (censored headcount ratio, %)										
			M0	H (%)	A (%)	YS	SY	CM	N	E	S	W	CF	A
Group-1	2010	female	1.8 [1.0,2.6]	4.4 [2.5,6.2]	40.7 [39.0,42.5]	2.6 [1.2,4.1]	0.8 [0.0,1.6]	0.3 [0.0,0.6]	2.9 [1.4,4.3]	0.0 [0.0,0.1]	1.3 [0.2,2.5]	3.1 [1.6,4.5]	3.7 [2.0,5.4]	2.4 [1.3,3.5]
		male	2.5 [1.7,3.3]	6.2 [4.2,8.1]	40.1 [38.4,41.8]	2.4 [1.5,3.4]	1.3 [0.7,1.9]	1.5 [0.6,2.3]	4.9 [3.2,6.6]	0.0 [0.0,0.1]	1.8 [0.7,2.8]	4.0 [2.5,5.5]	4.5 [2.8,6.3]	1.6 [0.9,2.4]
	2012	female	1.8 [1.2,2.4]	4.4 [2.8,6.0]	40.1 [37.4,42.8]	1.9 [0.7,3.1]	1.1 [0.3,1.9]	0.8 [0.1,1.6]	3.5 [2.0,5.0]	0.0 [0.0,0.0]	1.1 [0.4,1.9]	2.7 [1.5,3.9]	2.6 [1.4,3.8]	1.8 [0.8,2.8]
		male	1.2 [0.8,1.6]	2.9 [1.9,3.9]	40.2 [38.9,41.5]	1.0 [0.5,1.4]	0.9 [0.4,1.5]	0.7 [0.2,1.3]	2.6 [1.6,3.5]	0.0 [0.0,0.0]	0.3 [0.0,0.6]	1.7 [0.9,2.5]	1.7 [1.0,2.4]	0.7 [0.3,1.2]

	2014	female	1.0 [0.4,1.5]	2.5 [1.1,3.8]	39.9 [36.2,43.5]	0.7 [0.0,1.5]	1.0 [0.0,1.9]	0.7 [0.0,1.6]	2.1 [0.8,3.4]	0.0 [0.0,0.1]	0.4 [0.0,1.0]	1.0 [0.2,1.7]	1.5 [0.6,2.4]	0.5 [0.0,1.0]
		male	1.0 [0.5,1.5]	2.6 [1.2,4.0]	38.8 [36.6,41.0]	0.7 [0.3,1.1]	1.1 [0.3,2.0]	0.8 [0.3,1.3]	2.2 [0.9,3.6]	0.0 [0.0,0.0]	0.3 [0.0,0.6]	1.0 [0.5,1.5]	1.3 [0.6,1.9]	0.2 [0.0,0.4]
Group-2	2010	female	5.5 [3.9,7.1]	12.9 [9.4,16.5]	42.5 [39.9,45.1]	8.1 [5.2,11.1]	1.9 [0.6,3.2]	0.8 [0.0,1.9]	8.9 [6.2,11.5]	0.0 [0.0,0.1]	4.5 [2.3,6.8]	11.3 [7.9,14.7]	11.7 [8.2,15.3]	5.5 [2.8,8.1]
		male	5 [3.6,6.4]	11.5 [8.5,14.5]	43.2 [41.4,45.1]	5.4 [3.5,7.4]	2.0 [0.6,3.3]	2.2 [1.1,3.2]	8.1 [5.9,10.3]	0.1 [0.1,0.3]	6.6 [3.8,9.3]	8.1 [5.9,10.4]	10.7 [7.8,13.7]	4.8 [2.6,7.1]
	2012	female	3.8 [2.3,5.3]	8.7 [5.4,11.9]	44.3 [40.5,48.0]	3.1 [1.1,5.0]	2.9 [1.0,4.8]	2.4 [0.8,4.0]	7.3 [4.4,10.2]	0.0 [0.0,0.0]	3.9 [1.5,6.4]	4.8 [2.0,7.5]	7.6 [4.4,10.8]	1.9 [0.3,3.5]
		male	3.2 [2.1,4.3]	7.2 [5.0,9.4]	44.1 [40.7,47.5]	2.2 [0.7,3.7]	3.6 [2.0,5.3]	1.9 [1.0,2.9]	5.1 [3.5,6.7]	0.0 [0.0,0.0]	2.6 [1.3,3.9]	4.7 [2.8,6.5]	5.7 [3.7,7.8]	2.9 [1.3,4.5]
	2014	female	3.4 [1.7,5.1]	7.8 [3.9,11.8]	43.5 [40.8,46.3]	3.1 [0.9,5.3]	2.4 [0.6,4.2]	2.4 [0.0,4.9]	6.7 [3.1,10.4]	0.0 [0.0,0.0]	3.7 [0.4,6.9]	3.9 [1.5,6.4]	5.9 [2.3,9.5]	1.1 [0.1,2.0]
		male	2.7 [1.7,3.7]	6.4 [4.1,8.6]	42.3 [40.8,43.9]	1.4 [0.5,2.2]	2.3 [1.2,3.4]	2.4 [1.0,3.7]	5.5 [3.5,7.4]	0.0 [0.0,0.0]	2.4 [0.6,4.3]	2.9 [1.7,4.0]	5.3 [3.2,7.4]	1.3 [-0.0,2.5]
Group-3	2010	female	6.2 [4.8,7.6]	15 [11.6,18.3]	41.5 [39.8,43.2]	8.9 [6.7,11.2]	1.7 [0.6,2.7]	1.7 [0.5,2.9]	9.0 [6.0,12.1]	1.1 [0.0,2.8]	7.0 [4.2,9.8]	10.8 [7.7,13.8]	14 [10.6,17.4]	7.2 [5.3,9.1]
		male	5.5 [3.6,7.3]	12.5 [8.6,16.4]	43.6 [42.1,45.0]	5.9 [3.9,7.9]	2.7 [1.5,3.9]	1.8 [1.1,2.6]	7.6 [5.9,9.3]	0.8 [-0.5,2.2]	8.0 [3.9,12.0]	10.2 [6.3,14.1]	11.6 [7.7,15.6]	6.0 [3.1,8.9]
	2012	female	3.4 [2.3,4.4]	8.4 [5.7,11.1]	40.3 [38.6,42.0]	4.5 [2.9,6.0]	2.1 [0.7,3.6]	1.0 [0.0,2.4]	5.3 [3.0,7.5]	0.0 [0.0,0.0]	2.0 [1.0,3.0]	6.2 [4.2,8.2]	6.8 [4.6,9.1]	3.5 [1.9,5.1]
		male	4.2 [2.2,6.2]	9.4 [5.7,13.2]	44.9 [40.8,48.9]	5.5 [2.4,8.6]	2.5 [0.9,4.1]	1.1 [0.5,1.7]	6.7 [4.5,8.9]	0.6 [0.0,1.7]	3.6 [2.2,5.0]	7.5 [3.8,11.2]	8.4 [4.6,12.1]	4.0 [0.9,7.2]
	2014	female	2.1 [1.4,2.8]	5.3 [3.5,7.0]	39.5 [38.2,40.8]	4.1 [2.5,5.6]	0.4 [0.0,0.8]	0.6 [0.1,1.3]	3.5 [2.0,5.1]	0.0 [0.0,0.0]	0.7 [0.0,1.4]	2.4 [1.4,3.3]	4.1 [2.5,5.8]	2.4 [1.4,3.5]
		male	3.0 [2.1,4.0]	7.2 [5.2,9.2]	42.3 [40.2,44.5]	3.8 [2.1,5.5]	2.0 [0.8,3.3]	1.9 [1.1,2.6]	5.7 [4.0,7.3]	0.1 [0.0,0.2]	1.8 [0.8,2.7]	3.6 [2.6,4.6]	5.4 [3.6,7.1]	1.3 [0.7,1.8]
Group-3	2010	female	0.6 [0.2,1.0]	1.6 [0.6,2.6]	37.9 [35.0,40.8]	0.5 [0.1,0.9]	0.4 [-0.1,0.9]	0.3 [0.0,0.8]	1.2 [0.4,2.1]	0.0 [0.0,0.0]	1.0 [0.1,1.8]	0.8 [0.1,1.5]	0.9 [0.1,1.7]	0.5 [0.1,0.9]
		male	0.5 [0.3,0.7]	1.4 [0.7,2.0]	37.1 [34.8,39.4]	0.4 [0.1,0.6]	0.2 [0.0,0.4]	0.6 [0.2,1.1]	1.3 [0.7,1.9]	0.0 [0.0,0.0]	0.4 [0.1,0.7]	0.3 [0.0,0.6]	0.5 [0.1,0.9]	0.1 [0.0,0.1]
	2012	female	0.3 [0.1,0.6]	0.8 [0.2,1.5]	38.9 [33.9,43.8]	0.4 [0.1,0.7]	0.2 [0.0,0.6]	0.2 [0.0,0.6]	0.7 [0.2,1.2]	0.0 [0.0,0.0]	0.2 [-0.2,0.7]	0.2 [-0.0,0.4]	0.4 [0.0,0.9]	0.2 [0.0,0.5]
		male	0.6 [0.3,0.9]	1.6 [0.8,2.5]	35.1 [33.9,36.4]	0.2 [0.1,0.4]	0.8 [0.1,1.5]	0.5 [0.0,1.0]	1.3 [0.5,2.1]	0.0 [0.0,0.0]	0.3 [0.0,0.6]	0.4 [0.1,0.7]	0.5 [0.1,0.8]	0.1 [0.0,0.2]
	2014	female	0.8 [0.0,1.5]	1.8 [0.1,3.5]	41.8 [39.4,44.2]	0.4 [0.0,0.8]	1.0 [0.0,2.7]	0.4 [0.1,0.8]	1.7 [0.0,3.5]	0.0 [0.0,0.1]	0.7 [0.0,1.7]	0.8 [0.0,1.7]	0.5 [0.0,1.2]	0.3 [0.0,0.6]
		male	0.5 [0.2,0.7]	1.2 [0.6,1.9]	37.6 [35.6,39.5]	0.3 [0.1,0.6]	0.3 [0.1,0.7]	0.6 [0.1,1.1]	1.2 [0.5,1.8]	0.0 [0.0,0.1]	0.1 [0.0,0.2]	0.3 [0.0,0.6]	0.6 [0.2,1.0]	0.0 [0.0,0.1]

Appendix-E National poverty comparisons over time

	Absolute annualized change	t-statistics for difference		Absolute annualized change	t-statistics for difference		Absolute annualized change	t-statistics for difference	
	2010-2012			2012-2014			2010-2014		
M0	0.006	2.25	***	0.003	1.65		0.005	4.44	***
H	1.4	2.68	***	0.7	1.73	*	1.0	4.69	***
A	-0.3	0.41		0.8	1.07		0.3	1.26	
RHR									
Years of schooling	1.4	3.44	***	0.2	0.67		0.8	4.58	***
Child School Attendance	-0.3	1.05		0.3	1.31		0.0	0.35	
Child Mortality	0.0	0.10		-0.1	0.3		0.0	.42	
Nutrition	-.07	1.20		1.8	3.25	***	0.6	2.12	**
Electricity	0.1	0.77		0.1	1.06		0.1	1.53	
Improved Sanitation	1.7	2.22	**	2.1	4.13	***	1.9	5.42	***
Safe Drinking Water	2.1	1.61		3.0	2.57	**	2.6	4.13	***
Cooking Fuel	2.2	4.83	***	1.0	3.33	***	1.6	8.99	***
Assets	-2.0	4.48	***	-2.0	4.48	***	-2.0	4.48	***
CHR									
Years of schooling	0.8	2.19	**	0.4	1.33		0.6	4.50	***
Child School Attendance	-0.1	0.60		0.3	1.20		0.1	0.70	
Child Mortality	0.2	1.43		-0.1	.88		0.0	0.52	
Nutrition	0.7	2.40	**	0.3	1.24		0.5	3.71	***

Electricity	0.1	.63		0.1	.82		0.1	1.41	
Improved Sanitation	1.2	3.04	***	0.4	2.02	**	0.8	4.09	***
Safe Drinking Water	1.2	2.50	**	0.9	2.79	***	1.1	5.77	***
Cooking Fuel	0.8	2.06	**	0.6	2.37	**	0.7	5.29	***
Assets	-0.7	1.92	*	-0.7	1.92	*	-0.7	1.92	*

Note: *** statistically significant at α=0.01, ** statistically significant at α=0.05, * statistically significant at α=0.10

Cited References

沈扬扬. (2012a). 经济增长与不平等对农村贫困的影响. *数量经济技术经济研究, 8*(16), 19.

沈扬扬. (2012b). 收入增长与不平等对农村贫困的影响——基于不同经济活动类型农户的研究. *南开经济研究, 2*(20), 121.

陈辉, & 张全红. (2013). Alkire-Foster 模型测度城市多维贫困的研究——以广东省中山市为例. *五邑大学学报(自然科学版), 2*, 5.

陈立中. (2008a). 转型时期我国多维度贫困测算及其分解. *经济评论, 5*, 6.

陈立中. (2008b). 收入、知识和健康的三类贫困测算与解析. *改革, 3*, 5.

陈琦. (2012). 连片特困地区农村贫困的多维测量及政策意涵——以武陵山片区为例. *四川师范大学学报（社会科学版）, 39*(3), 6.

陈宗胜, 沈扬扬, & 周云波. (2013). 中国农村贫困状况的绝对与相对变动——兼论贫困线的设定. *管理世界, 1*, 11.

丁建军. (2014). 多维贫困的理论基础、测度方法及实践进展. *西部论坛（West Forum), 24*(1), 10.

范晨辉, 薛东前, & 马蓓蓓. (2015). Rasch 模型在多维贫困测度中的应用. *统计与决策, 6*, 3.

方迎风. (2012). 中国贫困的多维测度. *当代经济科学, 34*(4), 9.

郭建宇. (2012). 农户多维贫困程度与特征分析——基于山西农村贫困监测数据. *农村经济, 3*, 4.

郭建宇, & 吴国宝. (2012). 基于不同指标及权重选择的多维贫困测量——以山西省贫困县为例. *中国农村经济, 2*, 9.

洪兴建. (2005). 贫困指数理论研究述评. *经济评论, 5*, 6.

候卉, 王娜, & 王丹青. (2012). 中国城镇多维贫困的测度. *城市发展研究, 12*, 123-128.

蒋翠侠, 许启发, & 李亚琴. (2011). 中国家庭多维贫困的统计测度. *统计与决策, 22*, 4.

李飞. (2012). 多维贫困测量的概念、方法和实证分析——基于我国 9 村调研数据的分析. *广东农业科学, 9*, 4.

李佳路. (2010). 农户多维度贫困测量——以 S 省 30 个国家扶贫开发工作重点县为例. *财贸经济, 10*, 6.

李实, 沈扬扬, & 詹鹏. (2015). 清醒认识减贫成绩背后的问题. *国务院扶贫开发领导小组专家咨询委员会研究交流信息第一期, 1*, 6.

李小云, 李周, 唐丽霞, 刘永功, 王思斌, & 张春泰. (2005). 参与式扶贫指数的开发与验证. *中国农村经济, 5*.

林伯强. (2003). 中国的经济增长、贫困减少与政策选择. *经济研究, 12*, 10.

刘泽琴. (2012). 贫困的多维测度研究述评. *统计与决策, 10*, 33-36.

罗楚亮. (2010). 农村贫困的动态变化. *经济研究, 05*, 16.

尚卫平, & 姚智谋. (2005). 多维贫困测度方法研究. *财经研究, 31*(12), 7.

世界银行, Ald, A., & ASTAE. (2013). *中国：加快居民清洁炊事和采暖的普及*. Retrieved from

万广华, & 张藕香. (2008). 贫困按要素分解：方法与例证. *经济学（季刊）, 3*, 16.

万广华, & 张茵. (2006). 收入增长与不平等对我国贫困的影响. *经济研究, 6*, 12.

万广华, & 章元. (2009). 我们能够在多大程度上准确预测贫困脆弱性？. *数量经济技术经济研究, 6*, 11.

王小林, & Alkire, S. (2009). 中国多维贫困测量：估计和政策含义. *中国农村经济, 12*, 7.

王艳惠, 钱乐毅, & 段福洲. (2013). 县级多维贫困度量及其空间分布格局研究——以连片特困区扶贫重点县为例. *地理科学, 33*(12), 1489-1497.
王祖祥, 范传强, & 何耀. (2006). 中国农村贫困评估研究. *管理世界, 3*, 7.
吴国宝. (1997). 谁是穷人. In 刘文璞 & 吴国宝 (Eds.), *地区经济增长和减缓贫困*: 山西经济出版社.
夏庆杰, 宋丽娜, & Appleton, S. (2010). 经济增长与农村反贫困. *经济学（季刊）, 3*, 20.
谢宇, 张晓波, & 李建新. (2014). *中国民生发展报告 2014*: 北京大学出版社.
杨文, 孙蚌珠, & 王学龙. (2012). 中国农村家庭脆弱性的测量与分解. *经济研究, 4*, 12.
叶初升, & 王红霞. (2010). 多维贫困及其度量研究的最新进展：问题与方法. *湖北经济学院学报, 8*(6), 6.
叶初升, & 赵锐. (2012). 村级贫困的度量：维度与方法. *发展经济学研究, 1*, 10.
叶普万. (2005). 贫困经济学研究: 一个文献综述. *世界经济, 9*, 70-79.
叶普万. (2006). 贫困概念及其类型研究述评. *经济学动态, 7*, 3.
易红梅, & 张林秀. (2011). 农村最低生活保障政策在实施过程中的瞄准分析. *中国人口资源与环境（China Population, Resources and Environment), 21*(6), 8.
张建华, & 陈立中. (2006). 总量贫困测度研究述评. *经济学（季刊）, 2*, 20.
张林秀, 李强, 罗仁福, 刘承芳, & 罗斯高. (2005). 中国农村公共物品投资情况及区域分布. *中国农村经济, 11*, 18-25.
张全红. (2015). 中国多维贫困的动态变化：1991-2011. *财经研究, 41*(4), 11.
张秀玲, 田国英, 潘云, 张振, & 张文丽. (2012). 中国农村居民贫困测度研究——基于山西的调查分析. *经济问题, 4*, 6. doi:10.16011/j.cnki.jjwt.2012.04.016
中国国际扶贫中心. (2007). 中国农村反贫困政策综述. *见：张磊主编，中国扶贫开发政策演变：1949-2005 年。北京：中国财政经济出版社.*
邹薇, & 方迎风. (2011). 关于中国贫困的动态多维度研究. *中国人口科学, 6*, 11.
邹薇, & 方迎风. (2012). 怎样测度贫困：从单维到多维. *国外社会科学, 2*, 7.
Addabbo, T., Di Tommaso, M. L., & Facchinetti, G. (2004). To What Extent Fuzzy Set Theory and Structural Equation Modelling Can Measure Functionings? An Application to Child Well Being. *Materiali di Discussione del Dipartimento di Economia Politica, 468*.
Adelman, I., & Morris, C. T. (1973). *Economic Growth and Social Equity in Developing Countries*. Stanford, Calif: Stanford, Calif : Stanford University Press.
Ahluwalia, M. S. (1976). Inequality, Poverty and Development. *Journal of Development Economics, 3*(4), 36.
Ahluwalia, M. S. (2011). Prospects and Policy Challenges in the Twelfth Plan. *Economic and Political Weekly, 46*(21), 88-105.
Alkire, S. (2015). The Capability Approach and Well-Being Measurement for Public Policy. *OPHI Working Paper*. - cite published version.
Alkire, S., & Foster, J. (2011). Counting and Multidimensional Poverty Measurement. *Journal of Public Economics, 95*(7), 476-487.
Alkire, S., Foster, J., Seth, S., Santos, M. E., Roche, J. M., & Ballon, P. (2015). Multidimensional Poverty Measurement and Analysis. *Oxford University Press*.
Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A. R., Seymour, G., & Vaz, A. (2013). The Women's Empowerment in Agriculture Index. *OPHI Working Paper 58, University of Oxford*. cite *world development version*
Alkire, S., & Seth, S. (2016). Identifying Destitution through Linked Subsets of Multidimensionally Poor: An Ordinal Approach. *OPHI Working Paper 99*.
Apablaza, N., & Yalonetzky, G. (2013). Decomposing Multidimensional Poverty Dynamics. *Young Lives Working Paper 101*.
Appleton, S. (1996). Women-Headed Households and Household Welfare: An Empirical Deconstruction for Uganda. *World Development, 24*(12), 1811-1827.

Atkinson, A. B. (1992). Measuring Poverty and Differences in Family Composition. *Economica, 59*(233), 1-16.
Azariadis, C., & Stachurski, J. (2005). Poverty Traps. *Handbook of economic growth, 1*, 295-384.
Bane, M. J., & Ellwood, D. T. (1983). Slipping into and out of Poverty: The Dynamics of Spells: National Bureau of Economic Research Cambridge, Mass., USA.
Barrett, C. R., & Pattanaik, P. K. (1989). Fuzzy Sets, Preference and Choice: Some Conceptual Issues. *Bulletin of Economic Research, 41*(4), 229-254.
Beaulier, S. A., & Subrick, J. R. (2006). Poverty Traps and the Robust Political Economy of Development Assistance. *The Review of Austrian Economics, 19*(2-3), 217-226.
Becker, G. S. (1995). Human Capital and Poverty Alleviation. *HUman Resources Development and Operations Policy HRO working Paper 52*.
Bell, D. A. (2010). *China's New Confucianism: Politics and Everyday Life in a Changing Society*: Princeton University Press.
Berg, S. V. D. (2008). Poverty and Education. *Education policy series, 10*.
Bhalla, A. S., & Luo, D. (2012). *Poverty and Exclusion of Minorities in China and India*: Palgrave Macmillan.
Bilenkisi, F., Gungor, M. S., & Tapsin, G. (2015). The Impact of Household Heads' Education Levels on the Poverty Risk: The Evidence from Turkey. *Educational Sciences: Theory & Practice, 15*(2), 337-348.
Bourguignon, F. (1989). Family Size and Social Utility: Income Distribution Dominance Criteria. *Journal of Econometrics, 42*(1), 67-80.
Bourguignon, F. (2003). The Growth Elasticity of Poverty Reduction: Explaining Heterogeneity Across Countries and Time-Periods. *T. Eichler, S. Turnovsky (Eds.), Growth and Inequality, MIT Press, Cambridge, Mass*.
Brown, P. H., & Park, A. (2002). Education and Poverty in Rural China. *Economics of Education Review, 21*(6), 19.
Buvinić, M., & Gupta, G. R. (1997). Female-Headed Households and Female-Maintained Families: Are They Worth Targeting to Reduce Poverty in Developing Countries? *Economic Development and Cultural Change, 45*(2), 259-280.
Cerioli, A., & Zani, S. (1990). A Fuzzy Approach to teh Measurement of Poverty. *Chapter: Income and Wealth Distribution, Inequality and Poverty, Part of the series Studies in Contemporary Economics pp 272-284, edits by Camilo Dagum and Michele Zenga, Springer Berlin Heidelberg*.
Chan, K. W., & Zhang, L. (1999). The Hukou System and Rural-Urban Migration in China: Processes and Changes. *The China Quarterly, 160*, 818-855.
Chen, S., & Ravallion, M. (2004). How Have the Worlds Poorest Fared since the Early 1980s? *The World Bank Research Observer, 19*(2), 29.
Chen, S., & Ravallion, M. (2008). China is Poorer than We Thought, But No Less Successful in the Fight Against Poverty. *Worldbank Policy Reseach Working Paper, 5*.
Chen, S., Ravallion, M., Galasso, E., Piazza, A., & Tidrick, G. (2005). Hidden Impact? Ex-post Evaluation of an Antipoverty Program. *Journal of Public Economics, 89*(11-12), 12.
Chenery, H. B., Ahluwalia, M. S., Bell, C. L. G., Duloy, J. H., & Jolly, R. (1974). Redistribution with Growth: An Approach to Policy. *Oxford University Press*.
Cherng, H.-Y. S., & Hannum, E. (2013). Community Poverty, Industrialization, and Educational Gender Gaps in Rural China. *Social Forces, 92*(2), 32.
Collicelli, C., & Valerii, M. (2000). *A New Methodology for Comparative Analysis of Poverty in the Mediterranean: A Model for Differential Analysis of Poverty at a Regional Level*.
Corcoran, M., Duncan, G., Gurin, G., & Gurin, P. (1985). Myth and Reality: The Causes and Persistence of Poverty. *Journal of Policy Analysis and Management, 4*(4), 516-536.
Decancq, K., & Lugo, M. A. (2013). Weights in Multidimensional Indices of Wellbeing: An Overview. *Econometric Reviews, 32*(1), 7-34.

Deininger, K., & Squire, L. (1998). New Ways of Looking at Old Issues: Inequality and Growth. *Journal of Development Economics, 57*(2), 259-287.
Dellaportas, G. (1980). The Effectiveness of Public Assistance Payments in Reducing Poverty. *American Journal of Economics and Sociology, 39*(2), 113-121.
Demery, L., & Squir, L. (1996). Macroeconomic Adjustment and Poverty in Africa: an Emerging Picture. *World Bank Research Observer, 11*, 21.
Deutsch, J., & Silber, J. (2005). Measuring Multidimensional Poverty: An Empirical Comparison of Various Approaches. *Review of Income and Wealth, 51*(1), 145-174.
Di Tommaso, M. L. (2007). Children Capabilities: A Structural Equation Model for India. *The Journal of Socio-Economics, 36*(3), 436-450.
Dollar, D., & Kraay, A. (2002). Growth is Good for the Poor. *Journal of Economic Growth, 7*(3), 31.
Dollar, D., & Kraay, A. (2004). Trade, Growth, and Poverty. *The Economic Journal, 114*(493), F22-F49.
Du, Y., Park, A., & Wang, S. (2005). Migration and Rural Poverty in China. *Journal of Comparative Economics, 33*, 22.
Duclos, J.-Y., Araar, A., & Giles, J. (2010). Chronic and Transient Poverty: Measurement and Estimation, with Evidence from China. *Journal of Development Economics, 91*(2), 12.
Duclos, J.-Y., & Tiverti, L. (Eds.). (2014). *Multidimensional Poverty Indices: A Critical Assessment*.
Filmer, D. (2000). The Structure of Social Disparities in Education: Gender and Wealth. *Worldbank Policy Reseach Working Paper*.
Filmer, D. (2005). Disability, Poverty, and Schooling in Developing Countries: Results from 11 Household Surveys. *World Bank Policy Research Working Paper*(3794).
Gao, Q., Garfinkel, I., & Zhai, F. (2009). Anti-poverty Effectiveness of the Minimum Living Standard Assistance Policy in Urban China. *The Review of Income and Wealth, 55*(1), 26.
Ge, J., & Lei, Y. (2013). Mining Development, Income Growth and Poverty Alleviation: A multiplier Decomposition Technique Applied to China. *Resources Policy, 38*(3), 10.
Gottschalk, P., & Danziger, S. (1993). *Family Structure, Family Size, and Family Income: Accounting for Changes in the Economic Well-Being of Children, 1968-1986.* Paper presented at the In Sheldon Danziger and Peter Gottschalk (Eds.), Uneven Tides: Rising Inequality in America.
Gustafsson, B., & Sai, D. (2009). Temporary and Persistent Poverty among Ethnic Minorities and the Majority in Rural China. *Review of Income and Wealth, 55*(s1), 588-606.
Gustafsson, B., & Shi, L. (2003). The Ethnic Minority-Majority Income Gap in Rural China during Transition. *Economic Development and Cultural Change, 51*(4), 805-822.
Hannum, E. (2005). Market Transition, Educational Disparities, and Family Strategies in Rural China: New Evidence on Gender Stratification and Development. *Demography, 42*(2), 275-299.
Hannum, E., & Xie, Y. (1998). Ethnic stratification in Northwest China: Occupational differences between Han Chinese and national minorities in Xinjiang, 1982–1990. *Demography, 35*(3), 323-333.
Iceland, J. (2003). Why Poverty Remains High: The Role of Income Growth, Economic Inequality, and Changes in Family Structure, 1949–1999. *Demography, 40*(3), 499-519.
Jackson, C. (1996). Rescuing Gender from the Poverty Trap. *World Development, 24*(3), 489-504.
Jalan, J., & Ravallion, M. (1998). Transient Poverty in Postreform Rural China. *Journal of Comparative Economics, 26*(2), 20.
Jalan, J., & Ravallion, M. (2002). Geographic Poverty Traps? A Micro Model of Consumption Growth in Rural China. *Journal of Applied Econometrics, 17*(4), 18.
Keister, L. A. (2008). Conservative Protestants and Wealth: How Religion Perpetuates Asset Poverty. *American journal of Sociology, 113*(5), 1237-1271.
Knight, J., Lina, S., & Gunatilaka, R. (2009). Subjective Well-being and its Determinants in rural China. *china Economic Review, 20*(4), 635-649.
Knight, J., & Song, L. (2000). Differences in Educational Access in Rural China. *Mimeo. UK: Department of Economics, University of Oxford*.

Kuang, L., & Liu, L. (2012). Discrimination against rural-to-urban migrants: the role of the Hukou system in China. *PloS one, 7*(11), e46932.
Kyereme, S. S., & Thorbecke, E. (1991). Factors Affecting Food Poverty in Ghana. *The Journal of Development Studies, 28*(1), 39-52.
Lelli, S. (2001). *Factor Analysis vs. Fuzzy Sets Theory: Assessing the Influence of Different Techniques on Sen's Functioning Approach*: Kath. Univ., Department Economie, Center for Economic Studies.
Lewis, O. (1966). *La Vida: A Puerto Rican Family in the Culture of Poverty-San Juan and New York* (Vol. 13): Random House New York.
Li, S. (2014). Poverty Reduction and Effects of Pro-poor Policies in Rural China. *China & World Economy, 22*(2), 20.
Li, S., & Sicular, T. (2014). The Distribution of Household Income in China: Inequality, Poverty and Policies. *THe China Quaterly, 217*(1), 14.
Liu, Z. (2005). Institution and Inequality: the Hukou System in China. *Journal of Comparative Economics, 33*(1), 133-157.
Lusting, N. (2011). Multidimensional Indices of Achievements and Poverty: What Do We Gain and What Do We :ose? An Ontroduction
to JOEI Forum on Multidimensional Poverty. *Journal of Economic Inequality, 9*, 8.
Luzzi, G. F., Flückiger, Y., & Weber, S. (2008). *A Cluster Analysis of Multidimensional Poverty in Switzerland*: Springer.
McLanahan, S. (1985). Family Structure and the Reproduction of Poverty. *American journal of Sociology, 90*(4), 873-901.
Meng, L. (2013). Evaluating China's Poverty Alleviation Program: A Regression Dsicontinuity Approach. *Journal of Public Economics, 201*, 11.
Montalvo, J. G., & Ravallion, M. (2010). The Pattern of Growth and Poverty Reduction in China. *Journal of Comparative Economics, 38*(1), 15.
Montgomery, J. L. (2012). Inheritance of Inequality: Hukou and related Barriers to Compulsory Education for China's Migrant Children. *Pac. Rim L. & Pol'y J., 21*, 591.
Naga, R. A., & Bolzani, E. (2008). Income, Consumption and Permanent Income: a MIMIC Approach to Multidimensional Poverty Measurement *Quantitative Approaches to Multidimensional Poverty Measurement* (pp. 104-117): Springer.
Narayan, D., Pritchett, L., & Kapoor, S. (2009). *Moving Out of Poverty: Success from the Bottom Up*: Palgrave and World Bank.
Okojie, C. E. (2002). *Gender and Education as Determinants of Household Poverty in Nigeria*: WIDER Discussion Papers//World Institute for Development Economics (UNU-WIDER).
Park, A., & Wang, D. (2010). Migration and Urban Poverty and Inequality in China. *China Economic Journal, 3*(1), 19.
Park, A., & Wang, S. (2010). Community-based Development and Poverty Alleviation: An Evaluation of China's Poor Village Investment Program. *Journal of Public Economics, 94*(9), 10.
Park, A., Wang, S., & Wu, G. (2002). Regional Poverty Targeting in China. *Journal of Public Economics, 86*(1), 31.
Pearce, D. (1978). The Feminization of Poverty: Women, Work, and Welfare. *The Urban & Social Change Review, 11*(1-2), 11.
Perry, E. J., & Selden, M. (2003). *Chinese Society: Change, Conflict and Resistance*: Routledge.
Pogge, T., & Wisor, S. (Eds.). (2014). *Measuring Poverty: A Proposal*.
Ram, R. (1982). Composite Indices of Physical Quality of Life, Basic Needs Fulfilment, and Income: A 'Principal Component' Representation. *Journal of Development Economics, 11*(2), 227-247.
Ravallion, M. (2005). Evaluating Anti-poverty Programs. *Handbook of Development Economics, 4*, 59.
Ravallion, M. (2011a). A Comparative Perspective on Poverty Reduction in Brazil, China, and India. *The World Bank Research Observer, 26*(1), 34.

Ravallion, M. (2011b). On Multidimensional Indices of Poverty. *Worldbank Policy Reseach Working Paper, WPS5580*. Cite JEI version - Journal of economic inequality; a

Ravallion, M., & Chen, S. (2007). China's (uneven) Progress Against Poverty. *Journal of Development Economics, 82*, 42.

Ravallion, M., & Jalan, J. (1999). China's Lagging Poor Areas. *American Economic Review, 89*(2), 5.

Ravallion, M., & Jalan, J. (2000). Is Transient Poverty Different? Evidence for Rural China. *Journal of Development Studies, 36*(6), 18.

Ren, Q., & Treiman, D. J. (2013). *The Consequences of Parental Labor Migration in China for Children's Emotional Well-being*. Paper presented at the Poster presented at the annual meeting of the Population Association of America, New Orleans, April.

Riskin, C. (1994). Chinese Rural Poverty: Marginalized or Dispersed? *The American Economic Review, 84*(2), 4.

Rozelle, S., Park, A., Benziger, V., & Changqi, R. (1998). Targeted Poverty Investments and Economic Grwoth in China. *World Development, 26*(12), 15.

Sen, A. (1989). Development as Capability Expansion. *Journal of Development Planning, 19*, 18.

Sen, A. (1999a). No - . look at my biblio - or OUP book. This would be Development as Freedom. Doesn't exist

Seth, S., & Alkire, S. (2014). Did Poverty Reduction Reach the Poorest of the Poor? Assessment Methods in the Counting Approach. *OPHI Working Paper77*.

Smith, J. P. (1988). Poverty and the Family. *Divided opportunities: Minorities, poverty, and social policy*, 141-172.

Swidler, A. (1986). Culture in Action: Symbols and Strategies. *American sociological review*, 273-286.

Thorat, S., & Fan, S. (2007). Public Investment and Poverty Reduction: Lessons from China and India. *Economic and Political Weekly, 42*(8), 7.

Tsui, K.-Y. (2002). Multidimensional Poverty Indices. *Social Choice and Welfare, 19*, 27.

UNDP. (2013). China's Progress towards the Millennium development Goals 2013 Report. *UNDP China 2013 Report*.

Varley, A. (1996). Women Heading Households: Some More Equal than Others? *World Development, 24*(3), 505-520.

Waglé, U. R. (2008). Multidimensional Poverty: An Alternative Measurement Approach for the United States? *Social Science Research, 37*(2), 559-580.

Wang, S. (2005). Poverty Targeting in the People's Republic of China. *In: Weiss, J. (Ed.), Poverty Targeting in Asia. Edward Elgar, Cheltenham, United Kingdom*.

Wang, X., Feng, H., Xia, Q., & Alkire, S. (2016). On the Relationship between Income Poverty and Multidimensional Poverty in China. *OPHI Working Paper No.101*.

Whitehead, A., & Kabeer, N. (2001). *Living with Uncertainty: Gender, Livelihoods and Pro-poor Growth in Rural Sub-Saharan Africa*. Brighton: Brighton : Institute of Development Studies, University of Sussex.

WorldBank. (1999). Strategic Goals for Chinese Education in the 21st Century. *The World Bank, Washington, D.C.*

WorldBank. (2001). China: Overcoming Rural Poverty. *The World Bank, Washington, D.C.*

Wu, Q., Dai, L., Cui, Y., Zhang, W., Zhang, C., Chen, J., . . . XIe, Y. (2015). Supplement to the User's Manual for the 2010 CFPS Data.

Xie, Y., & Zhou, X. (2014). Income Inequality in Today's China. *PNAS, 111*(19), 6.

Xu, H., & Xie, Y. (2013). *The Causal Effects of Rural-to-Urban Migration on Children's Wellbeing in China*. Paper presented at the 2013 Population Association of America Annual Meeting,, New Orleans (April).

Yang, M. (2003). China's Rural Electrification and Poverty Reduction. *Energy Policy, 31*(3), 13.

Yao, S. (2000). Economic Development and Poverty Reduction in China over 20 Years of Reforms. *Economic Development and Cultural Change, 48*(3), 28.

Young, J. (2013). *China's Hukou System: Markets, Migrants and Institutional Change*: Palgrave Macmillan.
Yu, J. (2013). Multidimensional Poverty in China: Findings Based on the CHNS. *Social Indicators Research, 112*(2), 22.
Zhang, C., Xu, Q., Zhou, X., Zhang, X., & Xie, Y. (2013). An Evaluation of Poverty Prevalence in China: New Evidence from Four Recent Surveys. *IFPRI Discussion Paper 01293*, 28.
Zhang, C., Xu, Q., Zhou, X., Zhang, X., & Xie, Y. (2014). Are Poverty Rates Underestimated in China? New evidence from Four Recent Surveys. *china Economic Review, 31*(16), 410.
Zhang, D., Li, X., & Xue, J. (2015). Education Inequality between Rural and Urban Areas of the People's Republic of China, Migrants' Children Education, and Some Implications. *Asian Development Teview, 32*(1), 196-224.
Zhang, H. (2010). The Hukou System's Constraints on Migrant Workers' Job Mobility in Chinese Cities. *china Economic Review, 21*(1), 51-64.
Zhang, J., & Smith, K. R. (2005). Indoor Air Pollution from Household Fuel Combustion in China: A Review *Proceedings of the 10th International Conference on Indoor Air Quality and Climate* (pp. 65-83). Beijing: Tsinghua University Press.