

A Multidimensional Approach to Gender Gap in Poverty: An Application for Turkey

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Abstract: Income or expenditure data are collected at household level and are silent about within household inequalities. As an alternative, employing *counting-based double cut-off* method allows education, health, household living conditions to be measured separately and a deprivation score for each person is calculated based on pre-determined weights of each dimension. Individuals whose deprivation scores are above a pre-determined threshold are deemed multidimensionally poor. In this study, we calculate multidimensional poverty for Turkey in four equally weighted dimensions using Survey of Living Conditions 2006-2015: education, health, employment and household's living conditions. First, we find improvement in household's living conditions across the board and including employment leads to a faster drop in gender poverty gap. Second, overall improvement is the result of rapid improvement in younger cohorts; older individual experienced very little gain. Moreover, there is very little convergence in regional gaps between men and women and even a widening gap between women in Eastern provinces and women in the rest of the country. Finally, households with multidimensionally poor women and non-poor men are consistently the most common sub-group and the overall improvement is a result of increasing share of households with no poor members pointing towards polarization between households.

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INTRODUCTION

Conventional poverty measures have long been criticized as poor measures of quality of life (see Nussbaum, 2003 and Sen, 1999, among others). Income-based measures such as per capita income or GDP growth cannot adequately capture the conditions of the deprived within a given society. Such measures overlook dimensions of deprivation such as poor health, low levels education, environmental risk, substandard living conditions and social exclusion. They are doubly limited in particular due to the gendered nature of their shortcomings. Since these measures overlook the multiple dimensions of human deprivations, they tend to underrepresent the multi-dimensionality of gender disadvantage. The underestimation of gender differences in well-being would be more accentuated if gender disadvantage is more pronounced in non-income dimensions than it is in the income dimension (Bradshaw, Chant and Linneker, 2019). Perhaps more importantly, income-based measures capture outcomes, rather than choices and opportunities individuals face. Gender differentials in income are therefore likely to underestimate the different choices and opportunities faced by women and men, i.e. how women and men differ in transforming monetary resources into well-being due to differential control and command (Fukuda-Parr, 1999; Razavi, 1999).

A related yet distinct gendered shortcoming of conventional poverty measures has to do with their focus on households. In using household-level data, such measures hide the inequalities intra-household distribution of resources and living standards. A long tradition of scholarship in feminist economics demonstrate how access to food, health, education, time, *etc.* differ across household members, as well as the differential capacities of household members to negotiate the distribution of obligations and entitlements in households. The assumption of equal sharing of total household income by members, for instance, has been forcefully debunked and shown to significantly affect inequality and poverty measurements (e.g. Lundberg, Pollak and Wales, 1997; Phipps and Burton, 1995; Woolley and Marshall, 1994). Robeyns (2003) further argues that even if total household income is equally shared, whether it is earned or obtained from a partner matters for well-being assessments.

This paper takes a step towards addressing the shortcomings of conventional poverty measures in capturing gender disadvantage by constructing a multi-dimensional poverty index (MPI) for Turkey, using individual (rather than household) level data where possible. Our aim in

doing so is to provide a more comprehensive view of the multiple dimensions of gendered deprivation and meaningfully trace the changes in gender gap in well-being over time. Justice and Development Party (JDP) regularly mention its success in substantially reducing poverty. However, poverty statistics are a hotly contested issue in Turkey. Depending on the source, the number of income poor people varies between 11.4 million and 30.5 million (out of 80 Million population) at the end of 2014.³ The existence of so many competing claims reduces confidence in all estimates. It is possible to greatly manipulate poverty threshold by changing the minimum calorie requirement, basic goods basket, each good's weight and reference prices. In other words, for non-specialists poverty estimation is a black box. Moreover, laymen's conception of poverty is broader than income poverty. We contend that MPI is particularly suited for these purposes. MPI, as its name suggests, incorporates multiple dimensions of material and non-material deprivation such as living standards, health, education and social exclusion/disempowerment. It is therefore built on an explicit recognition that there is no necessary overlap between income and non-income dimensions of poverty. Conceptually rooted in the capabilities approach (Alkire and Foster, 2011a), the MPI allows for the introduction of opportunities, choices and freedoms faced by individuals as well as the outcomes, i.e. what people are able to do and to be. This makes the MPI particularly suitable for analyzing gender differences in well-being as it sheds light on the different levels of well-being achieved by women and men who have the same capabilities through the differential choices and opportunities they face. Moreover, the intuitive methodology of MPI and the explicit debate on dimensions makes it easier to unbox the methodological black box and communicate with non-specialists.

In addition to the multiple dimensions of poverty, MPI can incorporate a range of indicators within each dimension to capture the complexities of poverty. Yet, unlike the Human Development Index (HDI) or the Millennium Development Targets that similarly build on a multi-dimensional understanding of well-being/poverty, MPI depicts joint deprivation at the individual level rather than reporting group averages. Although most MPI studies deploy household-level data (i.e. impose the same household score to all members of the household), MPI actually allows the incorporation of individual-level data where available. It thus can better illuminate intra-household inequalities that might be critical determinants of gender differences in well-being (Vijaya et al.,

³ <http://www.dogrulukpayi.com/beyanat/553745b56d611>

2014; Klasen and Lohti, 2016; Espinoza-Delgado and Klasen, 2018), which makes it an especially useful instrument for analyzing gender poverty gap.⁴

Moreover, MPI offers the flexibility of including different indicators selected based on their relevance and adequacy for capturing specific dimensions of poverty within a given context. Suppa (2015), for instance, advocates for a society-tailored multidimensional poverty index to be able to better understand both the structure and dynamics of poverty. This flexibility is promising for the study of gender poverty gap in particular, since it enables the inclusion of contextual dimensions that are pertinent for gendered experiences of poverty in the MPI. More broadly, MPI makes the normative aspects of poverty measurement explicit in the sense that it reveals the choices made in the selection of included dimensions and indicators, weights assigned to them, and the determination of deprivation cut-offs for each dimension as well as the overall poverty cut-off.

In this study, we construct a MPI for Turkey by employing the Survey of Income and Living Conditions (SILC) 2006-2015 (TURKSTAT, 2016) and using the *counting-based double cut-off* method. The SILC data set allows us to observe education, self-reported health status and employment at the individual level and to perform our analysis at the individual level where possible, following Vijaya et al. (2014), Klasen and Lohti (2016) and Espinoza-Delgado and Klasen (2018). In other words, we perform our analysis at the individual level for education, health and employment, and at the household level for living conditions (i.e. each member of the household get the same score on living conditions). Our choice of poverty dimensions mostly follows the established practices in the literature, but introduces employment as an additional dimension. The contribution of employment to well-being (independent from material well-being) has been underlined by others and a consensus has emerged in the last decade that it is indeed a core capability beyond being a means to an end (Stiglitz, et al., 2009). Suppa (2015: 13) has notably proposed to include an employment-related dimension due its contribution to the often-ignored functionings such as self-respect, practical reason and appearing in public without shame in addition to its role as a source of income. Fukuda-Parr (1999) similarly emphasizes the independent impact of employment on well-being through social-inclusion. Such well-being impacts of

⁴ Klasen and Lohti (2016) use individual data when available and show that individual data yields considerably higher multidimensional poverty levels for women in India compared to the results when same household deprivation level is assigned to all household members. Yet they do not employ their data to further investigate intra-household inequalities.

employment are likely to be more pronounced for women than for men. In addition, employment is likely to increase women's capacity to negotiate entitlements and obligations within the household and increase their say in household matters (Duflo, 2012); that is to say, it can signal a broadened set of choices and opportunities for women.

Employment is a particularly striking aspect of gender inequality in Turkey. Although women's official unemployment rate is higher than men, unemployed-to-population ratio is higher for men, since labor force participation is much lower for women (30 percent compared to 70 percent for men, see table 1). Moreover, female unemployment rate increases with education since better-educated women are more attached to the labor force and are likely to continue job search for longer periods (Eryar and Tekgüç, 2014). Eryar and Tekgüç (2014) show that the majority of even the less educated women enter the labor force when they are young, but their attachment is weak and they are more likely to drop out of labor force if they get married. With highly limited availability of public care services for the elderly and almost non-existent public care services for young children, a typical characteristic of patriarchal settings like Turkey (Dildar, 2015), most women are forced to purchase care services privately if they want to return to labor market (Ilkaracan, Kim and Kaya, 2015). Given the patriarchal attitudes and public care constraints, most of the less educated women opt out of labor market (Ilkaracan, 2012).

Motivated by these distinct features of the female labor market participation in Turkey, we define employment deprivation based on non-employment instead of unemployment unlike Suppa (2015), where our main indicator, *not-employed* (rather than *unemployed*) includes all those above 15 years old who are not employed, retired or a student (i.e. the unemployed, disabled, and "housewives"). This choice captures the fact that most women lack the capability to participate in labor market due to weak or non-existing public care services and prevalence of patriarchal gender norms. It also avoids categorizing men and better educated women as more deprived than less educated women by using unemployment as the deprivation indicator. We also present two additional MPI measures: one includes an alternative employment deprivation indicator (the *discouraged unemployed*, i.e. including those not looking for but ready to work in addition to the officially unemployed), and the other presents a three-dimensional poverty index without the employment dimension, following Klasen and Lohti (2016).

We have three major findings regarding the gender poverty gap in Turkey. Firstly, while there is a consistent and widespread improvement in living conditions for almost every sub-group (including male-headed, female-headed, poor, and non-poor), gender gap in poverty is persistent (roughly eight percent higher headcount multidimensional poverty for women), even in specifications that exclude the employment dimension. This gap is driven mostly by differences in education and, to some extent, in self-reported health status. There is no gender gap in terms of living conditions on average; this is hardly surprising as we use household level data for living conditions and female-headed households are a minority (with living conditions slightly better than male-headed households), single mothers are very rare and most women live in male-headed households in Turkey.

Including the employment dimension increases both the average deprivation score and the headcount poverty rate, especially for women, as expected. It also increases the gender gap for headcount poverty, on average, to 32 percent (59 and 27 percent headcount multidimensional poverty, respectively for women and men). Furthermore, the inclusion of the employment dimension reveals a faster drop in gender poverty gap in the period under study. This is driven by the increase in female labor force participation in this period and the faster rise of educational attainment (beyond the compulsory level) by young women. Finally, defining employment deprivation as *not-employed* or *discouraged unemployed* does not make a significant difference for men's poverty, but yields differing results for women.

Secondly, we investigate the gender poverty gap by age and region. We find that the overall reduction in the gender gap in multidimensional poverty is driven solely by the faster improvement for young women (15-24 years old) and the gender poverty gap did not decline for other age groups. In terms of the regional distribution, we find that multidimensional poverty for both men and women in the Western and Central Regions are consistently below Turkey averages, while the Eastern region is by far the poorest. For men, the over-time reduction in multidimensional poverty follows a similar trend in every region, whereas for women the improvement is slowest in the Eastern region. Finally, we also investigate intra-household multidimensional poverty and find an increasing share of households with no poor members with a corresponding decrease in that of households with all poor members. Throughout the study period, half of all households have at least one poor member. Overwhelming majority of poor members are female. Our discussion in

the remaining sections attempts to justify the choice of dimensions and indicators and explore the drivers of the partial convergence between men and women.

LITERATURE REVIEW

Capabilities Approach and the Multiple Dimensions of Deprivation

The conceptual roots of MPI can be traced to the capabilities approach, famously proposed by Amartya Sen to replace objective (e.g. income-based) and subjective (e.g. utility) measures of well-being and poverty, and subsequently adopted by the UNDP in its Human Development Reports. The *capabilities* approach focuses on “what people are actually able to do and to be” (Nussbaum, 2003: 33), and defines human betterment as expanding the individuals’ freedom to pursue what they deem desirable, rather than attaining a certain level of an accomplishment such as income (Sen, 1993). That is to say, the capabilities approach emphasizes the opportunities, choices and freedoms faced by individuals in addition to outcomes. This makes the capabilities approach especially pertinent for analyzing gender differences in well-being as it sheds light on the different outcomes that are likely to be acquired by women and men who have the same capabilities through the differential choices and opportunities they face. Indeed, as Robeyns (2003) observes, a number of macro-level studies on gender inequality operationalize indices that assess inequality in multi-dimensional capabilities (or capability-like dimensions) and are in line with Sen’s approach.

An obvious shortcoming of the capabilities approach, however, is that capabilities themselves cannot be measured. Sen further elaborates the concept as having two components: Functionings, i.e. states and activities that are constitutive of a persons’ well-being (e.g. being educated, being well-nourished, having shelter), and freedoms to achieve valued functionings (Sen, 1992). While measuring capabilities is not feasible, functionings can be represented and measured by one (or a number of) specific indicator(s) (Sen, 1993). In multidimensional poverty analysis functionings correspond to different dimensions of poverty. Some have also pointed to the underspecified nature of the capabilities’ approach as a drawback (Nussbaum, 2003; Robeyns, 2003) as it does not specify which capabilities are to be taken into account or how to aggregate them. Sen himself has rejected a universal list of substantive capabilities and argued that such a

definitive list would fail to account for the constant evolution of social values and foreclose a democratic debate on the issue (Sen, 2004). He argues that a modified set of functionings, depending on the specific goal and limitations of each exercise, is a reasonable compromise.

The debate on the specification of capabilities is echoed within the MPI literature on the choice of dimensions to be included (and the indicators representing each dimension) and the specific weighting of the dimensions. The absence of a strictly defined theoretical background within which multidimensional poverty measures (the dimensions and the indicators to be included, the weights to be assigned) can be anchored led to an indulgence in ever more dimensions and indicators without any clear connection to theory (Ferreira and Lugo, 2012). Regarding the choice of dimensions and indicators, Suppa (2015: 1) argues that dimensions and appropriate indicators within each dimension should be selected in a way that is contingent upon the concrete purpose of the measure in any specific study, e.g. identifying general trends, assessing performance of poverty alleviation, understanding the structure and dynamics of poverty, etc. Most applications of the MPI include health, education and living standards (for example, see UNDP country reports): health and education are addressed as core functionings within the capabilities approach, necessary for human beings to participate in society and cannot be fully substituted by income (Sen, 1992). Living standards are also a central capability for leading a decent life. These three dimensions are corollary to the three dimensions of the Human Development Index applied to household-level data (instead of country averages).

The weighting of dimensions is a second and connected field of debate. An overwhelming majority of the MPI studies assigns equal weights to different dimensions and to each indicator within a given dimension.⁵ Data-driven methods such as the Principal Component Analysis (PCA) in assign weights are not preferred, precisely because they re-introduce the black-box trickery that MPI (especially counting based double cut-off method) aims to avoid. Moreover, when two dimensions are highly correlated (such as women's education and employment), such methods will assign lower weights to one of the dimensions, curtailing the identification of individuals with joint deprivations. Equal weighting, on the other hand, will inadvertently cause double counting of functionings if one or more of indicators are proxy for similar functionings. In this vein, the most

⁵ Muller et al. (2016) is the rare study where the dimensions have unequal weights where weights are decided by how often income poor respondents choose each dimension as important dimension of poverty.

controversial indicators are those related to income/expenditure as they tend to be correlated with other dimensions of deprivation.

The choice and number of dimensions and the weight attached to them are interdependent issues. Ferreira and Lugo (2012), for instance, criticizes studies that are crowded with indicators measuring different aspects of material well-being (especially when domestic markets for goods and services are reasonably functioning) and suggest limiting the MPI to health, education and income dimensions. If the markets for goods and services are reasonably well-functioning, undernourishment and poor dwelling conditions would be different facets of income deprivation, and their inclusion as separate dimensions would serve to increase the weight of material deprivations at the expense of truly public goods (e.g. health and education) rather than capturing additional dimensions of poverty. Accordingly, including different material deprivations together with income is justified only when remote or rural areas are not well integrated to domestic markets and prices vary significantly within a country, or when certain regions or slums do not have access to important public services like electricity, sewage or piped water systems. Suppa (2015) voices a similar criticism but proposes to exclude income while keeping dwelling conditions within the MPI, since material deprivations are more “closely linked to specific functionings” (Suppa, 2015: 22) whereas income is a means to an end.

Apart from the choice of dimensions and weights, the actual method of determining one’s poverty status has been a field of debate within the MPI literature. Currently, the most commonly used method is the *counting based double cut-off* method developed by Alkire and Foster (2011a) at the Oxford Poverty & Human Development Initiative (OPHI).⁶ According to the double cut-off approach a person is considered multidimensionally poor if she is deprived in more than a specified weighted average of the included dimensions, contrary to earlier studies where poverty was identified based on deprivation in either all or any one of included dimensions. The notable advantage of this method is its identification of people with “joint disadvantages” (Alkire and Santos, 2014: 252).

Although the conceptual framework offered by MPI makes it especially apt for such an investigation (see also Rubeyns, 2003), there are only a few MPI studies that deal with gender gap

⁶ Alkire and Foster (2011a, 2011b) presents the detailed methodology and address the potential misconceptions.

in poverty. Notably, Vijaya et al. (2014) is the first study that uses the counting based double cut-off methodology to highlight gender differences in multi-dimensional poverty, by employing both individual and household data at subnational level (Karnataka, India) and incorporating education, living standards, assets, and empowerment as dimensions. They find that headcount poverty for women is only one percent higher than men at the household level, and female-headed households are less likely to be multi-dimensionally poor. When the unit of analysis is the individual, on the other hand, the headcount poverty rate for women is more than double that for men (implying that most of the poor women live in non-poor male-headed households). The study also shows that deprivation is more severe among poor women than men. Klasen and Lohti (2016) follow Vijaya et al. (2014) and construct an MPI with individual data when available instead of assigning an overall value to all household members by employing the 2012 Indian Human Development Survey. They find considerably higher multidimensional poverty levels for women (especially older women) compared to the results of Alkire and Foster (2011a) who assigns the maximum value to all household members. Their finding is driven by the fact that adult and older women in India is less educated than both men in the same age categories and younger women. Finally, Rogan (2016) calculates a multidimensional poverty index for South Africa by using household data and assuming an equal distribution of household income across household members. Given that South Africa has a large number of female-headed households and that they are substantially different than male-headed households (more rural and more young dependents) his analysis suggests significant gender gaps in poverty, but the multidimensional gender poverty gap is narrower than income poverty gap.

MPI Studies on Turkey

The UNDP study prepared by OPHI researchers mentioned above (Alkire et al., 2011), included an MPI measure developed for Turkey but employed a relatively old dataset (from 2003). This study uses the standard indicators developed for least developed countries and assigns identical values to all household members even when individual data exists (such as on health and education). Subsequent MPI studies on Turkey vary in the scale (country-level vs. regional) of their focus. Notably, Limanlı (2017) uses the counting based double cut-off methodology for analyzing poverty trends in the period 2006-2012 and employs only household-level indicators, even for education and health for which individual-level data is available. While the study constructs two

separate MPI's based on alternative lists of deprivation dimensions and demonstrates a decline in poverty with both, it finds no difference in multidimensional poverty status by gender, likely because of the fact that all measures are at the household level. Karadağ and Saraçoğlu (2015), on the other hand, replicate the methodology and indicators used in Alkire et al. (2014) but use individual level data for health and education (and household level data for environment and material deprivation dimensions). Employing SILC data (2006-2012), the authors find a sustained decline in the multidimensionally poor in Turkey during the study period, yet they do not report breakdown of their findings by age or gender. Uğur (2016) also reproduces Alkire et al. (2014) for a country-level analysis for the year 2013 using SILC data and reports findings with gender breakdown, according to which women are more multidimensionally poor. Finally, Zambak and Çağatay (2013) develop a MPI for two provinces in Turkey (Mersin and Erzurum), following the AF-MPI methodology but using individual data when available. The authors have collected their own data specifically designed for the purpose of devising an MPI, as a result of which they are able to construct an equally-weighted eight-dimensional poverty index (with a total of 42 indicators) and capture relatively over-looked dimensions such as empowerment (7 indicators) and social exclusion (20 indicators). While the study finds no households identified to be deprived in more than 4 dimensions (out of 8), this is likely to have been driven by the unusual sampling choices of the authors (only urban households headed by employed persons, equal sampling from socio-economic status categories with widely different population sizes, no weighting of samples from different provinces) which render the study non-representative.

METHODOLOGY AND DATA

We develop three MPIs in this study: our first measure includes only the three “core” dimensions used in UNDP Country Reports (i.e. education, health and living conditions). The other two MPIs we construct include employment as an additional dimension, where employment deprivation is alternatively defined as unemployed (including discouraged unemployed) or not-

employed. As explained earlier, we believe that this third MPI measure is the most suitable for Turkey.⁷

Counting-based double cut-off method

We employ the methodology of Alkire and Foster (2011a), but use individual data when available. Alkire and Foster (2011a) introduce an intuitive two-step approach for identifying poverty: whether a person is deprived or not is determined for every dimension (e.g. if the age-specific compulsory education is completed or not) first. Then a simple counting approach is used where a person must be poor in a minimum number dimensions in order to be identified as multidimensionally poor. This method is easily generalizable to cases where dimensions have different weights, applicable even when the data used is ordinal or categorical, and prioritizes persons who have multiple deprivations over those who are deeply deprived in one or two dimensions (Alkire and Foster, 2011a, 2011b).⁸

Another advantage of MPI over classical poverty measures, especially within the context of least developed countries, is that the implicit assumption that household resources are shared equally (or according to need) can be relaxed for many dimensions (Klasen and Lahoti, 2016). As we have discussed earlier, this makes the MPI especially suited to explore gender gap in poverty as it allows for accounting for gender inequalities in intra-household sharing of resources by including individual-level observations when available. While most existing MPI studies do not take this into account and consequently overestimate male multidimensional poverty and underestimate the gender disparity in deprivation, we follow Klasen and Lohti (2016) and use individual-level data where available.

It is worth noting the shortcomings of the method we adopt here, as summarized by Datt (2018). Namely, this method violates the transfer principle, i.e. a regressive transfer from very poor to less poor can reduce the multidimensional poverty; ignores the deprivations of the non-poor; and

⁷ Unlike Suppa (2015), we do not include material deprivation or social participation to our analysis for different reasons. On the one hand, SILC Turkey do not consistently include questions that can help us to construct a social participation index throughout the study period. On the other hand, material deprivation is measured mostly at household level, however unlike genuine household level public goods (such as leaky roof) it is not clear such things as financial assets are equally enjoyed by all household assets. We suspect that assets are mostly controlled by male members in the case of Turkey. We include some of the material deprivation indicators proposed by Suppa (2015) to living conditions or employment dimensions.

⁸ We present an illustration of Alkire and Foster Methodology in matrix format in Appendix A.

treats multiple deprivations as sum of their parts, ignoring the potentially mutually reinforcing mechanisms between multiple deprivations. Datt (2018) proposes a distribution-sensitive measure to alleviate these problems by adopting a union approach where a person is defined as multidimensionally poor if she is deprived in any indicator, taking into account the poverty gap for each indicator and squaring the poverty score for each individual to emphasize the mutually reinforcing nature of deprivations. While we do not adopt the methodology developed by Datt (2018) here, we present additional analyses towards addressing the concerns he raises. We present the overall distribution of poverty scores in figures S1 and S2 (zero poverty score corresponds to non-poor in the union approach) and the average poverty scores for the entire sample (i.e. including the non-poor) in figure 1. We also present the ‘separate inequality measure’ in Table 5 to accompany the MPI, calculated similarly to variance of deprivation scores both for whole population and multidimensionally poor (see Appendix A) and satisfies the transfer principle.

Data

We employ Survey of Income and Living Conditions data sets for Turkey (SILC Turkey) for years 2006-2015. SILC Turkey has been conducted since 2006 and is available both as an annual cross-section data set as well as a four-year panel. Four-year panel sample size is smaller and do not contain information on region of residence. Hence we conduct our analysis by combining annual cross-section data sets. We limit our analysis to the population over 15 years of age, on whom the data set contains detailed information. Consequently, our findings may understate the true multidimensional poverty if the fertility rate is higher for multidimensionally poor households. While a potential solution would be to impute average deprivation scores younger members of households, we refrain from this strategy as it may overstate the true deprivation as younger generations are much more likely to complete compulsory education in Turkey.

Our samples comprise of approximately 30 thousand individuals (roughly 11 thousand households) between 2006 and 2010, which have gradually increased to approximately 60 thousand (roughly 23 thousand households) by 2015 (TURKSTAT, 2016). Since responding to TURKSTAT surveys are compulsory by law and non-response is punishable with a fee the response rates are quite high (e.g. 93 percent in 2014, TURKSTAT, 2016).

Dimensions and Indicators

A notable advantage of MPI is its explicit treatment of how (normative) assumptions related to poverty are operationalized within the context of measurement, namely the selection of functionings [dimensions] to be, respective deprivation cutoffs, assigned weights and the poverty cutoff (Suppa, 2015: 7-8). This stands in contrast to many other poverty indicators where they remain implicit. Accordingly, we briefly discuss our choice of specific dimensions and indicators in this section (see table 2 for a summary of indicators and weights). In assigning weights to dimensions and indicators within them, on the other hand, we follow the existing literature and assign equal weights to each dimension and indicator. We have one three-dimensional and two four-dimensional poverty measures for which we choose $k \geq 0.33$ and $k \geq 0.25$ as the poverty cutoff, respectively.⁹

Education and Health: Education and health are two of the core functionings that are included in every human development, MDG or multidimensional poverty index that we know of, and their central importance in determining well-being is well-established (Sen, 1993). We classify those who have not completed compulsory education for their age group as education deprived (*compulsory education*). Since the level of compulsory education in Turkey has been raised from primary and secondary school in 1997 (affecting those born in September 1986 and after), we use different cut-offs for age groups born before and after 1987 in defining education deprivation.¹⁰ An alternative would be using completion of primary school, in order to have a consistent threshold for the entire sample (*primary education*). We use *compulsory education* in our analysis since it is a somewhat more stringent threshold.

On the health dimension, we use two self-reported measures of health status as indicators. The SILC dataset has three questions that pertain to the respondents' health, all of which provide self-reported measures: self-reported overall health status (on a scale of one to five), the extent to which the respondent's daily activities had been limited within the last six months due to a mental or

⁹ Figure S3 provides the cumulative distribution of deprivation scores for all possible values of k for 2015. For men, the deprivation scores coincide irrespective of poverty measure and values of k . For women, for the values of k between 0.25 and 0.40, the order of not-employed is the most deprived definition and three dimensional is the least deprived definition.

¹⁰ As of September 2012, the compulsory education is raised to 12 years in Turkey, affecting those born September 1997 and after. The students who are potentially affected by this does not show up in our dataset since the latest data in our sample is from 2015 and the sample comprises of only those aged 15 or above.

physical ailment (on a scale of one to three), and the existence of any chronic illness. Cross-tabulations reveal that more than half of people with chronic disease report not having their daily activities limited. Thus we use the first two and define *bad health* by having bad or very bad health, and *limited health* as having daily activities limited or limited very much within the last six months due to a mental or physical ailment.¹¹ While access to health care could be another possible indicator to include, we chose not to do so as it does not provide information about an individual's status of health *per se*. Our data indicates that the share of individuals with no access to healthcare is lower than that with bad and limited health and it improved much faster with no gender gap. Hence, our estimates are conservative in health access improvement in this sense.

Living Conditions: Indicators of living conditions are the only ones for which we use observations at the household level, i.e. we assume they are household public goods (Klasen and Lahoti, 2016; Vijaya et al., 2014; Espinoza-Delgado and Klasen, 2018). In selecting indicators, we opted for those that are (1) more relevant proxies of living conditions in a middle income country and (2) more likely to asymmetrically effect the time use by household members. Our motivation in the latter is that certain forms of living conditions might imply a heavier burden of unpaid labor on female household members, e.g. a coal stove would mean that it is most likely women who is responsible for keeping the stove on, or the absence of a dishwasher would mean that women are spending disproportionate time in washing the dishes. The six indicators we choose are: i) sub-standard heating (heating house with a stove and using any one of wood, coal or dung, *sub-heating*); ii) sub-standard shelter (a house with at least one of a leaky roof; insufficient insulation; or dark rooms without sun-light; *sub-shelter*); iii) more than one person per room (*crowded*); iv) self-reported air pollution or frequent crime in the neighborhood (*neighborhood environment*); v) missing shower, toilet or piped water (*no stp*) and vi) missing washer, fridge or dishwasher due to economic hardship (*no wfd*). Since we do not have any data on the actual use or control over household resources, there is almost no gender gap in our dataset for living conditions because most of the women live in male-headed households and everybody in the household is assigned the same deprivation score.

¹¹ Espinoza-Delgado and Klasen (2018) point to the dearth of health related questions in their data and opt for defining health deprivation by having suffered from a chronic disease or several diseases in the past month.

Employment: As discussed in introduction, we define employment deprivation by non-employment (rather than unemployment), which includes all those who are neither employed nor retired or a student (*not-employed*).¹² We treat all non-working elderly without a pension as employment deprived, whereas widows who are collecting pensions of their deceased spouses are considered non-deprived. We define a second (unemployment-based indicator) that includes those who gave up searching for jobs but are ready to work within two weeks' notice (*discouraged*) in addition to the unemployed who are actively looking for jobs. In both our main employment deprivation indicator and the alternative, we assign half the deprivation score to the informally employed (*no social security*). We also considered other types of employment deprivation as potential indicators, such as long working hours and temporary or part-time employment. However, since employment associated with these characteristics is often informal, including them as extra indicators, through leading to a reduction in the weight of informal employment for a much larger group, would lead to the counter-intuitive result of reducing the deprivation score for all sample.

Most of the *not-employed* men are either unemployed (i.e. actively searching for jobs) or have indicated that they were ready to start a job in two weeks if any opportunity materialized. The difference between the *not-employed* and *discouraged* men is only around six percentage points; whereas for women this difference is strikingly large, around 50 percentage points. Most women who are out of the labor force chose the option indicating that they are busy with within-household care duties.

FINDINGS

Individual Indicators

Table 3 presents the share of households or individuals deprived by each indicator. We only present findings for years 2006 (first year of SILC Turkey), 2009, 2012 and 2015 (final year of this study) to save space. As can be seen, women report higher levels of health deprivation despite living longer, a paradoxical yet common finding (e.g. Case and Paxson, 2005). For all indicators except *limited health* there is a decline in the share of individuals or households who are deprived.

¹² For the elderly (over 60 years old), Espinoza-Delgado and Klasen consider access to social protection instead of employment where an elderly person is considered deprived if she does not have access to retirement pensions or work income. We do not separately calculate social protection deprivation for the elderly and treat all non-working elderly without a pension as employment deprived according to above definition.

Compulsory education, limited health and bad health, on the other hand, have changed similarly for both men and women, making them unlikely to affect the gender poverty gap during the study period. Employment related indicators have also improved over time, yet with varying degrees for men and women. The faster decrease in the *not employed* indicator for women had a narrowing effect in gender poverty gap, yet the convergence is dampened by the faster decline in *no social security* indicator for men.

We find significant improvement for Living Conditions indicators, except for *sub-standard shelter* indicator (at least one of leaky roof, inadequate insulation or dark room). The greatest decline is in *sub-standard heating* deprivation (with a marked increase in houses with central heating) and in dishwasher ownership. There is also a sustained decline in the share of houses without an in-house toilet, piped water or shower, mostly driven by the increase in households with an in-house toilet. There is almost no gender gap in indicators of living conditions since around 85 percent of households in Turkey are male-headed, i.e. most women live in male-headed households, and the living conditions of female-headed households are not worse than those of male-headed households on average.

Multidimensional Poverty Index

Figures 1 and 2 show the average deprivation (uncensored) scores (for all population, men and women) and the headcount multidimensional poverty, respectively. As can be seen, while the choice of indicators (corresponding to different multidimensional poverty indices) do not matter, on average, for men's poverty on average, average deprivation scores for women vary a lot depending on the dimensions included. For headcount poverty, similarly, the use of *not employed* (vs *discouraged* unemployed) does not make any discernible difference for men, while it proves to be a very crucial for women headcount poverty as it increases the level of headcount poverty significantly. The gender poverty gap is, on average, eight percent by our most conservative measure, the three-dimensional poverty index; it goes up to between 30 and 34 percent by the multidimensional poverty index that includes the *not employed* employment dimension.

We present the headcount poverty rate, average deprivation of poor individuals and the multidimensional poverty index (MPI) with the *not employed* dimension in Table 4.¹³ Both Limanlı (2017) and Karadağ and Saraçoğlu (2015) study 2006-2012 period. When we compare our headcount poverty findings for 2006-2012 period with their findings, we observe that the absolute decline in headcount poverty is around 8-9 percentage points in all these studies despite different dimensions, weights and unit of analysis (individual versus household). This suggest that the decline in multidimensional headcount poverty is robust and not dependent on study specifics. Table 5, on the other hand, shows the separate inequality measure among all individuals (Panel A) and among the multidimensionally poor (Panel B) over time (Seth and Alkire, 2014). As can be seen, there is a substantial decline in inequality among men from 2006 to 2007, whereas the reverse trend applies to women.¹⁴ Inequality among the multidimensionally poor (Panel B), in contrast, show little change and no particular trend. Both the inequality among all women and among the multidimensionally poor women are higher than the corresponding measures for men. The last columns of Tables 4 and 5 present gender poverty gap (headcount, average deprivation and MPI). These findings show that women are much more likely to be multidimensionally poor in Turkey (poverty is feminized) but they do not necessarily live in much more intense poverty compare to men.¹⁵

Multidimensional versus Income Poverty

Table 6 presents the cross-tabulation of income and multidimensionally poor households. We choose the income poverty threshold as those households whose *per capita income is less than one-third of gross minimum wage*, which is often used for social assistance eligibility in Turkey. Accordingly, 23 percent of income poor households are not multidimensionally poor and almost 48 percent of income non-poor households are actually multidimensionally poor (top panel). In other words, the comparison of MPI with income poverty reveals a significant discrepancy between the two measures, which validates the use of multidimensional poverty. Presumably, most of the

¹³ From this point on we only present further analysis of only *not employed* measure to save space. The further analysis of other two multidimensional measures are available from authors.

¹⁴ Tekgüç (2018: 562) also note an inexplicable 10 percent decline in absolute income poverty in the same data set and attribute it to data collection problems during the first wave of SILC Turkey.

¹⁵ We present age and regional breakdown of multidimensional poverty in Supplementary Materials in OLS format to save space. Our OLS coefficient estimates should be regarded as conditional correlations. As expected, older individuals are more deprived and Istanbul and Western Anatolia (Ankara, Konya and Eskişehir) are the least deprived regions. Three Eastern regions are significantly more deprived than the rest of the country.

households that are income poor but not multidimensionally poor are transiently poor and have resources to climb out of income poverty in subsequent periods. Indeed, a quick glance to the average deprivation scores of the households who are income poor but not multidimensionally poor reveal that their living standards deprivation are much worse than other three dimensions. On the other hand, households who are multidimensionally poor but not income poor are worse than average in every dimension except living standards.

Multidimensional Poverty by Age and Region

We separately present age and regional breakdown of multidimensional poverty in three age groups (young: 15-24, adult: 25-64; and old: 65 and above) and five broad regions.¹⁶ Figure 3 presents multidimensional poverty rates for both men and women over time and Figure 4 presents the decomposition of poverty deprivation score of multidimensionally poor by the four dimensions included. As can be seen in Figure 3, women older than 65 did not enjoy any improvement in headcount poverty over the study period, and both young and adult men have much lower multidimensional poverty levels than young women. On the positive side, young women depict the fastest drop in multidimensional poverty, which is in fact the main factor driving the convergence between the poverty rates of men and women. In terms of the deprivation scores of the multidimensionally poor (Figure 4), poor women (especially elderly women) are more deprived than poor men. All age groups for both women and men experienced a slight improvement in deprivation scores due to better living conditions. Finally, Figure 5 shows the time trend of multidimensional poverty by gender and region. The multidimensional poverty rates for men and women in the Eastern region are markedly higher than other regions in Turkey. While there is a slight convergence between the West and other regions for men, there is a divergence between the North and the East regions and the rest of the country for women.

Intra-Household Composition and Inequality

Figure 6 presents the household composition by individual members' multidimensional poverty status. The most visible trend here is the sustained increase in the share of households with no poor members throughout the study period, among which the share of one and two person

¹⁶ Following Turkish Demographic and Health Surveys, we divide Turkey into five broad regions: West (TR1, TR2, TR3, and TR4), South (TR6), Central (TR5 and TR7), North (TR8 and TR9), and East (TRA, TRB, TRC).

households is increasing. More importantly, among households with all poor members, the share of single-member households (mostly women) is rapidly increasing.¹⁷

In order to be able to capture the intra-household inequality between men and women, we limit our analysis to households with at least one male and one female member. Figure 7 presents the changing composition of these households, where poor and non-poor subgroups are defined the same way as Figure 6. One or more multidimensionally poor females (but no poor male) is the most populated sub-group during study period with respect to inequality in multidimensional poverty within the household.¹⁸ Moreover, the share of this group is not declining over time.

CONCLUSION

The drawbacks of conventional income-based poverty measures are now well known and discussed, paving the way to the development and increasing use of multidimensional poverty analysis. Yet most of the analyses found within the literature focus on household-based multidimensional poverty measures, which hide the inequalities in the intra-household distribution of resources and living standards and equate the poverty status of the household to that of the different household members. This is despite the fact that MPI allows the incorporation of individual-level data where available and can thus better illuminate intra-household inequalities that are critical determinants of gender differences in well-being. MPI also offers the flexibility of including different indicators selected based on their relevance and adequacy for capturing specific aspects of poverty within a given context, making it especially suitable for studying contextual dimensions of gender gap in poverty.

In this paper, we contribute to the literature on gender poverty gap by constructing an individual-based MPI for Turkey where we use individual level indicators of multidimensional poverty where available. Our measure of multidimensional poverty introduces employment deprivation as an additional dimension to health, education, and living conditions. We motivate this choice by highlighting that employment contributes to well-being in addition to its role as a source of income. More specifically, we construct two MPIs that capture the employment

¹⁷ We present the ordered logit estimates for transitions between three categories: no poor, some poor and all poor households in Supplementary Materials.

¹⁸ Although we do not report here, the findings are similar when we limit the analysis to households where household heads are between 25 and 54 years old.

dimension with *not-employed* and *discouraged unemployed* indicators, the former of which is our main index, as well as a third three-dimensional MPI that does not include employment dimension.

We find that the gender poverty gap in Turkey is, on average, eight percent by the three-dimensional poverty index, our most conservative measure. Our preferred definition of employment deprivation, namely *not employed*, is associated with a higher level of overall multidimensional poverty and a much higher gender headcount poverty gap (on average 32 percent, with a gradual reduction over the study period) in comparison to the two alternative indices developed here. We believe that our definition of employment deprivation is the most apt for the context of Turkey and justified given the distinct features of the female labor force participation in Turkey. Furthermore, it holds the potential to reorient the social policy debate on the immensely important and intensely conflictual issue of the appropriate place of women in the public sphere. The ruling Justice and Development Party (JDP) regularly stresses the primacy of care giving responsibilities of women and their role first and foremost as mothers. This dominant ideology, combined with the lack of public provision of care services for children and the elderly, effectively forces most women to be stay-home mothers. The burden of care responsibilities, hugely disproportionally shouldered by them, put most women on a path that cannot easily be altered or reversed in terms of employment outside of the household. It is indeed hard to argue that women outside of the labor force have the enhanced freedoms to “actually be able to do and to be” what they have reason to value. If, on the other hand, one assumes that staying outside the labor force is a completely voluntary decision by women and not an outcome compelled by patriarchal relations and structures, one arrives, more or less, to our alternative definition of employment deprivation, *discouraged unemployed*. Even with our MPI that operationalizes this particular definition, the gender headcount poverty gap is roughly 19 percent and does not decline over the study period, unlike the narrowing poverty gap in the MPI with the *not employed* indicator.

Our analysis also reveals that quite a substantial part of young women are staying in school longer and joining the labor market in greater numbers than before. Young women depict the fastest drop in multidimensional poverty, which is the main factor driving the convergence between the poverty rates of men and women. A more detailed investigation reveals that only the young women in the Western and Southern regions were (partially) able to close the gender multidimensional poverty gap. Moreover, we find that while female-headed households are not substantially poorer

than male-headed households in Turkey, the prevalence of households where poor women residing with non-poor men is the highest, which points to the dominance of intra-household inequalities.

These findings point toward specific directions for policy. The largest group of multidimensionally poor women are adult women (ages between 25 and 64) most of whom are not in the labor force. Rapid improvement in the education and health for this group are unlikely; an increase in the availability of public sector care services, however, can substantially increase the employment prospects of these women, both by direct employment opportunities and by freeing them domestic care work obligations.

Yet our findings should be interpreted in light of the limitations posed by our data. We have been able to only partially individualize our multidimensional poverty measures, since our dataset do not include individual observations on living conditions. Treating living conditions as household public goods is thus an obvious shortcoming of our findings as it likely leads to the underestimation of women's poverty. The literature on gender and intra-household inequality suggests not only that household resources/assets are likely to be unequally shared by female and male members, but also that the deprivation in certain dimensions of living conditions impacts women disproportionately (Espinoza-Delgado and Klasen, 2018). Although we have tried to address the latter by including dimensions of living conditions whose absence would asymmetrically effect the time use by female and male household members, our measures remain limited indicators in capturing gender gap in multidimensional poverty. A connected and second shortcoming of our measures is related to the fact that we cannot account for unequal time use by household members in (unpaid) household work. A substantial body of work within feminist economics demonstrate the centrality of the distribution of unpaid work for women's well-being and autonomy as well as for gender inequality (Galvez-Muñoz, et al, 2011; Gammage, 2010; Noh and Kim, 2015; Zacharias et al., 2014) The disproportional burden of household work falling onto women would not only have implications on their health and income-generating activities (Bradshaw, Chant and Linneker, 2019) but can be considered an independent dimension of well-being as it restricts one's capability to be and do what one deems valuable. Moreover, if and when such responsibilities are combined with women's income generating activities, i.e. double-shift, women's time deprivation is likely to be intensified and/or dampen the positive welfare impacts of income generating activities that potentially reduce income poverty (Bradshaw, Chant and Linneker, 2019). Unfortunately, in the absence of relevant

and more defined data it is impossible to address these immensely important dimensions of gender poverty gap. We therefore join others in their call for more comprehensive and detailed individual data (Espinoza-Delgado and Klasen, 2018).

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Tables and Figures

Table 1: Official Labor Force Statistics for 15-64 year olds, 2015 (000)

Panel A Education	Unemployed		Employed		Population	
	men	Women	men	women	men	women
No Diploma	120	60	669	1,059	1,254	4,703
Primary	558	211	5,889	2,443	8,089	8,506
Middle	527	195	3,941	1,043	6,578	4,977
High	383	297	4,054	1,239	5,709	4,156
Tertiary	287	403	3,483	2,071	4,217	3,394
Total	1,875	1,166	18,036	7,855	25,846	25,736

Panel B Education	Unemployment Rate		Employment Rate		Labor Force Part. Rate	
	men	women	men	women	men	women
No Diploma	15%	5%	53%	23%	63%	24%
Primary	9%	8%	73%	29%	80%	31%
Middle	12%	16%	60%	21%	68%	25%
High	9%	19%	71%	30%	78%	37%
Tertiary	8%	16%	83%	61%	89%	73%
Total	10%	15%	70%	30%	77%	35%

Source: TURKSTAT (2018). TURKSTAT derive these statistics from Household Labor Force Surveys (HLFS) which have much larger sample size (more than 300,000 adults per year).

Table 2: Dimensions, Indicators and Respective Weights

Dimensions	Indicators	Weights		
		Not Employed	Discouraged unemployed	Three dimensions
Education	Not completed compulsory education	0.250	0.250	0.333
Health	bad health	0.125	0.125	0.167
	limited health	0.125	0.125	0.167
Living standards	Substandard heating (stove using wood or coal or dung)	0.042	0.042	0.056
	Sub-standard shelter (leaky roof or insulation or dark room)	0.042	0.042	0.056
	Neighborhood environment (air pollution or crime)	0.042	0.042	0.056
	Crowded (less than one room per capita)	0.042	0.042	0.056
	No shower or toilet or piped water	0.042	0.042	0.056
	No washer or fridge or dishwasher	0.042	0.042	0.056
Employment	Not employed (unemployed, disabled, housewife, other)	0.125		
	Unemployed + not searching but ready to work		0.125	
	No social security of own name*	0.125	0.125	

*: Not employed people are also assumed to have no social security for their name (we exclude the retired and over 65 years olds from this group). Most people are eligible for public health care in Turkey, however only formally employed people are eventually become eligible for public pensions.

Table 3: Deprivation Headcount Ratios by Gender

All	2006	2009	2012	2015
Not completed compulsory education	0.20	0.21	0.19	0.18
bad health	0.35	0.32	0.28	0.28
limited health	0.24	0.27	0.24	0.26
Not employed, in education or retired	0.40	0.38	0.34	0.32
Discouraged and Unemployed	0.09	0.11	0.07	0.05
No social security of own name	0.54	0.51	0.47	0.43
n of individuals	30,186	32,539	47,504	59,662
Substandard heating	0.65	0.58	0.53	0.44
Sub-standard shelter	0.58	0.60	0.62	0.55
Neighborhood environment	0.37	0.35	0.28	0.27
Over crowded	0.45	0.40	0.38	0.35
No shower or toilet or piped water	0.13	0.12	0.09	0.07
No washer or fridge or dishwasher	0.12	0.07	0.05	0.02
n of households	10,853	11,866	17,559	22,749
Men				
Not completed compulsory education	0.11	0.11	0.09	0.09
bad health	0.34	0.31	0.27	0.27
limited health	0.19	0.22	0.21	0.22
Not employed, in education or retired	0.16	0.17	0.13	0.12
Discouraged and Unemployed	0.10	0.12	0.08	0.07
No social security of own name	0.36	0.33	0.27	0.24
n of individuals	14,293	15,680	22,932	28,837
Women				
Not completed compulsory education	0.29	0.30	0.28	0.27
bad health	0.36	0.33	0.29	0.29
limited health	0.28	0.32	0.28	0.31
Not employed, in education or retired	0.62	0.59	0.55	0.52
Discouraged and Unemployed	0.08	0.09	0.07	0.03
No social security of own name	0.71	0.68	0.66	0.61
n of individuals	15,893	16,859	24,572	30,825
Gender Gap (Women – Men)				
Not completed compulsory education	0.19	0.19	0.19	0.18
bad health	0.02	0.02	0.02	0.02
limited health	0.09	0.09	0.07	0.09
Not employed, in education or retired	0.46	0.41	0.42	0.40
Discouraged and Unemployed	-0.03	-0.02	-0.01	-0.04
No social security of own name	0.35	0.35	0.40	0.38

We do not present living conditions by gender to save space since they hardly differ by gender.

Table 4: Multidimensional Poverty Index and Its Components (not-employed)

	Headcount Poverty (H)			Sex-Poverty Ratio (W/M)
	All	Men	Women	
2006	0.649	0.479	0.811	1.693
2007	0.613	0.435	0.784	1.802
2008	0.606	0.420	0.784	1.867
2009	0.618	0.454	0.777	1.711
2010	0.609	0.438	0.773	1.764
2011	0.581	0.402	0.754	1.878
2012	0.561	0.383	0.735	1.920
2013	0.546	0.364	0.722	1.983
2014	0.541	0.363	0.715	1.970
2015	0.537	0.366	0.704	1.923
Change	0.111	0.113	0.106	
	Average Depr. of the Poor (A)			Sex-Poverty Ratio (W/M)
	All	Men	Women	
2006	0.468	0.422	0.493	1.170
2007	0.460	0.417	0.483	1.159
2008	0.460	0.417	0.482	1.155
2009	0.470	0.425	0.495	1.164
2010	0.467	0.420	0.492	1.173
2011	0.461	0.417	0.484	1.163
2012	0.458	0.415	0.480	1.159
2013	0.454	0.415	0.473	1.139
2014	0.454	0.418	0.472	1.130
2015	0.450	0.406	0.472	1.162
Change	0.018	0.016	0.022	
	MDPI (H*A)			Sex-Poverty Ratio (W/M)
	All	Men	Women	
2006	0.303	0.202	0.400	1.982
2007	0.282	0.182	0.379	2.088
2008	0.279	0.175	0.378	2.156
2009	0.290	0.193	0.384	1.992
2010	0.284	0.184	0.381	2.068
2011	0.268	0.167	0.365	2.183
2012	0.257	0.159	0.353	2.224
2013	0.248	0.151	0.342	2.259
2014	0.246	0.152	0.338	2.226
2015	0.242	0.149	0.332	2.235
Change	0.062	0.053	0.068	

Table 5: Separate Inequality (Variance measure, not-employed)**Panel A: Inequality among Multidimensionally Poor & Non-poor**

	All	Men	Women	Sex-Poverty Ratio (W/M)
2006	0.211	0.270	0.157	0.582
2007	0.212	0.140	0.190	1.359
2008	0.213	0.139	0.191	1.374
2009	0.220	0.148	0.200	1.354
2010	0.215	0.142	0.199	1.400
2011	0.212	0.137	0.197	1.437
2012	0.208	0.133	0.197	1.484
2013	0.210	0.132	0.194	1.463
2014	0.205	0.135	0.197	1.455
2015	0.212	0.129	0.199	1.541
Change	-0.001	0.141	-0.042	

Panel B: Inequality among Multidimensionally Poor

	All	Men	Women	Sex-Poverty Ratio (W/M)
2006	0.138	0.097	0.117	1.203
2007	0.139	0.105	0.119	1.135
2008	0.138	0.103	0.116	1.130
2009	0.142	0.104	0.117	1.128
2010	0.141	0.100	0.118	1.174
2011	0.140	0.103	0.115	1.122
2012	0.139	0.102	0.116	1.140
2013	0.134	0.103	0.113	1.093
2014	0.134	0.100	0.115	1.147
2015	0.131	0.097	0.113	1.162
Change	0.007	0.000	0.004	

Table 6: Cross-tabulation of Income and Multidimensional Headcount Poverty, 2015

		4D, not-employed		
		non-poor	poor	Total
< 1/3 of MW	non-poor	52.2	47.8	100
	poor	22.9	77.1	100
	Total	46.3	53.7	100
		4D, discouraged		
		non-poor	poor	Total
< 1/3 of MW	non-poor	60.1	39.9	100
	poor	27.9	72.1	100
	Total	53.6	46.4	100
		3D poverty		
		non-poor	poor	Total
< 1/3 of MW	non-poor	72.8	27.2	100
	poor	44.0	56.0	100
	Total	67.0	33.0	100

Figure 1: Average MDP Deprivation Scores

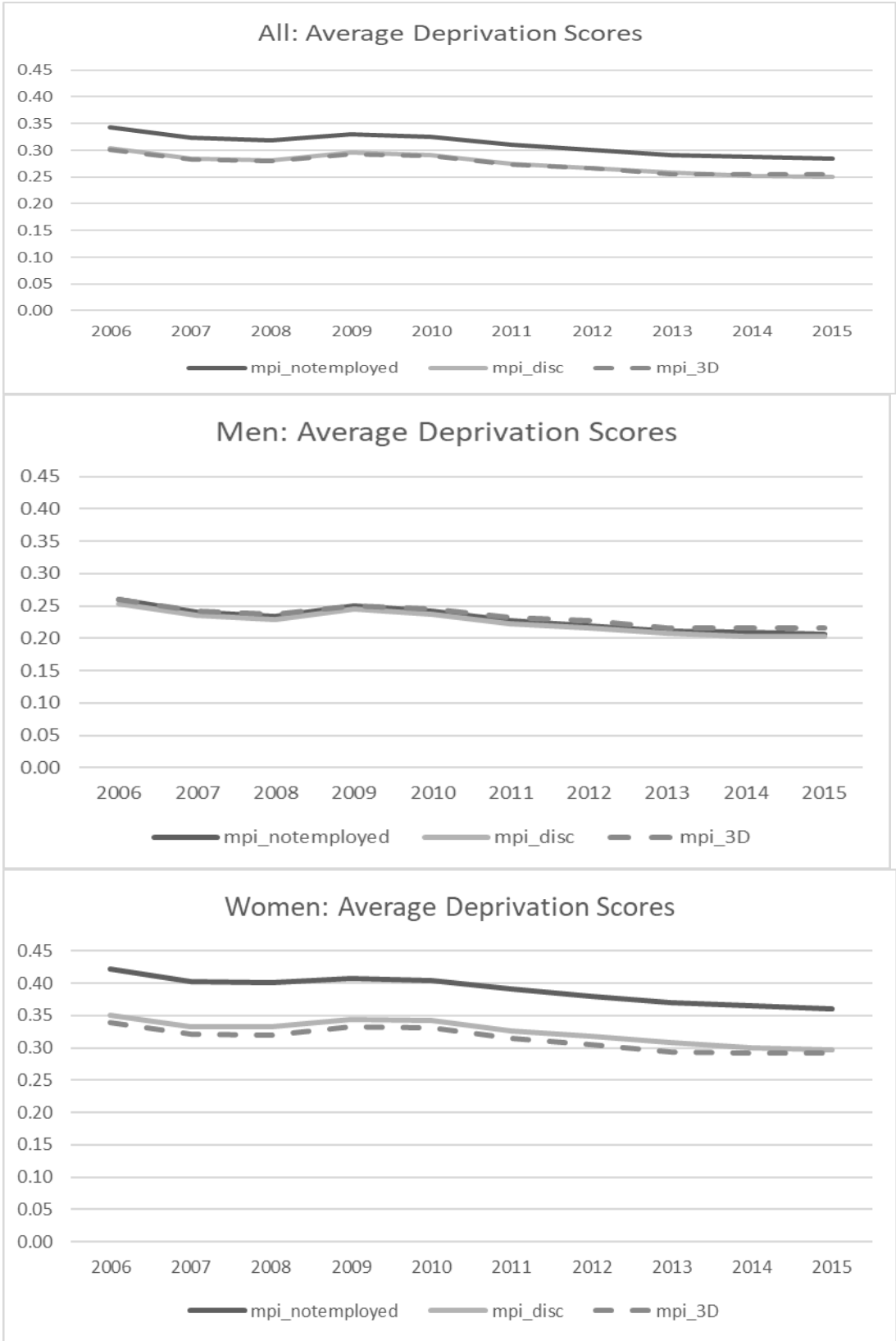


Figure 2: Headcount Poverty Rates between 2006-2015

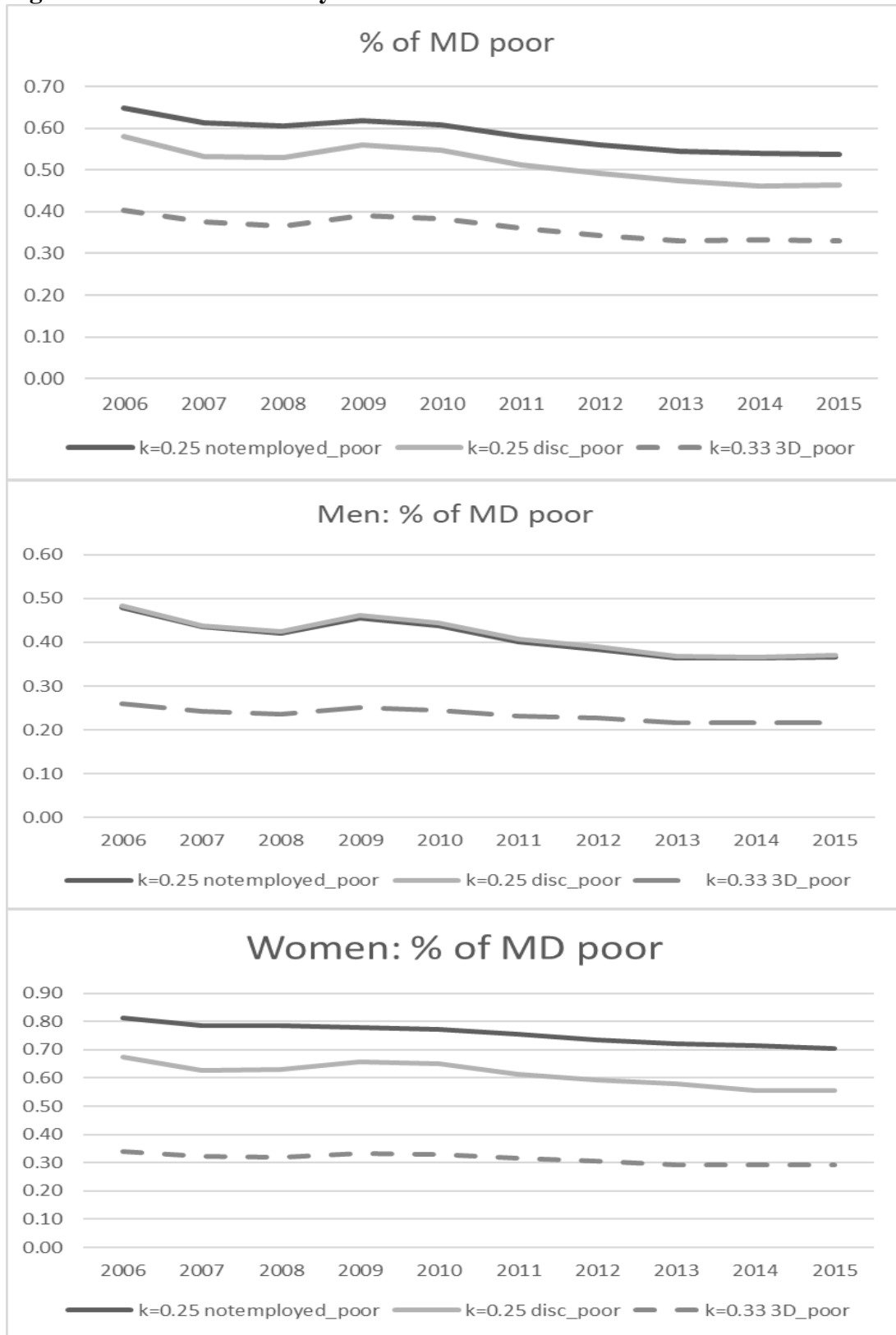


Figure 3: Multidimensional Poverty Rates by Age Cohorts (not-employed, $k \geq 0.25$)

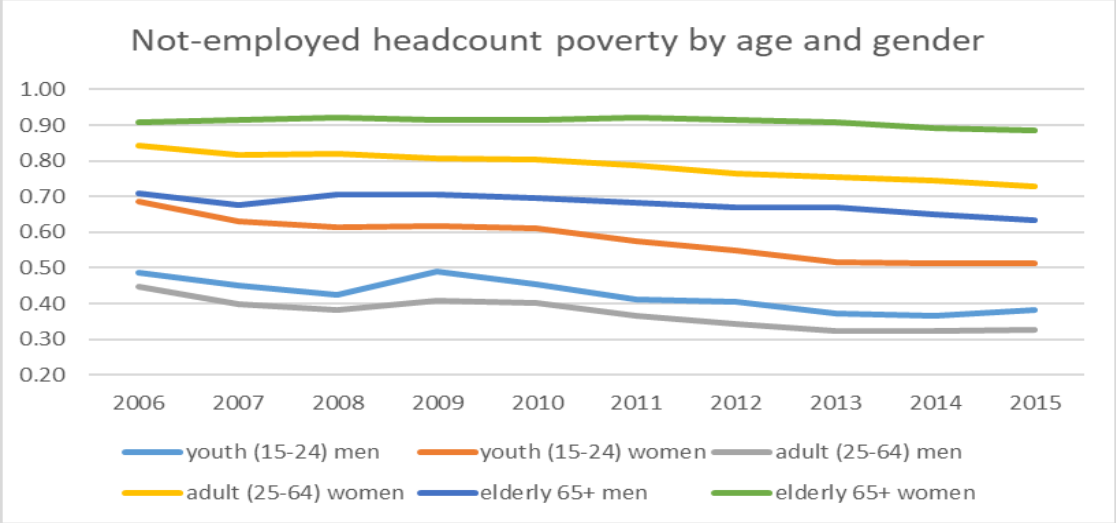


Figure 4: Deprivation score Decomposition of Multidimensional poor of Gender & Age (k>=0.25, not-employed)

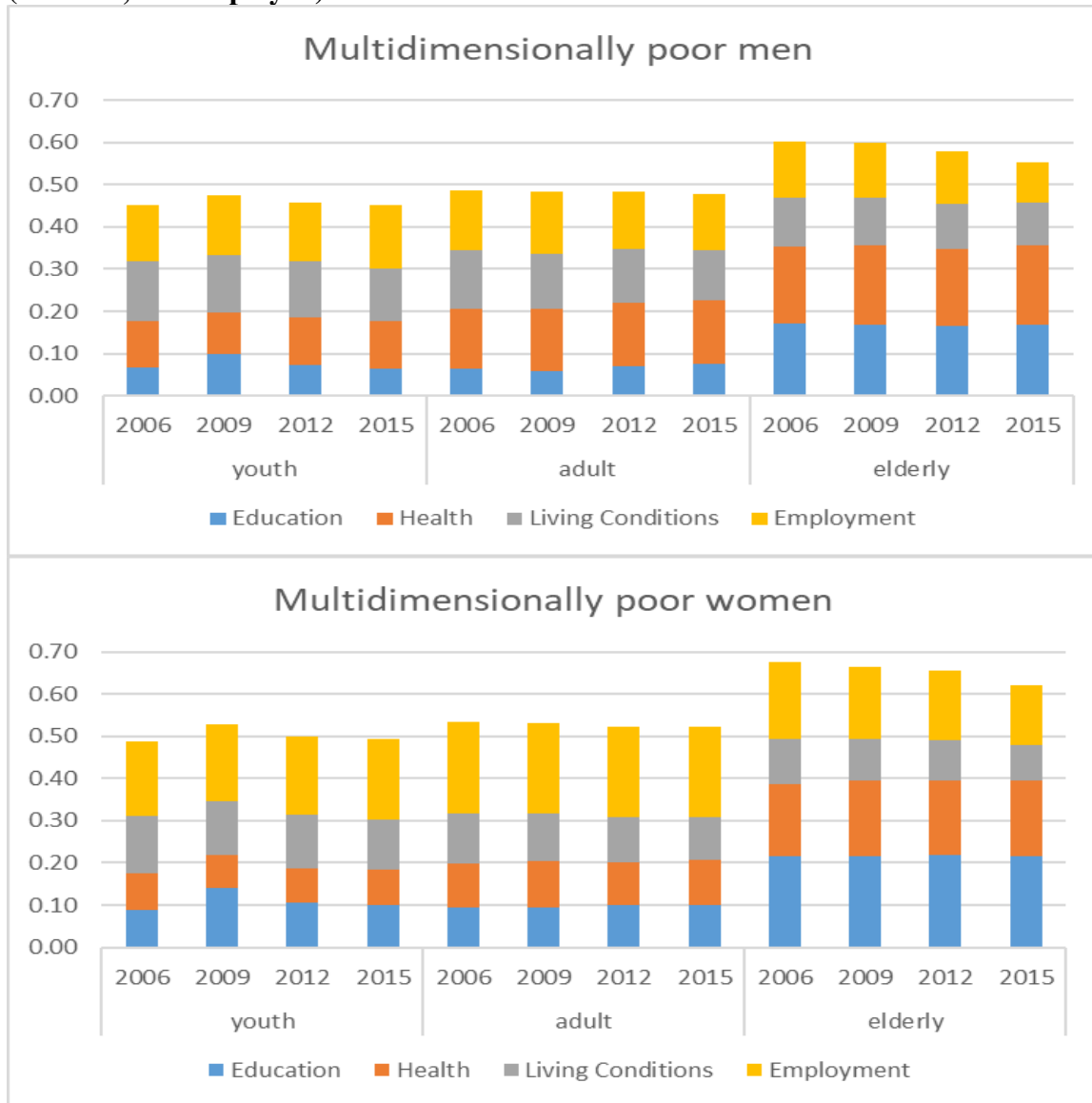


Figure 5: Multidimensional Poverty Rates by Regions (not-employed, $k \geq 0.25$)

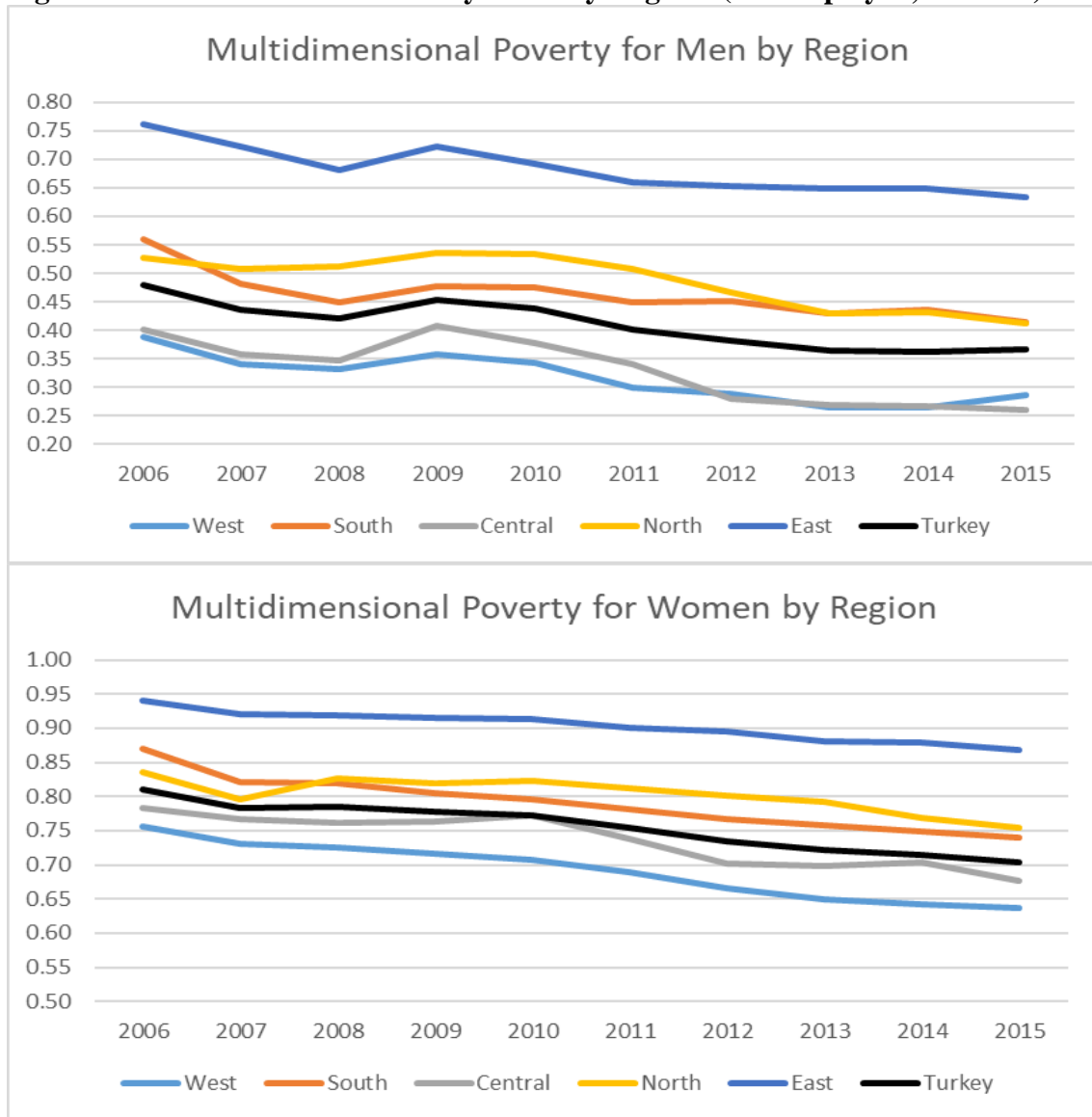


Figure 6: Household Composition by Members' Multidimensional Poverty Status

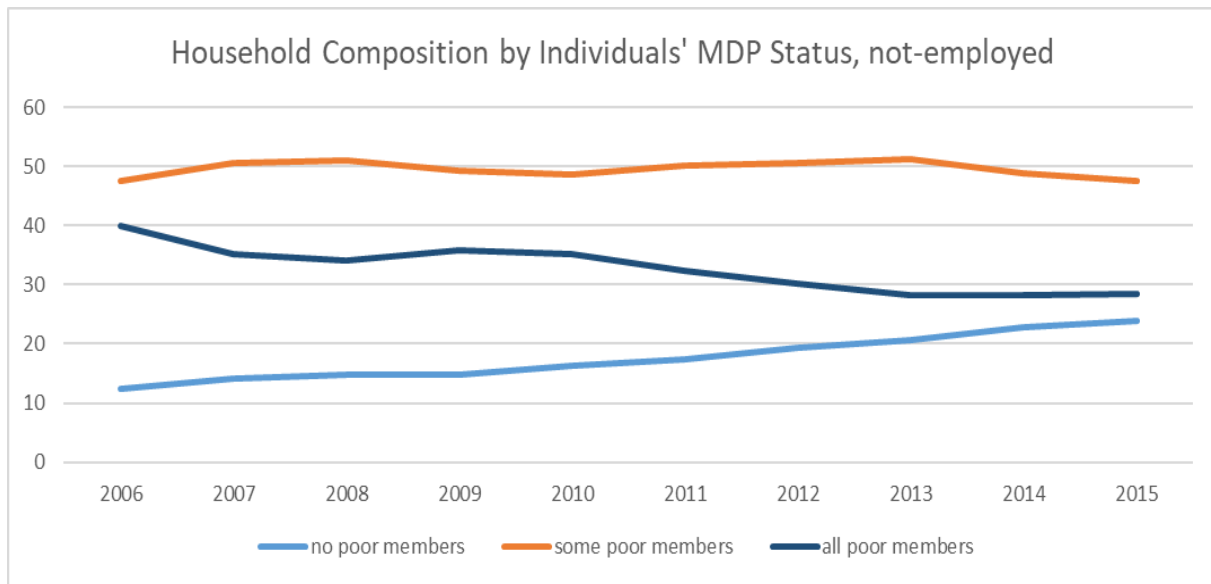
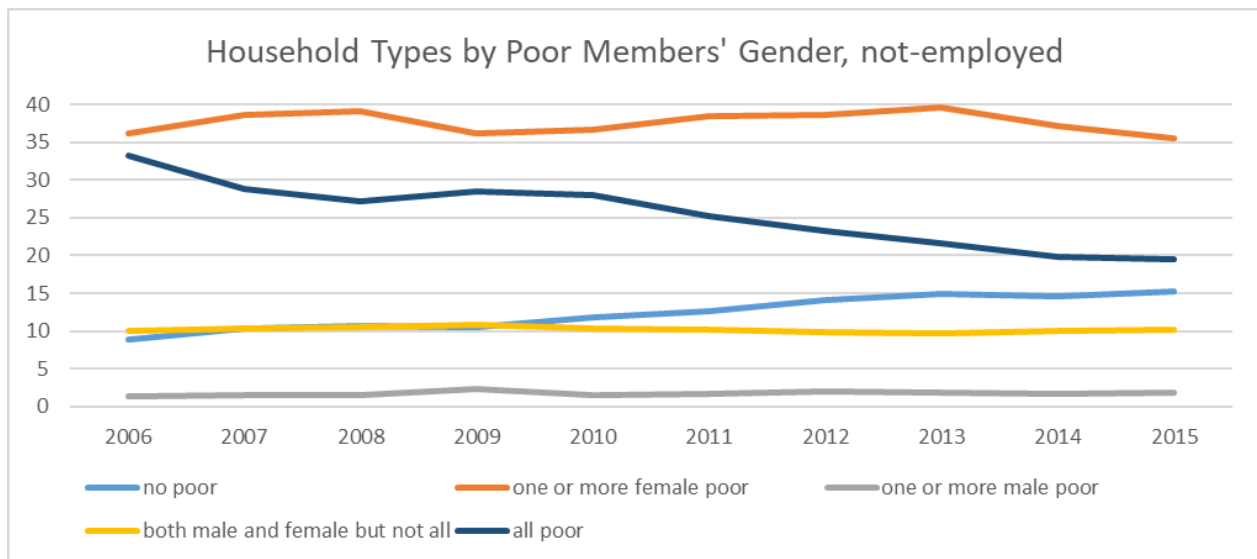


Figure 7: Household Composition by Members' Multidimensional Poverty Status (households with at least one male and one female member)



No poor: households where all men and women are non-poor; *one or more female poor*: households where at least one of the women is poor but none of the men; *one or more male poor*: households where at least one of the men is poor but none of the women; *both male and female but not all*: households where at least one of the women and one of the men are poor, with at least one non-poor member; *all poor*: households where all members are poor.

Appendix A: Alkire Foster Methodology

Below we present this methodology in matrix form. Y matrix depicts the data for four individuals, where the columns are per capita income, years of schooling, daily calorie intake, an indicator for having access to pensions through employment (1 for yes, 0 for no), and an indicator for having access to health insurance (1 for yes, 0 for no), respectively. z matrix shows individual cut-offs for each dimension: 1000 TL per capita, 8 years of schooling, 2100 calories per day, existence of pension and health insurance. G is the deprivation matrix that restates Y matrix with respect to the cut-off matrix (1 for below cut-off, 0 for being equal or above cut-off). In other words, in G matrix we can count the dimensions of deprivation. Finally, if the minimum number of dimensions for identifying multidimensional poverty is two (k=2), then G(k=2) matrix is the censored deprivation matrix where only multidimensionally poor persons are counted. In the example below, two out of four individuals are multidimensionally poor.

$$Y = \begin{bmatrix} 1800 & 11 & 2500 & 1 & 1 \\ 1500 & 5 & 2150 & 1 & 1 \\ 2000 & 8 & 3200 & 0 & 0 \\ 800 & 5 & 1800 & 0 & 1 \end{bmatrix}; \quad z = (1000 \quad 8 \quad 2100 \quad 1 \quad 1)$$

$$G = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 2 \\ 4 \end{bmatrix} \rightarrow G(k=2) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 2 \\ 4 \end{bmatrix}$$

As it is readily observable, different weights for each dimension can be easily incorporated within this method. For example, below we assign a weight of 30% to income, 30% to years of schooling, 10% to calorie intake, and 15% each to access to pensions and health insurance. Finally, we set k = 0.33 (current cut-off adopted by OPHI and UNDP). As can be seen, the same numerical example yields a different multidimensional poverty headcount: one out of four.

$$g = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix} * \begin{bmatrix} 0.3 \\ 0.3 \\ 0.1 \\ 0.15 \\ 0.15 \end{bmatrix} = \begin{bmatrix} 0 \\ 0.3 \\ 0.3 \\ 0.85 \end{bmatrix} \rightarrow g(k=0.33) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0.85 \end{bmatrix}$$

MPI measure can be decomposed into the product of (censored) headcount (H) and (censored) average poverty intensity of the poor (A): $MPI = H \cdot A$.

Finally, separate inequality is calculated very similar to variance of deprivation score between multidimensionally poor as proposed by Seth and Alkire (2014):

$$V^i(x) = \frac{\alpha}{q} \sum_{i=1}^q [x_i - A]^2$$

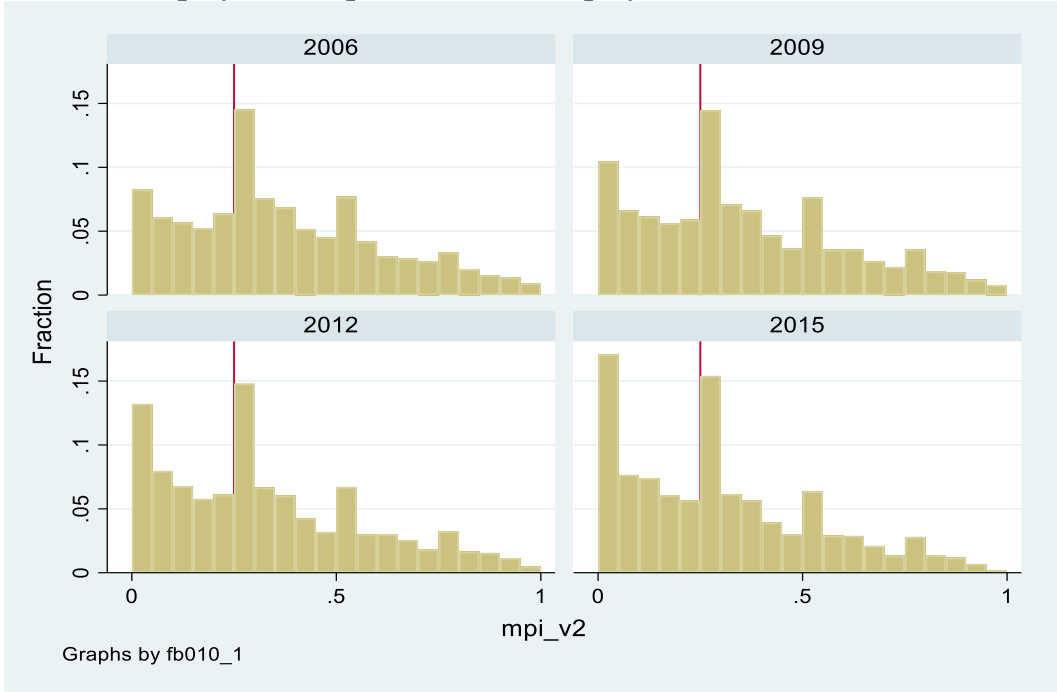
where q is the number of multidimensionally poor. The variance measure is multiplied by a constant to rescale it where maximum potential variance is equal to one. Seth and Alkire (2014) and Espinoza-Delgado & Klasen choose α as four, and we follow the convention.

Supplementary Materials

Distribution of Individual Deprivation Scores

Figure S1A presents the distribution of deprivation for selected years for our preferred MDP Index (*not employed*) and figure S1B presents the distribution of deprivation for *discouraged*. Both graph shows three spikes at around 0-0.05, 0.25-0.30 and 0.50-0.55 deprivation scores. Any person who is not deprived in any indicator or only one of living conditions indicators will fall into 0-0.05 bin. Any person who is deprived of education and any one of housing indicators will fall into 0.25-0.30 bin; and any person who is deprived of education, and one of employment or health indicators plus one of housing indicators will fall into 0.5-0.55 bin. Figure S2 presents the gender breakdown of deprivation distribution for 2015 which shows that 0-0.05 spike is mostly populated by men and 0.25-0.30 and 0.50-0.55 spikes are mostly populated by women. The vertical line at $k=0.25$ represents the poverty cut-off. Individuals with deprivation scores below the line are deemed non-poor and individuals on the line and above are deemed poor. Headcount poverty rate is the percentage of household at or above the red line. A close inspection of Figure 1 reveal that the distribution below the line gradually become more skewed towards zero.

Figure S1: Histogram of Deprivation Scores (Employment) for Selected Years
Panel A: Employment deprivation: not employed

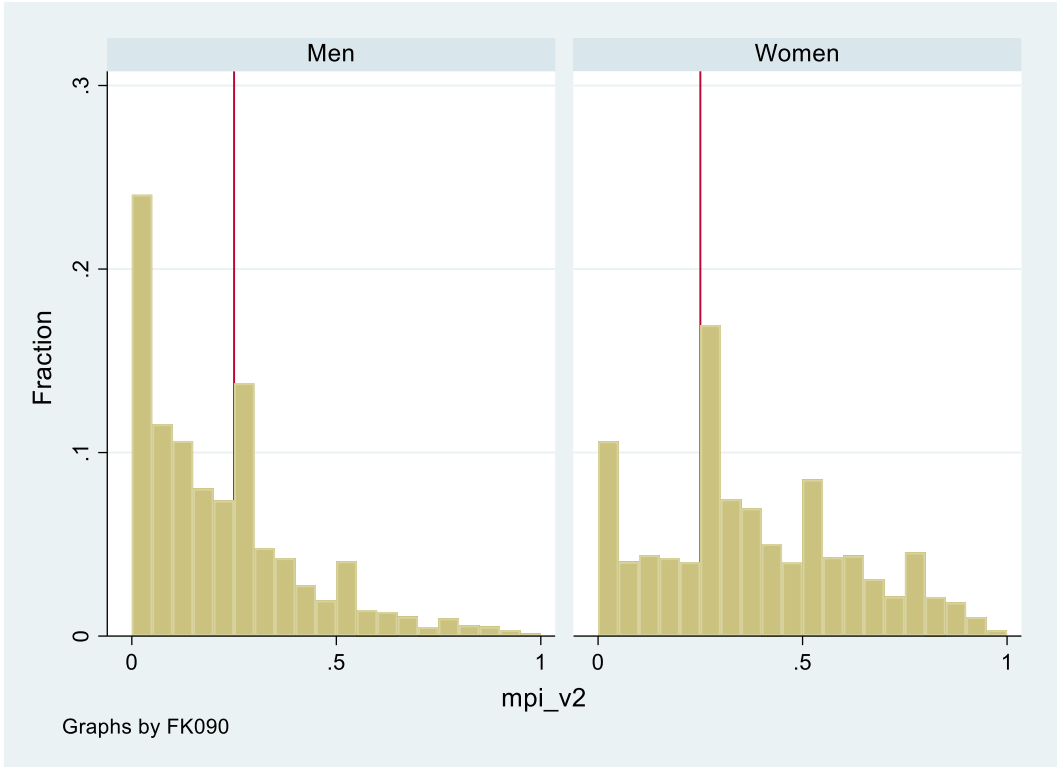


Panel 1B: Employment deprivation: discouraged unemployed



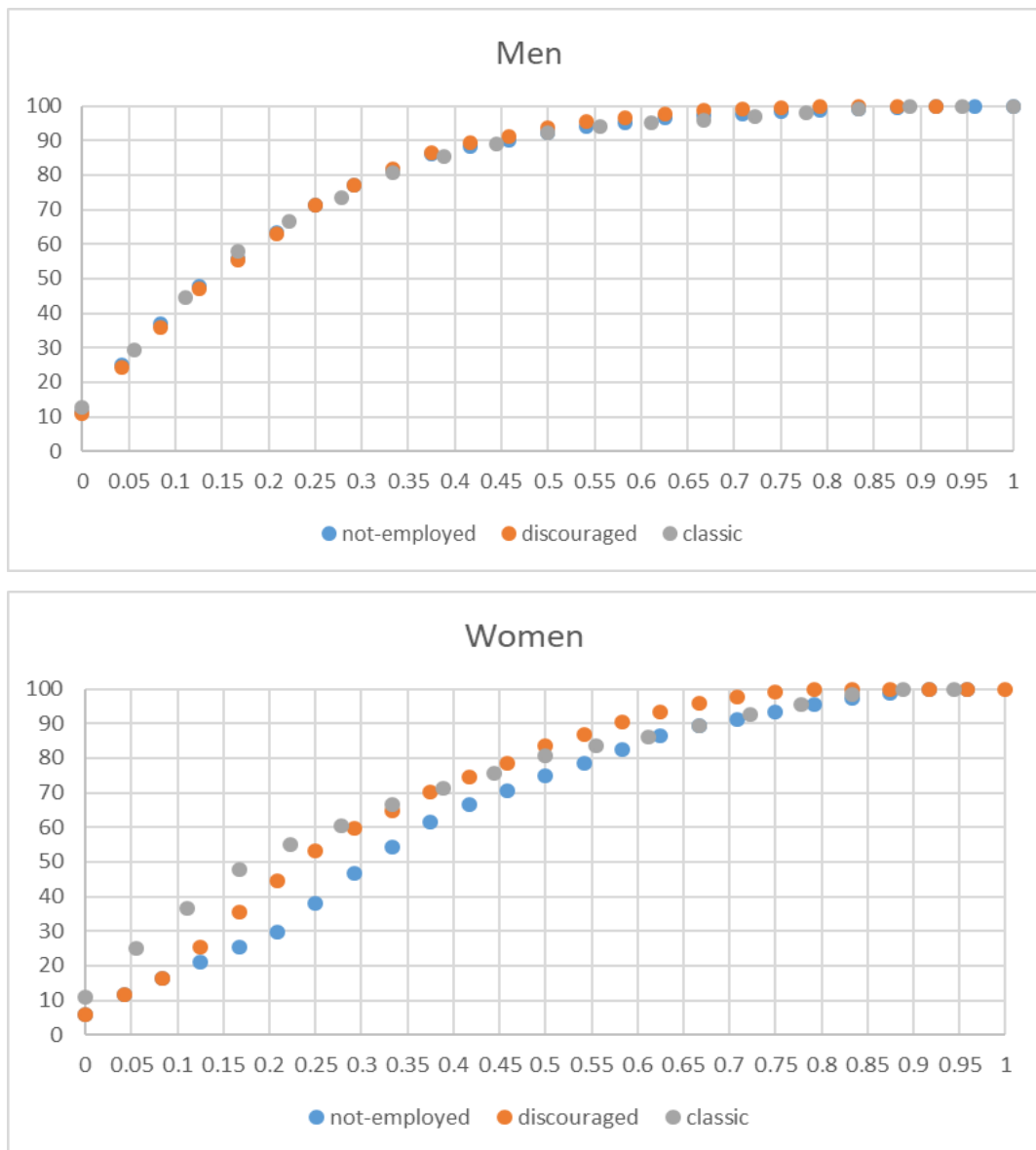
Vertical red line: Poverty cut-offs: $k \geq 0.25$

Figure S2: Histogram of Deprivation Scores (not-employed) for 2015 by Gender



Vertical red lines: Poverty cut-offs: $k \geq 0.25$

Figure S3: Cumulative Distribution of deprivation Scores, 2015



Decomposition of the Deprivation of Multidimensionally Poor

Table S1 presents each dimension's contribution to deprivation of poor. Over the years, contribution of living conditions to deprivation scores of multidimensionally poor have declined for poor individuals whereas contribution of health (especially *limited health* indicator as discussed above) and education dimensions increased to erase the gains in living conditions. Non-poor individuals also experienced gains in living conditions but almost all of these non-poor individuals completed compulsory education and they were able to enjoy good health (not shown here).

Poor individuals are two distinct groups: older poor individuals on average experienced improving living conditions but worsening health conditions. Younger poor individuals' improving living conditions are counter-balanced by their increasing education deprivation. Individuals born after September 1986 are subject to a higher compulsory education cut-off (eight instead of five years). Between 1997 and 2001 middle school enrolment rate has increased from roughly 60 to 90 percent (World Bank, 2016). The minority of students who dropped out of school before completing eight grade during this transition period (and beyond) are counted as education deprived. We further investigate multidimensional poverty by age and region in the following section.

Table S1: Dimensional Decomposition of Average Deprivation of Multidimensional Poor

All Individuals					
Dimensions	2006	2009	2012	2015	2015 - 2006
Education	0.08	0.08	0.08	0.08	0.006
Health	0.10	0.11	0.10	0.11	0.005
Living Conditions	0.12	0.11	0.10	0.10	-0.022
Employment	0.16	0.15	0.15	0.15	-0.005
	0.45	0.45	0.44	0.44	
Men					
Dimensions	2006	2009	2012	2015	2015 - 2006
Education	0.06	0.06	0.06	0.06	0.006
Health	0.12	0.12	0.13	0.13	0.011
Living Conditions	0.13	0.12	0.12	0.11	-0.021
Employment	0.10	0.10	0.10	0.09	-0.007
	0.41	0.41	0.40	0.40	
Women					
Dimensions	2006	2009	2012	2015	2015 - 2006
Education	0.09	0.10	0.09	0.09	0.004
Health	0.09	0.10	0.09	0.10	0.002
Living Conditions	0.11	0.10	0.10	0.09	-0.022
Employment	0.19	0.18	0.18	0.18	-0.006
	0.48	0.48	0.46	0.46	

World Bank Development Indicators (2016). <http://databank.worldbank.org/data/home.aspx>

Correlates of Multidimensional Deprivation Scores

First, third and fifth columns of Table S2 presents usual demographic variables (gender, age, region, household size, marital status) and time trend as independent variables for three alternative multidimensional poverty measures. Columns two, four and six presents additional interaction variables of age and region. The coefficient estimates show that women, people older than 65, and people living in Eastern regions are a lot more deprived than others. Average deprivation have declined over the years. Larger households are also more deprived as expected. Age and region interaction variables reveal that old people living in Northern and Eastern regions have especially high level of multidimensional deprivation. Another interesting observation is that most coefficient estimates are qualitatively similar across the three alternatives. The exception are coefficient estimates for women in *not employed* version. Coefficients estimates are significantly larger in the first two columns suggesting that women suffer more from employment deprivation even after controlling for all the usual demographic controls.

Table S2: OLS Regressions for Determinants of Deprivation Scores

Dependent variable	not employed		not employed		discouraged		discouraged		3D		3D	
Women	0.159	***	0.159	***	0.093	***	0.094	***	0.071	***	0.072	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
base: Young (15-24)												
Adult, 25-64	0.054	***	0.032	***	0.060	***	0.038	***	0.044	***	0.026	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Old, 65+	0.265	***	0.226	***	0.154	***	0.127	***	0.281	***	0.244	***
	(0.002)		(0.002)		(0.001)		(0.002)		(0.002)		(0.002)	
base: West												
South	0.064	***	0.049	***	0.059	***	0.045	***	0.065	***	0.052	***
	(0.001)		(0.002)		(0.001)		(0.002)		(0.001)		(0.002)	
Central	0.011	***	-0.001		0.006	***	-0.006	***	0.006	***	-0.008	***
	(0.001)		(0.002)		(0.001)		(0.001)		(0.001)		(0.002)	
North	0.056	***	0.014	***	0.060	***	0.018	***	0.072	***	0.026	***
	(0.001)		(0.002)		(0.001)		(0.002)		(0.001)		(0.002)	
East	0.146	***	0.110	***	0.131	***	0.099	***	0.153	***	0.128	***
	(0.001)		(0.002)		(0.001)		(0.001)		(0.001)		(0.002)	
base: married												
Single	-0.044	***	-0.044	***	-0.025	***	-0.025	***	-0.021	***	-0.021	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Widow	-0.004	**	-0.004	**	0.083	***	0.083	***	0.115	***	0.115	***
	(0.002)		(0.002)		(0.001)		(0.001)		(0.002)		(0.002)	

Divorced	-0.024	***	-0.022	***	0.013	***	0.015	***	0.013	***	0.014	***
	(0.002)		(0.002)		(0.002)		(0.002)		(0.002)		(0.002)	
Separated	0.058	***	0.057	***	0.059	***	0.059	***	0.066	***	0.066	***
	(0.005)		(0.005)		(0.005)		(0.005)		(0.006)		(0.006)	
OECD scale	0.054	***	0.054	***	0.049	***	0.049	***	0.059	***	0.059	***
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
base 2006												
2007	-0.021	***	-0.021	***	-0.019	***	-0.019	***	-0.020	***	-0.020	***
	(0.002)		(0.002)		(0.001)		(0.001)		(0.002)		(0.002)	
2008	-0.027	***	-0.027	***	-0.026	***	-0.026	***	-0.027	***	-0.027	***
	(0.002)		(0.002)		(0.001)		(0.001)		(0.002)		(0.002)	
2009	-0.013	***	-0.013	***	-0.010	***	-0.010	***	-0.011	***	-0.011	***
	(0.002)		(0.002)		(0.001)		(0.001)		(0.002)		(0.002)	
2010	-0.021	***	-0.022	***	-0.017	***	-0.017	***	-0.018	***	-0.018	***
	(0.002)		(0.002)		(0.001)		(0.001)		(0.002)		(0.002)	
2011	-0.036	***	-0.036	***	-0.033	***	-0.033	***	-0.033	***	-0.033	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.002)		(0.002)	
2012	-0.044	***	-0.044	***	-0.040	***	-0.040	***	-0.039	***	-0.039	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.002)		(0.002)	
2013	-0.055	***	-0.055	***	-0.050	***	-0.050	***	-0.052	***	-0.052	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
2014	-0.063	***	-0.063	***	-0.060	***	-0.060	***	-0.059	***	-0.060	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
2015	-0.069	***	-0.069	***	-0.064	***	-0.064	***	-0.062	***	-0.062	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
base: Young and West												
Adult & South			0.013	***			0.014	***			0.010	***
			(0.002)				(0.002)				(0.002)	
Adult & Central			0.014	***			0.013	***			0.014	***
			(0.002)				(0.002)				(0.002)	
Adult & North			0.042	***			0.046	***			0.047	***
			(0.002)				(0.002)				(0.002)	
Adult & East			0.044	***			0.043	***			0.031	***
			(0.002)				(0.002)				(0.002)	
Old & South			0.054	***			0.036	***			0.054	***
			(0.004)				(0.003)				(0.004)	
Old & Central			0.019	***			0.026	***			0.036	***
			(0.004)				(0.003)				(0.004)	
Old & North			0.094	***			0.073	***			0.097	***
			(0.004)				(0.003)				(0.004)	
Old & East			0.066	***			0.029	***			0.049	***
			(0.003)				(0.003)				(0.003)	
constant	-0.113	***	-0.094	***	-0.039	***	-0.022	***	-0.040	***	-0.024	***

	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
R-squared	0.346	0.348	0.276	0.278	0.310	0.311
N	418,870	418,870	418,870	418,870	418,870	418,870

Robust standard errors are in parenthesis. ***: 0.01; **: 0.05; *: 0.1 significance level.

Intra-Household Poverty Inequality

Table S3 presents the ordered logit estimates for transitions between three categories: no poor, some poor and all poor households. After controlling for household size, various demographic characteristics of household heads, and region and year effects; we observe that household living standards deprivation score has the largest effect on transitioning from all poor to some poor and from some poor to no poor sub-groups followed by health deprivation score.

Table S3: Ordered Logit Estimates for Household Types

Three category dependent variable: no poor (0), some poor (1), all poor (2)

	demographics	deprivations	all variables
Women	0.372 *** (0.028)		0.681 *** (0.034)
base: youth (15-24)			
Adult, 25-64	0.147 *** (0.040)		0.037 (0.050)
Old, 65+	1.696 *** (0.044)		0.670 *** (0.055)
base: West			
South	0.584 *** (0.017)		0.150 *** (0.022)
Central	0.17 *** (0.014)		0.094 *** (0.018)
North	0.572 *** (0.016)		0.146 *** (0.021)
East	1.208 *** (0.014)		0.337 *** (0.019)
base married			
Single	-1.138 *** (0.045)		-0.302 *** (0.058)
Widow	0.325 *** (0.035)		0.938 *** (0.044)

Divorced	-0.503 ***		0.157 **
	(0.053)		(0.063)
Separated	0.369 ***		0.657 ***
	(0.103)		(0.145)
household size, OECD scale	0.386 ***		-0.002
	(0.008)		(0.010)
base 2006			
2007	-0.184 ***		-0.026
	(0.027)		(0.034)
2008	-0.27 ***		-0.109 ***
	(0.026)		(0.034)
2009	-0.191 ***		-0.120 ***
	(0.026)		(0.034)
2010	-0.282 ***		-0.176 ***
	(0.026)		(0.034)
2011	-0.415 ***		-0.237 ***
	(0.025)		(0.032)
2012	-0.532 ***		-0.318 ***
	(0.024)		(0.031)
2013	-0.624 ***		-0.311 ***
	(0.024)		(0.030)
2014	-0.694 ***		-0.307 ***
	(0.023)		(0.030)
2015	-0.739 ***		-0.31 ***
	(0.023)		(0.030)
average education deprivation of females		1.798 ***	1.514 ***
		(0.019)	(0.020)
average health deprivation of females		3.739 ***	3.542 ***
		(0.024)	(0.024)
average living standards deprivation		4.801 ***	5.061 ***
		(0.034)	(0.037)
average employment deprivation of females		2.561 ***	3.082 ***
		(0.019)	(0.020)
cut-off one	-0.24 ***	1.733 ***	2.776 ***
	(0.060)	(0.017)	(0.077)
cut-off two	2.28 ***	6.14 ***	7.381 ***
	(0.060)	(0.027)	(0.080)
N	154,744	149,883	149,723
Pseudo R-Squared	0.095	0.405	0.428

We use only average deprivation scores of women in the household to multi-collinearity with men's deprivation scores. OECD Scale: 1 for first adult, 0.5 for each additional adult; 0.3 for each child (younger than 14). Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.