

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

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Hasan Tekgüç (Kadir Has University)*

Bengi Akbulut (Concordia University)†

Abstract: Income or expenditure data are collected at household level and are silent about within household inequalities. Moreover, income is a means to an end. As an alternative, Amartya Sen's capabilities approach is operationalized as multidimensional poverty index with *counting-based double cut-off* method. With this method, valued functionings [dimensions] such as being educated, healthy, decent household living conditions are measured separately and a deprivation score for each household is calculated based on pre-determined weights of each dimension. Households whose deprivation scores are above a pre-determined threshold are deemed multidimensionally poor. *Counting-based double cut-off* method is actually flexible enough to incorporate individual level data if available. 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. We employ individual level data for the first three dimensions and hence we shed light on within household inequalities in deprivation. Unlike most of the earlier studies, we choose employment as the fourth dimension i) to highlight the gender differences in a patriarchal society ii) to participate in a hotly debated policy issue of low level female labor force participation over the past decade in Turkey. First, we find improvement in household's living conditions across the board. Second, including employment as a fourth dimension increases the gender gap in poverty from 8 percent to 33 percent in the study period. Third, including employment leads to a faster drop in gender poverty gap because increase in female labor force participation outpaced men in the study period. Finally, we find almost no change in average deprivation score of poor individuals. For multidimensionally poor households, on average, gains in living conditions are erased either by their worsening health (for older individuals) or by lack of completion of compulsory education (for younger individuals).

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* Corresponding author, Associate Prof. of Economics, hasan.tekguc@khas.edu.tr.

† Assistant Prof. of Geography, Planning and Environment, bengi.akbulut@concordia.ca.

INTRODUCTION

Income-based poverty measures have long been criticized as poor measures of quality of life (see Nussbaum, 2003 and Sen, 1999, among others). Neither income per capita nor GDP growth shed light on the condition of the deprived within a given society. The use of subjective measures (e.g. utility) in measuring well-being has also been criticized, due to the fact that people exhibit *adaptive preferences*, i.e. poor/marginalized people adapt their preferences in a way that reflect their lower status (Sen, 1999). Instead of utility and access to resources (e.g. income), Amartya Sen has famously proposed the capabilities approach, which has been adopted by the UNDP in its Human Development Reports. As summarized by Nussbaum (2003: 33) the *capabilities* approach focuses on “what people are actually able to do and to be.” In other words, the goal of human betterment is to expand the individuals’ freedom to pursue what they deem desirable, instead of attaining a certain level of an accomplishment (e.g. income). According to the capabilities approach, a person is deprived if she does not have the capability to achieve the outcome she desires.

Human Development Index measures the capabilities of groups. Millennium and Sustainable Development Goals have a similar structure: they specify targets in different dimensions (health, education, gender equality etc.). Multidimensional poverty index (MPI), is the corollary to measure the well-being at individual level with the important difference that unlike group averages we can observe joint deprivation at individual level. The most popular version of MPI was introduced in the 2010 Human Development Report with the collaboration of Oxford Poverty & Human Development Initiative (OPHI) in a comprehensive manner.¹ Each dimension of MPI can incorporate a range of indicators to capture the complexity of poverty and better inform policies to relieve it. Moreover, it offers the flexibility of including different indicators that can be chosen as appropriate to a given society and situation. For example, while being educated can be measured solely by whether a person has completed compulsory education, having shelter is generally measured by a combination of indicators including availability of piped water, connection to electrical grid and sewage system, etc. The initial MPI studies by scholars at OPHI focused on least developed countries and employ Demographic and Health Surveys (DHS) as consistent data sources across these countries. Given the scope of data in DHS, they construct three

¹ Alkire and Foster (2011a, 2011b) presents the detailed methodology and address the potential misconceptions.

dimensional poverty index: poor health, lack of education, inadequate shelter living conditions at the household level. In order to create a score for each household, these studies employ the *counting-based double cut-off* method (explained in methodology section).

There are two major criticisms of MPI country reports by OPHI researchers: ignorance of within household inequality and one-size fits all approach in the choice of indicators for all countries. Klasen and Lohti (2016) points out *counting-based double cut-off* method can incorporate individual level data, there is no need to impose household scores to everybody within the household (especially for health and education). They employ *counting-based double cut-off* method, except they use individual data when available for India. They show that using individual data yields considerably higher multidimensional poverty levels for women and older people, and especially older women, compared to the results when same household deprivation level is assigned to all household members.

Suppa (2015) advocates for a society-tailored multidimensional poverty index to evaluate policy measures more carefully and to better understand both poverty structure and dynamics in the said society. Hence he implements *counting-based double cut-off* for Germany with additional dimensions for employment, social participation, and material deprivation. Suppa (2015: 13) proposes to include the employment-related dimension, not because of its contribution to material well-being but rather because of its contribution to the often ignored functionings such as *self-respect, practical reason and appearing in public without shame*.

In this study we also use *counting-based double cut-off* method and employ Survey of Income and Living Conditions (SILC) 2006-2015 for Turkey provided by Turkish Statistical Institute (TURKSTAT, 2016). SILC data set allow us to observe education, self-reported health status and employment at individual level. So, we follow Suppa (2015) and Klasen and Lohti (2016) and perform our analysis at the individual level where possible. In other words, for education, health and employment we perform our analysis at individual level and for living conditions at household level (i.e. each member of the household get the same score). Like Suppa (2015), we include employment as a dimension of well-being. We also focus on employment because one of the most contentious issue of the last decade in Turkey is the role of women in public life. On the one hand there is an ongoing battle between conservatives/Islamist and others about whether if women belong to labor force. On the other hand, Erdoğan governments from time

to time implements policies to encourage female wage employment (Uysal, 2013). By including employment dimension to MPI, we can incorporate this very public and crucial focal point of disagreement and policy to our analysis.

Additionally, we define *not-employed* instead of *unemployed* as deprived. Women's official unemployment rate is higher than men in Turkey. However, this is due to much lower labor force participation of women in Turkey (70 percent for men and 30 percent for women, see table 1). Actually, the number of unemployed men is more than unemployed women. Moreover, female unemployment rate increases with education. This is the result of the fact that better educated women are more attached to labor force and they continue job search for longer periods. In an all-encompassing analysis (i.e. not only labor force participants), defining deprivation based on unemployment will result in men and better educated women being more deprived than less educated women because they are more attached to labor market. Instead, in our main measure we define being not-employed as being deprived after taking into account already retired and students. Specifically, if one is between the ages of 15 and 64, not a student, not retired and not employed than that person is classified as deprived in employment dimension (65 and older are assumed non-deprived in employment). In our sample, most of the not-employed men are the unemployed, followed by the disabled. For women, overwhelming majority of not-employed are housewives. If the person is informally employed than we assigned him/her half of deprivation score. We also present two more MPI. In one, we replace the not-employed with a redefined unemployment measure: we redefine unemployed to include discouraged unemployed (not looking for job but ready to work). In another, we follow Klasen and Lohti (2016) and present three dimensional poverty index, excluding employment dimension.

We have six major findings. First, there is persistent and widespread improvement in living conditions for almost every sub-group (male-headed, female-headed, poor, non-poor, young or old; poorer regions improved more). This finding is robust to alternative indicators of living conditions.

Second, there is persistent gender gap (roughly eight percent higher headcount multidimensional poverty for women) even without including employment dimension. This gender poverty gap is mostly the result of education gap and to some extent worse self-reported health of women. On average there is no gender gap in terms of living conditions. Single mothers are very rare in Turkey, and most women live in male-headed households. Female headed households are a

minority (albeit increasing) and their living conditions are slightly better than male-headed households.

Third, including employment dimension increases both average deprivation score and also significantly increases the headcount poverty rate, especially for women as expected. Defining employment deprivation either as not-employed or discouraged unemployed yields similar results for men but very dissimilar results for women. Presumably, great majority of women identifying themselves as housewives with care responsibilities cannot entertain job offers in short notice. Including employment dimension increases gender gap for headcount poverty, on average, to 33 percent (60 and 27 percent headcount multidimensional poverty, respectively for women and men).

Fourth, inclusion of employment dimension not only resulted in higher level of headcount poverty but also resulted in faster drop in gender poverty gap during the study period. This drop is the result of both i) the increase in female labor force participation and ii) the faster increase among young women continuing their education beyond compulsory education (especially at tertiary level). The pace of narrowing of gender gap is dampened by faster increase in formal employment for men.

Fifth, the average deprivation score for the poor stayed roughly the same. On the one hand, non-poor individuals enjoyed improvements in their employment, and living conditions dimensions and no major change in health and education dimensions. On the other hand, poor individuals also experienced gains in living conditions but these gains are countered by either worsening health conditions (older poor individuals) or increasing education deprivation (younger poor individuals).

Finally, we show that there is a significant non-overlap between the income poor and multidimensionally poor throughout the period. Even in our most conservative estimates, we identify one-fourth of non-income poor as multidimensionally poor. On the other hand, almost half of income poor are not multidimensionally poor.

The rest of the paper is organized as follows. In the next section, we succinctly discuss the capabilities approach, the development and controversies of multidimensional poverty index and summarize the applied literature for Turkey. In Methodology and Data Section we briefly present counting-based double cut-off method, introduce the SILC Turkey data set and define the indicators

that we use in the empirical analyses. Next, we present our findings. We conclude the paper by discussing policy implications of our findings.

LITERATURE REVIEW

Capabilities Approach

The capabilities approach has been widely elaborated on and operationalized within the context of development economics in general, and of the study of poverty in particular. It also forms the building block of the conceptual basis of the MPI. The capabilities approach not only reveals the shortcomings of poverty measures exclusively based on income, but also establishes a conceptual ground for alternative –expanded— measures of poverty that can more adequately account for the conditions of deprivation of the poor. In that sense, it provides the theoretical underpinning of the MPI as well as a forceful justification to move towards multidimensional measures of poverty.

The obvious shortcoming of the capabilities approach, however, is that capabilities themselves cannot be measured. Thus, Amartya Sen further elaborates the concept as having two components: functionings and freedoms to achieve valued functionings (Sen, 1992). Functionings are “beings and doings”, states and activities that are constitutive of a persons’ well-being (e.g. being educated, being well-nourished, having shelter). While measuring capabilities is not feasible, functionings can be represented and measured by one (or a number of) specific indicator(s). In multidimensional poverty analysis functionings are dimensions.

Sen has notoriously rejected providing a list of substantive capabilities (Nussbaum, 2003). He argues that such a definitive list generated by social justice theorists could stifle democratic debate and would be closed to the constant evolution of social values (Sen, 2004). Moreover, he indicates that a modified set of functionings, depending on the specific goal and limitations of each exercise, is a reasonable compromise. He points out when specific capabilities were being determined for the first Human Development Report in 1989, only three functionings with very rough indicators were settled upon, because the aim was to generate an index for all countries by using the already existing data (Sen, 2004).

Multidimensional Poverty Index (MPI)

Multidimensional poverty indices had gone through several methodologies since early 1990s when they emerged as an alternative to income-based measures. Early researchers within this vein devised mainly two competing approaches to determine the state of poverty: Intersection vs Union. According to the former, a person is considered multidimensionally poor if she is poor according to all dimensions included in the analysis. According the latter, on the other hand, a person is considered poor if she is deprived in any one of the included dimensions (Bourguignon and Chakravarty, 2003). In contrast, the dashboard approach to multidimensional poverty, which was later developed and best exemplified within the Millennium Development Goals, reports the percentage of people deprived in various dimensions.

When applied to middle income countries, the intersection approach generally yields poverty rates that are almost zero, while the Union approach results in estimates of the majority of the population being poor. Both conclusions are grossly counterintuitive for these countries (Muller et al., 2016: 7).

Currently, the most commonly used method of multidimensional poverty analysis is the *counting based double cut-off* method developed by Alkire and Foster (2011a). 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. The notable advantage of this method is that contrary to dashboard approaches, it identifies people with “joint disadvantages” (Alkire and Santos, 2014: 252). UNDP also adopted the MPI method developed by Alkire and Foster (2011a) in its estimates for less developed countries.

Apart from the actual methodology of determining one’s poverty status, the choice of dimensions to be included within the index (as well as of the indicators representing each dimension) and the specific weighting of the dimensions are the two main fields of debate within the literature. This is mostly due to the relative absence of a strictly defined theoretical background, to which multidimensional poverty measures (the dimensions and the indicators to be included, the weights to be assigned) can be anchored. A significant consequence of this absence has been the indulgence of 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. More specifically, he argues that the following questions should be taken into account while determining the dimensions and indicators:

i) Does the task entail identifying general trends across countries and assessing countries' relative performance in alleviating poverty?

ii) Is there a need for a society-tailored poverty index to evaluate policy measures more carefully and to better understand both poverty structure and dynamics in the said society?

In most applications of the MPI, dimensions include health, education and living standards (for example, see UNDP country reports). To recall, health and education are core functionings within the capabilities approach, necessary for human beings to participate in society and cannot be fully substituted by income. Living standards are also a central capability for leading a decent life. Furthermore, 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 the second field of debate within the MPI literature. An overwhelming majority of the MPI studies assigns equal weights to different dimensions and to each indicator within a given dimension (number of indicators may change in each dimension)². In other words, data-driven methods (such as the Principal Component Analysis) to assign weights to dimensions/indicators are not preferred, precisely because such methods re-introduce the black-box trickery that MPI exercises (especially counting based double cut-off method) aim to avoid. However, as a result of equal weighting, if one or more of indicators are proxy for similar functionings than these similar indicators inadvertently cause double counting of those functionings. In this vein, the most controversial indicators are those related to income/expenditure.

The choice and number of dimensions and the weight attached to each dimension are interdependent issues. On the one hand, Ferreira and Lugo (2012) criticizes studies that are crowded with indicators measuring different aspects of material well-being, especially when

² 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.

domestic markets for goods and services are reasonably functioning. They suggest that MPI should be limited to health, education and income dimensions. If the markets for goods and services are reasonably functioning, undernourishment and dwelling conditions would be different functions of low income. Including these into an MPI measure as separate dimensions would only serve to increase the weight of material deprivations at the expense of truly public goods, health and education, rather than capturing additional dimensions of poverty. Including different material deprivations together with or in addition to income is only justified when remote or rural areas are not well integrated to domestic markets and prices vary significantly within a country, or when remote regions or slums do not have access to electricity, sewage or piped water systems.

Suppa (2015) voices a similar criticism, but proposes to exclude income while keeping dwelling conditions as dimensions of MPI because income is a means to an end whereas material deprivations are more “closely linked to specific functionings” (Suppa, 2015: 22). Moreover, he points out that even though employment is a source of income, it is also a widely-mentioned functioning in the theoretical literature due to its well-established effect on self-worth as well as its role as a source of income (Suppa, 2015).

On the issue of dimensions and weights, this paper most closely follows Suppa (2015). We develop three alternative MPI. One of them include only three dimensions as UNDP Country Reports (education, health and living conditions). The other two alternative MPI include a fourth dimension, employment. In one alternative we define individuals as deprived if they are unemployed (including discouraged unemployed who give up job search). In the third one we define not-employed as employment deprived. As we explained in Introduction section, we believe the third MPI measure is the most suitable to highlight gender differences in Turkey.³

³ Unlike Suppa (2015), we do not include material deprivation and 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. Moreover, we include some of the material deprivation indicators proposed by Suppa (2015) to living conditions or employment dimensions.

MPI Studies on Turkey

There are two strand of studies of MPI on Turkey: We have already mentioned the UNDP study prepared by OPHI researchers (Alkire et al., 2011), which also includes an MPI measure developed for Turkey. This study employs a relatively old dataset (from 2003); 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).

Limanlı (2017) employ OPHI-UNDP methodology for Turkey for a more recent period (2006-2012). The paper also provides a detailed regional breakdown of multidimensional poverty. Similar to OPHI-UNDP, he employs only household level indicators, including for education and health. Paper provides two alternative list of dimensions: health and education is common in both, the first one income (per capita income less than 60 percent of median is defined as deprived), time (missing a health appointment due to lack of time), environmental problems (crime and pollution). The second measure replace income, time, environmental problems with household conditions. According to the first measure headcount poverty declined from 44 to 36 percent between 2006 and 2012 (intensity of poverty is 37-38 percent). According to the second measure headcount poverty declined from 53 to 43 percent between 2006 and 2011 (intensity of poverty is 55-52 percent). Istanbul and Western Anatolia (including Ankara) are the least poor regions and three eastern regions are markedly poorer than the rest of the country. There is no difference between multidimensionally poor status by gender, probably because all measures are at the household level and age and multidimensional poverty has an inverted-U shaped relationship which means middle aged households are most deprived, *ceteris paribus*.

Karadağ and Saraçoğlu (2015) employ Alkire et al. (2014) methodology and indicators to construct a comparable measure for Turkey to EU member countries (plus Iceland, Norway and Switzerland). Alkire et al. (2014) develop their *experimental* MPI measures for European countries taking into account for the fact that overall level of welfare is much higher in Europe compare to less developed countries that original OPHI-UNDP MPI developed for. This experimental measures present three experimental measures with health, education, environment (what we call living standards) and EU2020 dimension. EU2020 dimension is composed of indicators defined in EU 2020 strategy document. It has three indicators: per capita household income less than 60 % of median; quasi-joblessness (less than two months of employment of available adults) and severe

material deprivation. All three alternative measures include same indicators with varying weights. In the first MPI measure the EU2020 dimension has 25 percent weight, in the second one 40 percent and the third measure at 50 percent. The overall cut-off for the first measure is $k = 0.26$; the second measure is $k=0.21$, and the third measure is $k=0.34$. Karadağ and Saraçoğlu adapt first and third measure for Turkey. Health and Education dimensions are determined at individual level and environment and material deprivation dimensions are determined at household level.

Karadağ and Saraçoğlu (2015) also employ SILC data (2006-2012) and find a sustained decline in the multidimensionally poor in Turkey during the study period (from 43 to 35 percent in the first measure and from 33 to 26 percent in the third measure). Interestingly, the intensity of poverty of the multidimensionally poor did not change over the study period. Unsurprisingly, Turkey has the highest multidimensional poverty rate in Europe except for Portugal for the first measure in 2012.⁴ Karadağ and Saracoğlu (2015) do not report breakdown of their findings by age or gender. Uğur (2016) also reproduces Alkire et al. (2014) for Turkey for the year 2013 (SILC data) and he reports gender and age breakdown. Women are more multidimensionally poor and there is a U-shaped relationship between age and multidimensional poverty.

The second strand is the work of Zambak and Çağatay (2013), who develop the MPI for two provinces in Turkey, Mersin and Erzurum. They follow the AF-MPI methodology as well, but unlike the UNDP study they use 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). Zambak and Çağatay (2013) also pay special attention to the relatively over-looked dimensions of poverty, such as empowerment (7 indicators) and social exclusion (20 indicators). Unfortunately, the unusual sampling choices of the authors render the study unrepresentative. More specifically, the study (i) samples only urban households; (ii) includes only the households headed by employed persons; (iii) samples equally from households in each socio-economic status defined by the Association of Marketing Research Firms (TUAD), despite the fact that there are wide disparities between the size of different status categories (TUAD, 2012) and (iv) merges the dataset with no weighting of samples from different provinces, despite the fact that the sampling

⁴ This is an apples-to-oranges comparison because Portuguese high multidimensional poverty is driven by education deprivation. Portuguese compulsory education is up to the age of 15 whereas for Turkey Karadağ and Saracoğlu adapts primary school completion as cut-off for Turkey (five years of schooling).

population in Mersin is twice as much as that in Erzurum (Zanbak and Çağatay, 2013: 84-86). The main finding of the study is that there are no households identified to be deprived in more than 4 dimensions (out of eight). This, however, is likely to have been driven by the sampling choices of the authors, which have probably resulted in the over-representation of higher status and higher income households within the selected sample.

METHODOLOGY AND DATA

Counting-based double cut-off method

We employ the Alkire and Foster (2011a)'s methodology, but we also take into account the criticism raised by Klasen and Lohti (2016) to them, i.e., individual data will be used when available. Alkire and Foster (2011a) introduce an intuitive two-step approach for identifying the poor. At the first step, if a person is deprived or not is determined for every dimension (e.g. if the age-specific compulsory education is completed or not). The second step uses a simple counting approach, where a person must be poor in a minimum number of k dimensions in order to be identified as multidimensionally poor. This method is easily generalizable to cases where dimensions have different weights and applicable even when most of the data is ordinal or categorical in character (Alkire and Foster, 2011b). The method also prioritizes persons who have multiple deprivations over those who are deeply suffering in one or two dimensions only (Alkire and Foster, 2011a: 477).

Datt (2018) points out several major shortcomings of Alkire and Foster methodology: i) Just like headcount income poverty measure, it also violates transfer principle; i.e. a regressive transfer from very poor to less poor can reduce the multidimensional poverty. ii) It ignores the deprivations of the non-poor. iii) It treats multiple deprivations as sum of their parts, ignoring the potentially mutually reinforcing mechanisms between multiple deprivations (i.e. the poverty traps). He proposes to solve these problems with distribution sensitive measures: a) adapting union approach instead of an overall cut-off (a person is defined as multi-dimensionally poor if she is deprived in any indicator), b) taking into account the poverty gap for each indicator ($\alpha > 0$ in his formulation) and c) and squaring the poverty score for each individual to emphasize the poverty traps. In his empirical application, he shows that Alkire and Foster methodology significantly

under-states multidimensional poverty in most deprived regions of India (Bihar compare to Kerala). In this study, we did not adapt Datt (2018) methodology because combining our chosen indicators with union approach result in very high levels of multidimensional poverty (more than 80 percent for any year) in Turkey and the additional steps and extra calculations robes the counting based double cut-off approach its simplicity and intuitive appeal. Nevertheless, in figure 1 we present the overall distribution of poverty scores (zero poverty score mean non-poor in union approach) and in figure 3 we present the average poverty scores for all sample, including the non-poor. Both figures show a sustained increase in non-poor and decline in average deprivation over the study period.

Below we present this methodology in matrix form. Accordingly, 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.

$$Y = \begin{bmatrix} 1800 & 11 & 2500 & 1 & 1 \\ 1500 & 5 & 2150 & 1 & 1 \\ 2000 & 8 & 3200 & 0 & 0 \\ 800 & 5 & 1800 & 0 & 1 \end{bmatrix}$$

$$z = (1000 \ 8 \ 2100 \ 1 \ 1)$$

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

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 rate of multidimensional poverty: one out of four.

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

Finally, MPI measure can be decomposed into the product of (censored) headcount (H) and (censored) average poverty intensity (A):

$$MPI = H * A$$

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). In particular, substantial gender inequalities in intra-household sharing of resources are well-documented in the feminist economics literature, especially for South Asia and Middle East. An especially vexing problem in income poverty literature has been what to do about household level public goods. The MPI methodology allows for individual-level observations to be included for some of dimensions such as education and health. Many of the existing studies, however, do not take this into account and consequently assign all members of the household the same deprivation even if only one person within the household is in fact deprived. For example, if the male child in the household is attending compulsory education and the female child is not, the Alkire and Foster (2011a) methodology consider all members of the household to be deprived in terms of education. This methodological choice simultaneously overestimates male multidimensional poverty and underestimates the gender disparity in deprivation.

Klasen and Lohti (2016) follow the Alkire and Foster (2011a) methodology closely, except they employ individual data, when available, instead of assigning an overall value to all household members. They show that their methodology yields considerably higher multidimensional poverty levels for women and older people, and especially older women, compared to the results of Alkire and Foster (2011a). Their finding is driven by the fact that adult and older women in India is grossly less educated than men of their age categories as well as than the younger generation of women. Hence, assigning a household average or a maximum to all household members (as Alkire and

Foster (2011a) does) overestimates the educational achievement of adult and older women. We suspect that the situation would be similar for the case of Turkey. Hence we follow Klasen and Lohti (2016) in this particular regard instead of Alkire and Foster (2011a).

Data

We employ Survey of Income and Living Conditions for years from 2006 to 2015 data sets for Turkey (SILC Turkey). SILC Turkey have 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. SILC Turkey contains detailed information on every household member age 15 or older. For younger individuals only available information is their age TURKSTAT (2016). If the fertility rate is higher for multidimensionally poor households, our findings may understate the true multidimensional poverty. A potential solution is to impute the average deprivation score in the household to younger members. However, younger generations are much more likely to complete compulsory education in Turkey so imputing household average may overstate the true deprivation. As a result, we concern ourselves with the 15+ population where we have direct observations.

Between 2006 and 2010, the sample sizes for 15+ individuals were around 30 thousand (roughly 11 thousand households). Then, the sample size has gradually increased to 60 thousand (roughly 23 thousand households) by 2015 (TURKSTAT, 2016). Responding to TURKSTAT surveys are compulsory by law and non-responding is punishable with a fee in Turkey. Hence, response rate is quite high. For example, in 2015 24,461 households were planned to be surveyed, and eventually data is collected from 22,763 households, 93 percent response rate (TURKSTAT, 2016). The primary function of this data set is to produce the official poverty and income inequality measures. These data sets are collected by following EUROSTAT directives in order to generate comparable poverty and income inequality.

Dimensions and Indicators

Another advantage of MPI is how (normative) assumptions related to poverty are operationalized within the context of measurement. A core feature of MPI is that the normative basis of measurement it adopts is out and front, whereas the normative nature of measurement remains implicit in many of other existing poverty measurement methodologies. Suppa (2015) points out that in an MPI “value judgments are needed for (i) the selection of functionings [dimensions] included in the index, (ii) the respective deprivation cutoffs, (iii) the assigned weights, and (iv) the poverty cutoff.” (2015: 7-8). This stands in contrast to income-based poverty measures, where there is often no explicit justification for determining the cut-off poverty line. In this section we briefly discuss why we select specific dimensions and indicators within them. We follow the existing literature and assign equal weights to each dimension, and again equal weight to each indicator within each dimension (see table 2 for a summary of indicators and weights). We have one three dimensional and two four dimensional poverty measures so we choose $k > 0.33$ as the poverty cut-off for the main analysis. We present relevant graph and tables where $k > 0.25$ for four dimensional poverty measures in the appendix. The multidimensional headcount poverty rate is naturally higher where $k > 0.25$ however overall conclusions do not change.

Education: Education and health are two of the core functionings in capabilities literature and they are included in every human development, MDG or multidimensional poverty index we know of. For these two dimensions, we follow this well-established convention. We classify people who have not completed compulsory education for their age group as education deprived (*compulsory education*). In 1997, completion of middle school became compulsory (affecting those born in September 1986 and afterwards). Until 1997, only the completion of primary school was compulsory in Turkey. As of September 2012, the compulsory education is raised to 12 years in Turkey (those born September 1997 and afterwards). The students who are potentially affected by the latest change in compulsory schooling law has not completed the compulsory period of schooling yet, since latest data in our sample is from 2015 and SILC Turkey interviews only those aged 15 or above. Hence, we define those born before 1987 without primary school education and those born 1987 and after and without middle school education as education deprived.⁵ We

⁵ In 2006-2010 dataset we observe only the five-year interval for age. For 2011-2015 datasets we observe the year of birth for the correspondents.

alternately classify everybody education deprived if they did not completed primary school in order to have a consistent threshold for the whole sample (*primary education*). The alternative definition reduces headcount deprivation only by one percent since most of the education deprived is concentrated among older cohorts. Hence we use *compulsory education* in our analysis since it is a somewhat more stringent threshold.

Health: SILC Turkey has only three questions pertaining to respondents' health. All these questions are self-reported subjective state of persons' health. One of these questions is self-report overall health status (respondents answer from very good to very bad on a scale of five: we define *bad health* if respondent report having bad or very bad health). The second health question inquiries about whether a person has any chronic disease (*chronic*). And the third question inquiries whether any mental or physical ailment had limited respondents' daily activities in the last six months (on a scale of one-to-three: yes very much, yes, no; we defined *limited health* if interviewee responded as yes very much or yes). Cross-tabulations revealed that more than half of people with chronic disease reports that their daily activities is not limited by their ailment. Hence, we choose self-report *bad health* and *limited health* as two indicators for health dimension.

Living Conditions: Indicators of Living Conditions (or housing) are the only one where measurement is at the household level. Compare to existing UNDP study on Turkey we tried to pick more relevant indicators for a middle income country. At most, only 3 percent of households are deprived of any indicator in original Country Briefing for Turkey (Alkire et al., 2011). The six indicator 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) either air pollution or frequent crime in the neighborhood is reported (*neighborhood environment*); v) missing any one of shower, toilet or piped water (*no stp*) and vi) missing any one of the following appliances due to economic hardship (washer, fridge or dishwasher; *no wfd*). We tried to select living conditions indicators that are more likely to asymmetrically affect division of labor within the household. For example, if a household is heated with a coal stove instead of central heating than it is most likely the women of the house who is responsible for keeping the stove on. Or if the household do not have a dishwasher, it is most likely the women who wash the dishes etc. Nevertheless, 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.

Employment: In the last decade, a consensus emerged that employment is a core capability for humans in addition to be a means to an end (Stiglitz, et al., 2009). We not only agree with this emerging consensus we actually believe it is very apt in highlighting gender inequality in the case of Turkey. However, unlike Suppa (2015) we prefer to define deprivation based on non-employment instead of unemployment. We believe that this distinction is especially relevant to very patriarchal countries like Turkey (Dildar, 2015) with weak or non-existing public care services. Eryar and Tekgüç (2014) show that even the majority of less educated women enter the labor force when they are young. However, their attachment to labor force is weak and they are more likely to drop out of labor force if they get married. With very limited public care services for elderly and almost non-existent public care services for young children, most of these women need to buy these care services privately if they want to return to labor market. Given the patriarchal attitudes and public care constraints, most of the less educated women opt out of labor market. In effect, these women lost their capability to participate in labor market. On a more practical level, as we show in table 1 the number of unemployed men are more than the unemployed women and unemployment increases with education for women. As table 1 makes clear, the high unemployment rate for women is driven by very low labor force participation of less educated women. Basing the employment deprivation on unemployment will result in higher deprivation for men and for better educated women compare to less educated women.

As a result, we consider these individuals who are neither employed nor retired or student between the ages of 15 and 64 as deprived of employment (*not-employed*). Alternatively, we also define a second employment deprivation where we enlarge the definition of unemployed to include those discouraged workers who gave up searching for jobs but are ready to work within two weeks (*discouraged*). In both our main employment deprivation as well as the alternative, we assigned informally employed half deprivation score (*no social security*). Most of the *not-employed* men are either unemployed (i.e. actively searching for jobs) or indicate that they are ready to start a job in two weeks if any job is materialized. Hence there is only one-two percentage point difference between *not-employed* and *discouraged* men. However, this difference is very large for women; in some years the difference is more than 10-fold for women. Most of the women who are out of labor

force are housewives with within household care duties which severely limit their capability of joining the labor force if they desire. We also considered other kinds of deprivation such as very long working hours; temporarily employed or part-timers. However, these sub-groups are generally informally employed and including these extra indicators have the effect of reducing the weight of informal employment for a much larger group which in return have the counter-intuitive result of reducing the deprivation score for all sample.

FINDINGS

Individual Indicators

Table 3 presents the share of household or individuals deprived by each indicator. We present years 2006 (first year of SILC Turkey), 2009, 2012 and 2015 (last year of this study) to save space. For all indicators except *limited health* there is a decline in the share of individuals or household who are deprived. The limited health indicator worsened by three percentage in 2009 and stayed at that level (for both men and women). Household Budget Survey (also by TURKSTAT) includes a somewhat similar question, “*do you have any health problems that prevents you from working?*” and affirmative responses to that question increased by two percent in 2009 and stayed at the new higher level. In other words, the increase in this indicator of health is not peculiar to SILC dataset and also it is not the result of society’s gradual aging. Moreover, it suggest that the effect of economic crisis are not totally transient even in countries that did not experience a prolonged recession.

Slowest change in our sample has happened in *compulsory education* indicator due to the fact that very few people go back to school once they are adults. This indicator improves gradually as new generations replace older ones. *Bad health* indicator also improved. *Compulsory education*, *limited health* and *bad health* indicators changed similarly for both sexes. Hence, these two dimensions are unlikely to affect gender poverty gap during the study period.

Employment related indicators all have improved over time. For men *not employed* share declined gradually but the share of *no social security* declined significantly. For women both *not employed* share and *no social security* declined significantly. Faster decrease in *not employed* indicator for women resulted in narrowing gender poverty gap while faster decline in *no social*

security indicator for men (11 percent versus nine percent for men and women) dampened the narrowing of gender poverty gap. *Discouraged* indicator also declined for women faster however this decline is probably misleading. Rates of employment and unemployment for men that we obtain from SILC Turkey coincides roughly with official TURKSTAT statistics compiled from Household Labor Force Survey (HLFS). Female employment rate we obtain from SILC also coincides with official employment statistics. However, SILC Turkey significantly under-reports female unemployment for some reason compare to HLFS. This underrepresentation of unemployed women (or overrepresentation of out of labor force women) is another strength of our preferred index since *not employed* indicator makes no distinction between unemployed and out of labor force categories.

We find significant decline for Living Conditions indicators, except for *sub-standard shelter* indicator (at least one of leaky roof, inadequate insulation or dark room). Leaky roofs and inadequate insulation are the most persistent problems concerning housing stock in Turkey over the last decade. The greatest decline is in *sub-standard heating* deprivation. There is a marked increase in houses with central heating (24 to 46 percent) to the expense of coal stoves (from 50 to 31 percent). There is very gradual decline in heating homes with wood and dung (from 22 to 18 percent). The decline is probably an urban phenomenon. Likewise there is a marked increase in dishwasher ownership during the study period. There is also a sustained decline in the share of houses without *no stp* indicator (at least one is missing: in-house toilet, piped water or shower). By 2006, 97 percent of all houses already had piped water and 94 percent already had shower in Turkey. In other words, the decline in *no stp* indicator is mostly the result of more houses having an in-house toilet. There is almost no gender gap in living conditions indicators because on average 85 percent of houses are male-headed in Turkey hence most women live in male-headed households. Moreover, female-headed households' living conditions, on average, are not worse than male-headed households' houses.

Distribution of Individual Deprivation Scores

Figure 1A presents the distribution of deprivation for selected years for our preferred MDP Index (*not employed*) and figure 1B 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, both of employment or health indicators plus one of housing indicators will fall into 0.5-0.55 bin. Figure 2 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 $k=0.33$ 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 3 shows the average deprivation (uncensored) scores for all population, men, and women. Figure 4 presents the headcount poverty for multidimensional poverty. The exact choice of which dimensions to include do not matter, on average, for men. For men, average deprivation score gradually declined to from 0.25 to 0.20 after 2009-2010 recession. If we had conducted our study at household level (where overwhelming majority household heads are men), probably the addition of employment dimension would not have mattered much. However, average deprivation scores for women vary a lot by the choice of which dimensions to include. This finding validates Klasen and Lohti's (2016) intuition. When we move on to headcount poverty, we observe that the exact choice between *not employed* or *discouraged* unemployed does not make any discernible difference for men (three dimensional headcount poverty is a little bit lower). However, the definition of employment deprivation is very crucial for women headcount poverty. Especially measurement of employment based on *not-employed* not only increases the level of headcount poverty significantly but also increases the decline in headcount poverty over the study period. Even in the most conservative case, three-dimensional poverty, gender poverty gap is, on average, eight percent. In case of multi-dimensional poverty including *not employed* employment dimension gender poverty gap is between 35 and 30 percent. Another interesting observation from figure 4 is that multidimensional poverty indices including employment dimension is more sensitive to economic crisis compare to measure not including an employment dimension.

Multidimensional Poverty Index

We present headcount poverty rate, average deprivation of poor individuals and index for multidimensional poverty (MPI) including *not employed* dimension in table 4.⁶ The most striking finding of this decomposition analysis is that decline in MPI is almost wholly driven by decline in headcount poverty. The average deprivation of the poor hardly changed during the study period. Poor women are a little bit more deprived than poor men. Figure 3 shows a sustained decline in average deprivation scores as we discussed above average. Comparison of figure 3 and table 4 suggests average deprivation scores of poor and non-poor diverging. Figure 5 presents each dimension's contribution to deprivation of poor. Over the years, contribution of living conditions to deprivation scores 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.

Deprivation Scores by Age and Region

We present regional and age group differences in deprivation scores in the form of OLS regressions to save space. First three columns include all individuals (age 15 and above). Columns 4, 5, and 6 include only individuals between ages 15 and 64. Since we assume 65 year old and older individuals cannot be employment deprived, findings in Columns 4, 5, and 6 are more relevant for this paper's purpose. The coefficient estimates show that women, people older than

⁶ The decompositions of alternative multidimensional measures are available upon request.

40, widows or separated, and people living in Eastern regions are a lot more deprived than others. Average deprivation have declined over the years. Age dummies probably catch the increasing deprivation in education and health for older cohorts. Istanbul and Western Anatolia (Ankara, Konya and Eskişehir) are the least deprived regions as expected. Three Eastern regions are significantly more deprived than the rest of the country even after controlling for a host of other demographic factors. Larger households are also more deprived as expected. Another interesting observation is that most coefficient estimates are qualitatively similar across the three alternatives. The exceptions are coefficient estimates for women and middle and older ages. For women coefficients estimates are significantly larger in columns 4 and 5 compare to 6, suggesting that women suffer more from employment deprivation. For middle aged and old, coefficient estimates are higher at column 6, suggesting that they suffer more from education and health deprivation (each dimension has higher weight in three-dimensional measure).

DISCUSSION AND CONCLUSION

MPI is theoretically more appropriate measure for poverty studies compare to income poverty as discussed above. However, it is much more time consuming to construct. Hence, if the poor households identified by income and MPI are mostly same than all these extra efforts are wasted. 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*. This cut-off is often used to for social assistance in Turkey. According to Table 6, one-third of income poor households are not multidimensionally poor (in the top panel which employs our preferred employment dimension) and almost 40 percent of income non-poor households are actually multidimensionally poor. In other words, comparison of MPI and income poverty discovers significant non-overlap between the two measures validating the extra efforts to develop an alternative measure. Presumably, most of the households who are income poor but not multidimensionally poor are transiently poor and have resources to climb out of income poverty in subsequent periods. Investigating this hypothesis is beyond the scope of this paper and it presents an agenda for future research.

Our preferred definition of employment deprivation, namely *not employed*, produces an increase in overall multidimensional poverty and a very high level of gender headcount poverty

gap (on average 33 percent) compare to the two other alternative developed here. However, we believe that our definition of employment deprivation is justified if the aim is to create an indicator that can focus the policy discussion on one of the most important aspect of conflict in Turkey, namely appropriate place of women in public sphere. The ruling party and President Erdoğan regularly stress the primacy of motherhood for women. This dominant ideology combined with lack of public sector care services for children and elderly force most women to be stay at home mothers. Under these circumstances, taking over care responsibilities (such as giving birth) put most women on a path that is not easily changed and it is hard to argue that they have the freedom to "... actually able to do and to be."

Nevertheless, if we assume that being a housewife is a completely voluntary decision by women not impacted by circumstances, we are more or less at our alternative definition of employment deprivation, *discouraged* unemployed. Even in this case, gender headcount poverty gap is roughly 19 percent and unlike the *not employed* employment deprivation version it is not narrowing over the study period. This is a long-winding way of saying that actually quite a substantial part of young women is voting with their feet and are staying in school longer and are joining the labor market in greater numbers than before. In other words, our chosen definition of deprivation actually reflects the wants and aspirations of younger generations.

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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	0.36	0.34	0.31	0.30
Discouraged and Unemployed	0.09	0.11	0.07	0.05
No social security of own name	0.53	0.50	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	0.12	0.13	0.10	0.10
Discouraged and Unemployed	0.10	0.12	0.08	0.07
No social security of own name	0.37	0.34	0.29	0.25
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	0.59	0.55	0.51	0.50
Discouraged and Unemployed	0.08	0.09	0.07	0.03
No social security of own name	0.69	0.66	0.64	0.60
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	0.47	0.42	0.41	0.39
Discouraged and Unemployed	-0.03	-0.02	-0.01	-0.04
No social security of own name	0.32	0.32	0.36	0.35

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

Headcount Poverty (H)			
	All	Men	Women
2006	0.50	0.32	0.66
2007	0.46	0.28	0.62
2008	0.45	0.27	0.61
2009	0.47	0.30	0.63
2010	0.46	0.29	0.62
2011	0.43	0.26	0.59
2012	0.41	0.25	0.57
2013	0.40	0.24	0.56
2014	0.39	0.24	0.54
2015	0.39	0.23	0.54
Change	<i>0.11</i>	<i>0.09</i>	<i>0.13</i>
Average Depr. of the Poor (A)			
	All	Men	Women
2006	0.51	0.48	0.53
2007	0.51	0.48	0.52
2008	0.51	0.48	0.53
2009	0.52	0.49	0.53
2010	0.52	0.48	0.53
2011	0.51	0.48	0.53
2012	0.51	0.48	0.52
2013	0.51	0.48	0.52
2014	0.51	0.48	0.52
2015	0.51	0.47	0.52
Change	<i>0.01</i>	<i>0.01</i>	<i>0.01</i>
MPI = H*A			
	All	Men	Women
2006	0.26	0.15	0.35
2007	0.23	0.14	0.33
2008	0.23	0.13	0.32
2009	0.24	0.15	0.33
2010	0.24	0.14	0.33
2011	0.22	0.13	0.31
2012	0.21	0.12	0.30
2013	0.20	0.11	0.29
2014	0.20	0.12	0.28
2015	0.20	0.11	0.28
Change	<i>0.06</i>	<i>0.04</i>	<i>0.07</i>

Table 5: OLS Regressions for Determinants of Deprivation Scores

	4D, not employed		4D, discouraged		3D		4D, not employed		4D, discouraged		3D	
Women	0.154	***	0.098	***	0.076	***	0.178	***	0.111	***	0.078	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
base: 15-19						base: 20 - 24						
20-24	0.127	***	0.123	***	0.025	***						
	(0.001)		(0.001)		(0.001)							
25-29	0.109	***	0.106	***	0.027	***	-0.011	***	-0.013	***	0.005	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
30-34	0.107	***	0.105	***	0.028	***	-0.012	***	-0.013	***	0.008	***
	(0.001)		(0.001)		(0.002)		(0.001)		(0.001)		(0.001)	
35-39	0.118	***	0.118	***	0.045	***	0.000		0.001		0.025	***
	(0.001)		(0.001)		(0.002)		(0.001)		(0.001)		(0.002)	
40-44	0.135	***	0.134	***	0.066	***	0.017	***	0.017	***	0.046	***
	(0.002)		(0.001)		(0.002)		(0.001)		(0.001)		(0.002)	
45-49	0.159	***	0.157	***	0.091	***	0.041	***	0.040	***	0.072	***
	(0.002)		(0.001)		(0.002)		(0.001)		(0.001)		(0.002)	
50-54	0.190	***	0.186	***	0.125	***	0.072	***	0.070	***	0.106	***
	(0.002)		(0.001)		(0.002)		(0.002)		(0.001)		(0.002)	
55-59	0.230	***	0.223	***	0.175	***	0.112	***	0.107	***	0.156	***
	(0.002)		(0.002)		(0.002)		(0.002)		(0.002)		(0.002)	
60-64	0.278	***	0.265	***	0.232	***	0.159	***	0.149	***	0.214	***
	(0.002)		(0.002)		(0.002)		(0.002)		(0.002)		(0.002)	
65+	0.220	***	0.257	***	0.334	***						
	(0.002)		(0.001)		(0.002)							
base: Istanbul												
W. Marmara	0.035	***	0.040	***	0.041	***	0.033	***	0.040	***	0.039	***
	(0.001)		(0.001)		(0.002)		(0.002)		(0.001)		(0.002)	
Aegean	0.026	***	0.034	***	0.036	***	0.022	***	0.032	***	0.033	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
E. Marmara	0.019	***	0.022	***	0.025	***	0.015	***	0.018	***	0.021	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.002)	
W. Anatolia	0.004	***	0.006	***	0.002		0.002		0.004	***	-0.001	
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.002)	
Med.	0.083	***	0.085	***	0.092	***	0.080	***	0.083	***	0.086	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
C. Anatolia	0.065	***	0.063	***	0.069	***	0.062	***	0.061	***	0.062	***
	(0.001)		(0.001)		(0.002)		(0.002)		(0.001)		(0.002)	
W. Blacksea	0.069	***	0.075	***	0.086	***	0.063	***	0.071	***	0.078	***
	(0.001)		(0.001)		(0.001)		(0.002)		(0.001)		(0.002)	
E. Blacksea	0.080	***	0.090	***	0.103	***	0.073	***	0.086	***	0.094	***
	(0.002)		(0.002)		(0.002)		(0.002)		(0.002)		(0.002)	

NE Anatolia	0.142 *** (0.001)	0.143 *** (0.001)	0.164 *** (0.002)	0.144 *** (0.002)	0.147 *** (0.001)	0.162 *** (0.002)
CE Anatolia	0.160 *** (0.001)	0.156 *** (0.001)	0.179 *** (0.001)	0.160 *** (0.002)	0.157 *** (0.001)	0.175 *** (0.002)
SE Anatolia	0.181 *** (0.001)	0.168 *** (0.001)	0.193 *** (0.001)	0.186 *** (0.001)	0.172 *** (0.001)	0.193 *** (0.002)
base: married						
Single	0.003 ** (0.001)	0.020 *** (0.001)	0.013 *** (0.001)	0.013 *** (0.001)	0.026 *** (0.001)	0.019 *** (0.001)
Widow	0.052 *** (0.001)	0.057 *** (0.001)	0.081 *** (0.001)	0.084 *** (0.002)	0.072 *** (0.002)	0.086 *** (0.002)
divorced	0.002 (0.002)	0.019 *** (0.002)	0.020 *** (0.002)	0.004 * (0.002)	0.023 *** (0.002)	0.024 *** (0.002)
separated	0.052 *** (0.005)	0.059 *** (0.004)	0.067 *** (0.005)	0.053 *** (0.005)	0.061 *** (0.005)	0.068 *** (0.005)
Oecd scale	0.054 *** (0.000)	0.053 *** (0.000)	0.063 *** (0.000)	0.060 *** (0.000)	0.058 *** (0.000)	0.067 *** (0.000)
base 2006						
2007	-0.019 *** (0.001)	-0.020 *** (0.001)	-0.021 *** (0.002)	-0.020 *** (0.002)	-0.020 *** (0.002)	-0.020 *** (0.002)
2008	-0.026 *** (0.001)	-0.025 *** (0.001)	-0.026 *** (0.002)	-0.026 *** (0.002)	-0.026 *** (0.002)	-0.024 *** (0.002)
2009	-0.011 *** (0.001)	-0.009 *** (0.001)	-0.010 *** (0.002)	-0.009 *** (0.002)	-0.007 *** (0.002)	-0.006 *** (0.002)
2010	-0.020 *** (0.001)	-0.016 *** (0.001)	-0.017 *** (0.002)	-0.019 *** (0.002)	-0.016 *** (0.002)	-0.015 *** (0.002)
2011	-0.034 *** (0.001)	-0.032 *** (0.001)	-0.032 *** (0.001)	-0.034 *** (0.002)	-0.032 *** (0.001)	-0.031 *** (0.002)
2012	-0.042 *** (0.001)	-0.040 *** (0.001)	-0.040 *** (0.001)	-0.044 *** (0.002)	-0.042 *** (0.001)	-0.040 *** (0.002)
2013	-0.054 *** (0.001)	-0.051 *** (0.001)	-0.053 *** (0.001)	-0.054 *** (0.002)	-0.052 *** (0.001)	-0.052 *** (0.002)
2014	-0.060 *** (0.001)	-0.061 *** (0.001)	-0.061 *** (0.001)	-0.061 *** (0.001)	-0.063 *** (0.001)	-0.060 *** (0.002)
2015	-0.066 *** (0.001)	-0.066 *** (0.001)	-0.064 *** (0.001)	-0.068 *** (0.001)	-0.069 *** (0.001)	-0.063 *** (0.002)
constant	-0.220 *** (0.002)	-0.173 *** (0.002)	-0.123 *** (0.002)	-0.153 *** (0.002)	-0.089 *** (0.002)	-0.113 *** (0.003)
R-squared	0.358	0.335	0.356	0.370	0.324	0.292
N	418,870			322,217		

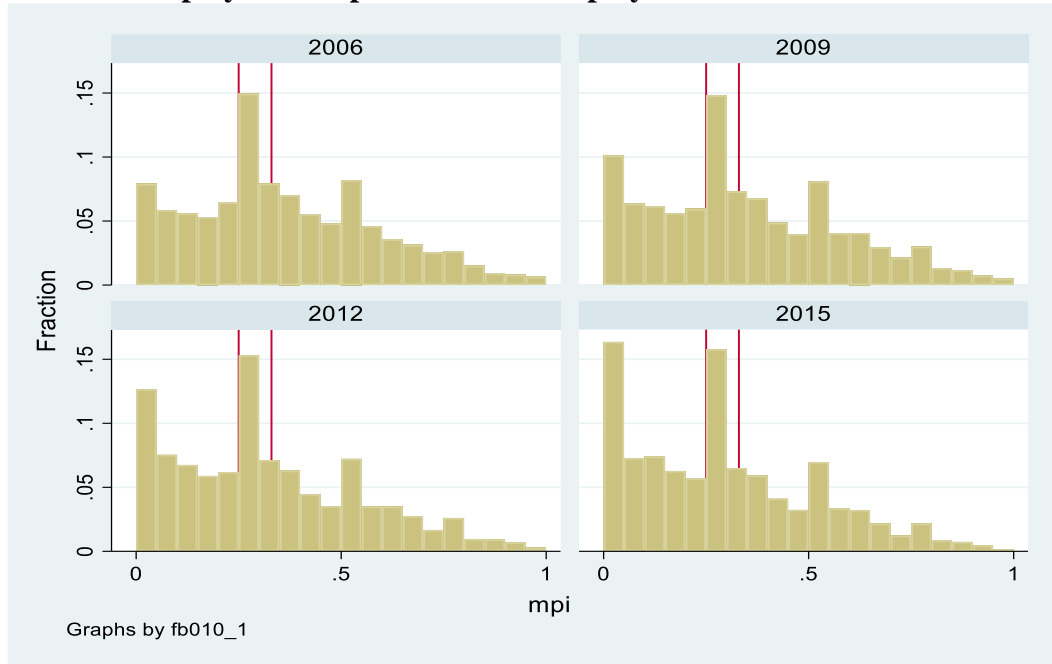
***, **, *: p<0.01; p<0.05; p<0.1 respectively. +: household size adjustment: first adult 1; remaining 14+ ages 0.5; each child (younger than 14) 0.3.

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

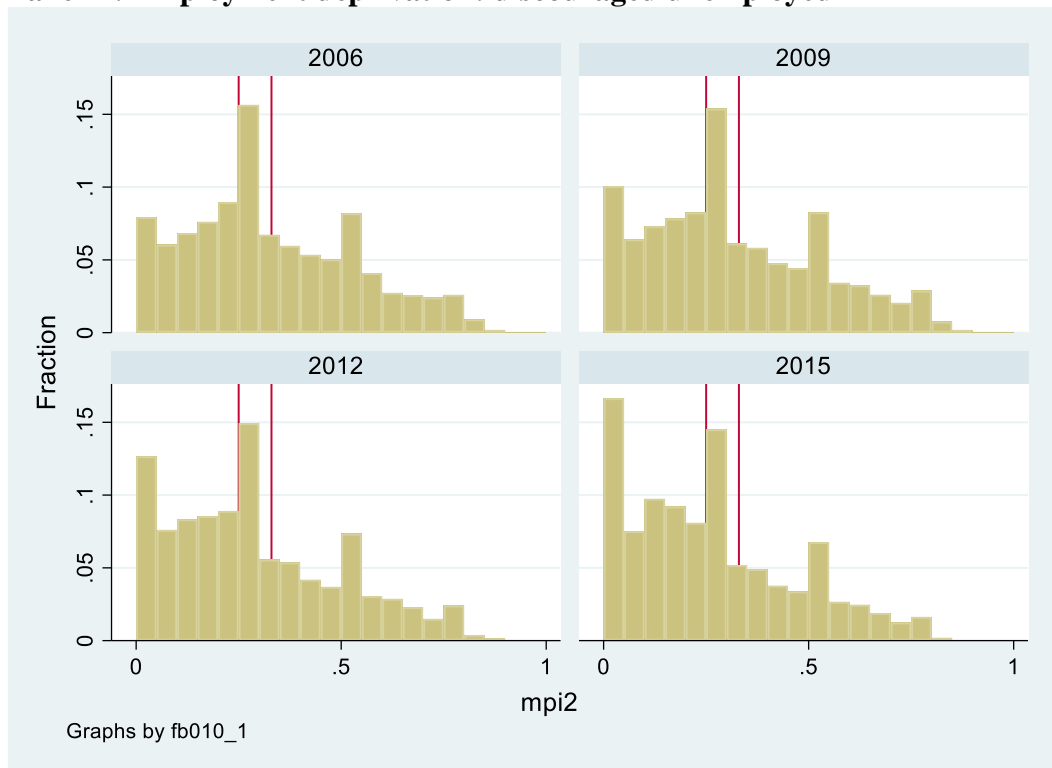
		4D, not-employed		
		non-poor	poor	Total
< 1/3 of MW	non-poor	67.0	33.0	100
	poor	38.7	61.3	100
	Total	61.2	38.8	100
		4D, discouraged		
		non-poor	poor	Total
< 1/3 of MW	non-poor	73.8	26.2	100
	poor	46.3	53.8	100
	Total	68.2	31.8	100
		3D poverty		
		non-poor	poor	Total
< 1/3 of MW	non-poor	72.8	27.2	100
	poor	44.0	56.0	100
	Total	67.0	33.0	100

Figure 1: Histogram of Multidimensional Poverty (Employment) for Selected Years

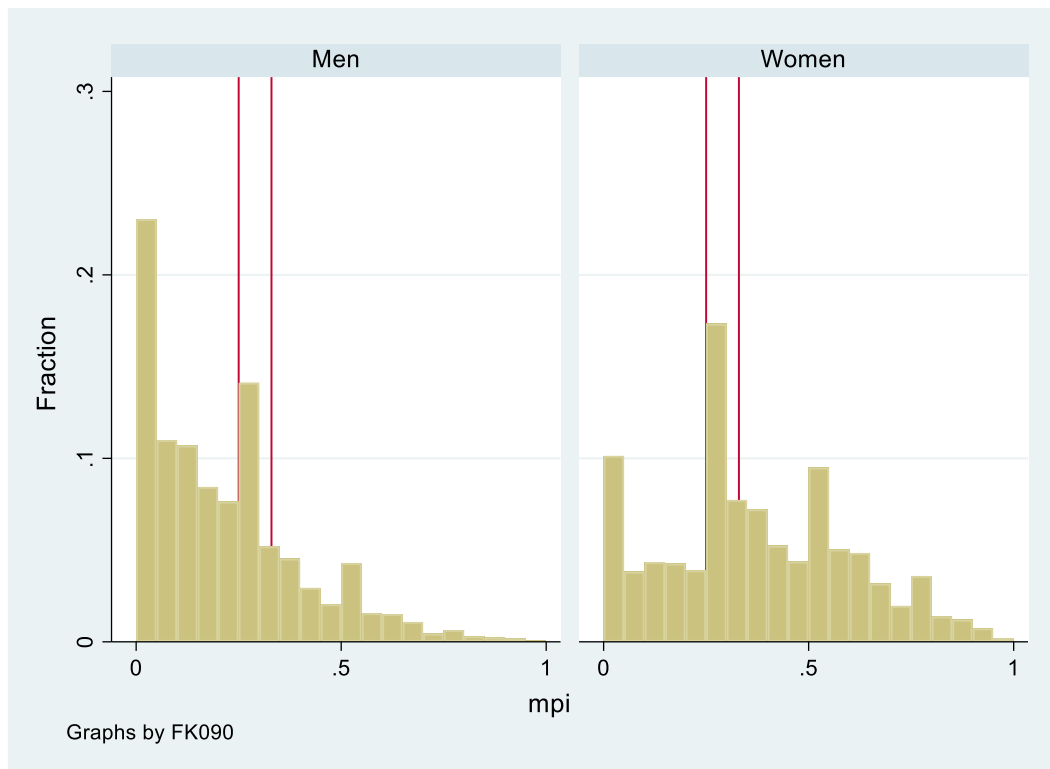
Panel A: Employment deprivation: not employed



Panel B: Employment deprivation: discouraged unemployed



Vertical red line: Poverty cut-offs: $k > 0.25$ and $k > 0.33$

Figure 2: Histogram of Multidimensional Poverty (non-employed) for 2015 by Gender

Vertical red lines: Poverty cut-offs: $k > 0.25$ and $k > 0.33$

Figure 3: Average MDP Deprivation Scores

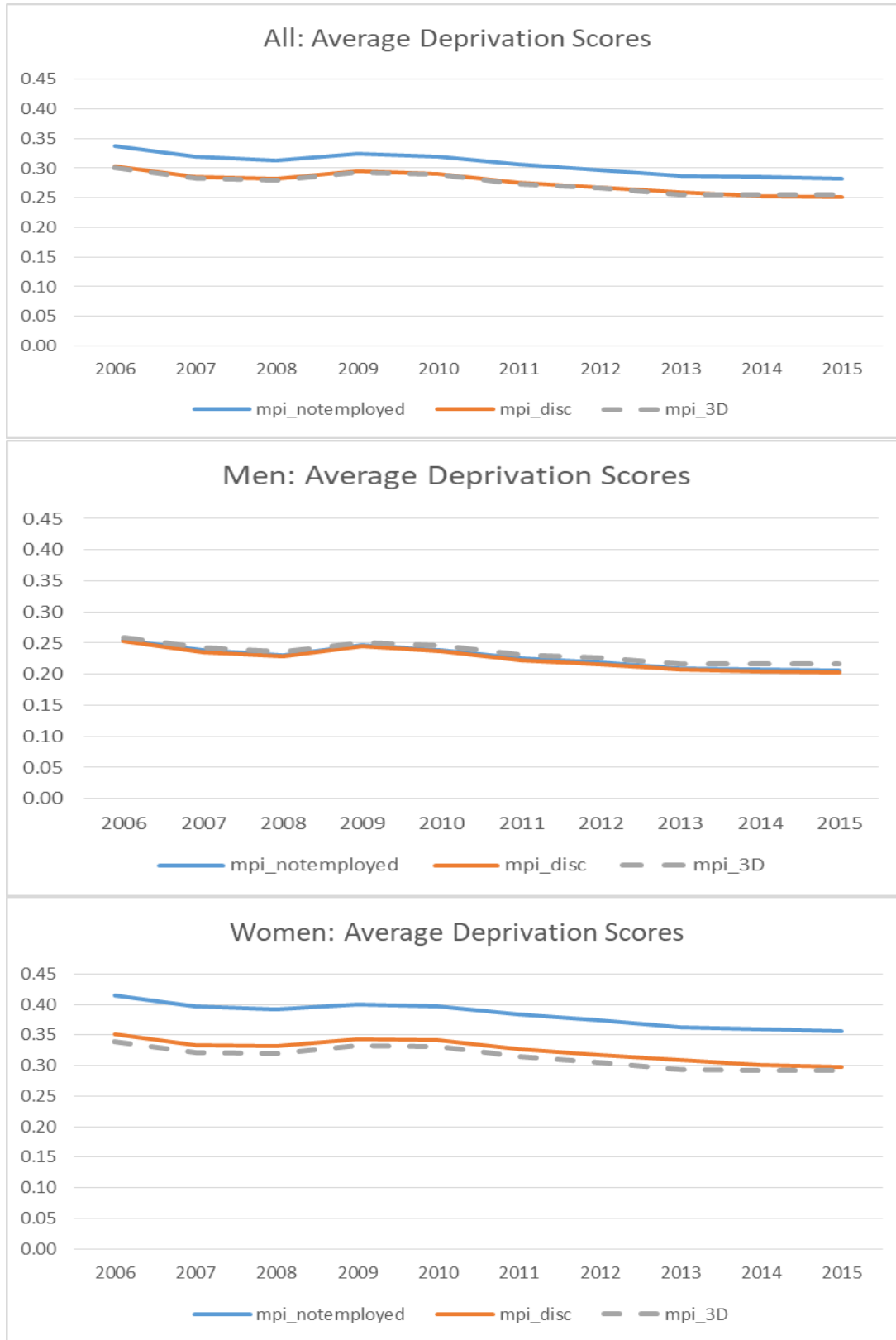


Figure 4: Headcount Poverty Rate between 2006-2015

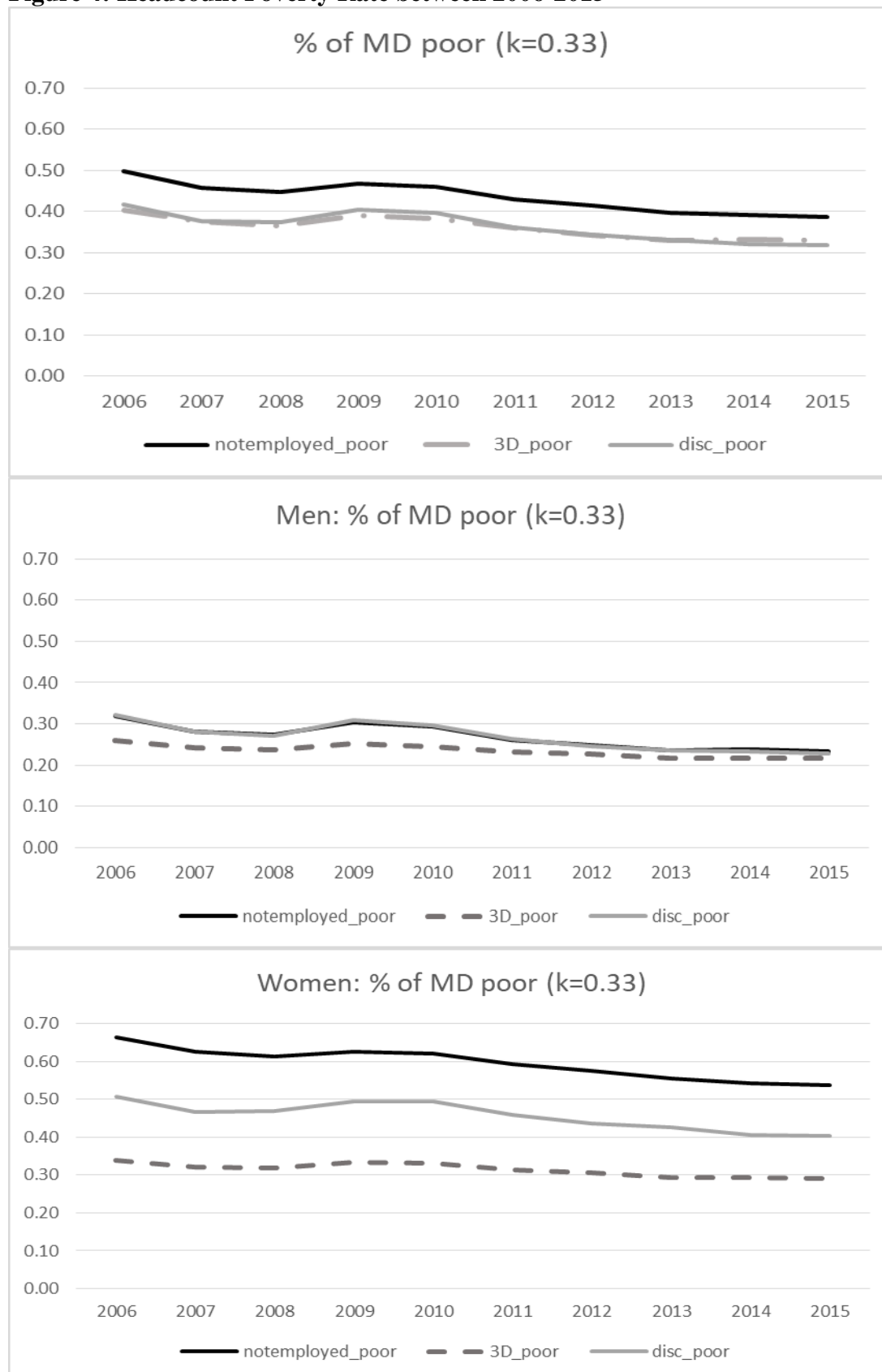


Figure 5: Contribution of Each Dimension to Individuals' Multidimensional Poverty



Appendix (k>0.25)**Table A1: Multidimensional Poverty Index and Its Components (corollary to Table 4)**

Headcount Poverty (H)			
	All	Men	Women
2006	0.65	0.48	0.82
2007	0.62	0.44	0.79
2008	0.61	0.42	0.79
2009	0.62	0.46	0.78
2010	0.61	0.44	0.78
2011	0.59	0.41	0.76
2012	0.57	0.39	0.75
2013	0.55	0.37	0.73
2014	0.55	0.37	0.73
2015	0.55	0.37	0.71
Change	0.11	0.11	0.10

Average Depr. of the Poor (A)			
	All	Men	Women
2006	0.46	0.41	0.48
2007	0.45	0.41	0.47
2008	0.45	0.40	0.47
2009	0.46	0.41	0.48
2010	0.45	0.41	0.48
2011	0.45	0.41	0.47
2012	0.44	0.40	0.46
2013	0.44	0.40	0.46
2014	0.44	0.40	0.46
2015	0.44	0.40	0.46
Change	0.02	0.01	0.02

MDPI			
	All	Men	Women
2006	0.30	0.20	0.39
2007	0.28	0.18	0.37
2008	0.27	0.17	0.37
2009	0.28	0.19	0.38
2010	0.28	0.18	0.37
2011	0.26	0.16	0.36
2012	0.25	0.16	0.35
2013	0.24	0.15	0.34
2014	0.24	0.15	0.33
2015	0.24	0.15	0.33
Change	0.06	0.05	0.07

Figure A1: Headcount Poverty Rate between 2006-2015 (corollary to Figure 4)

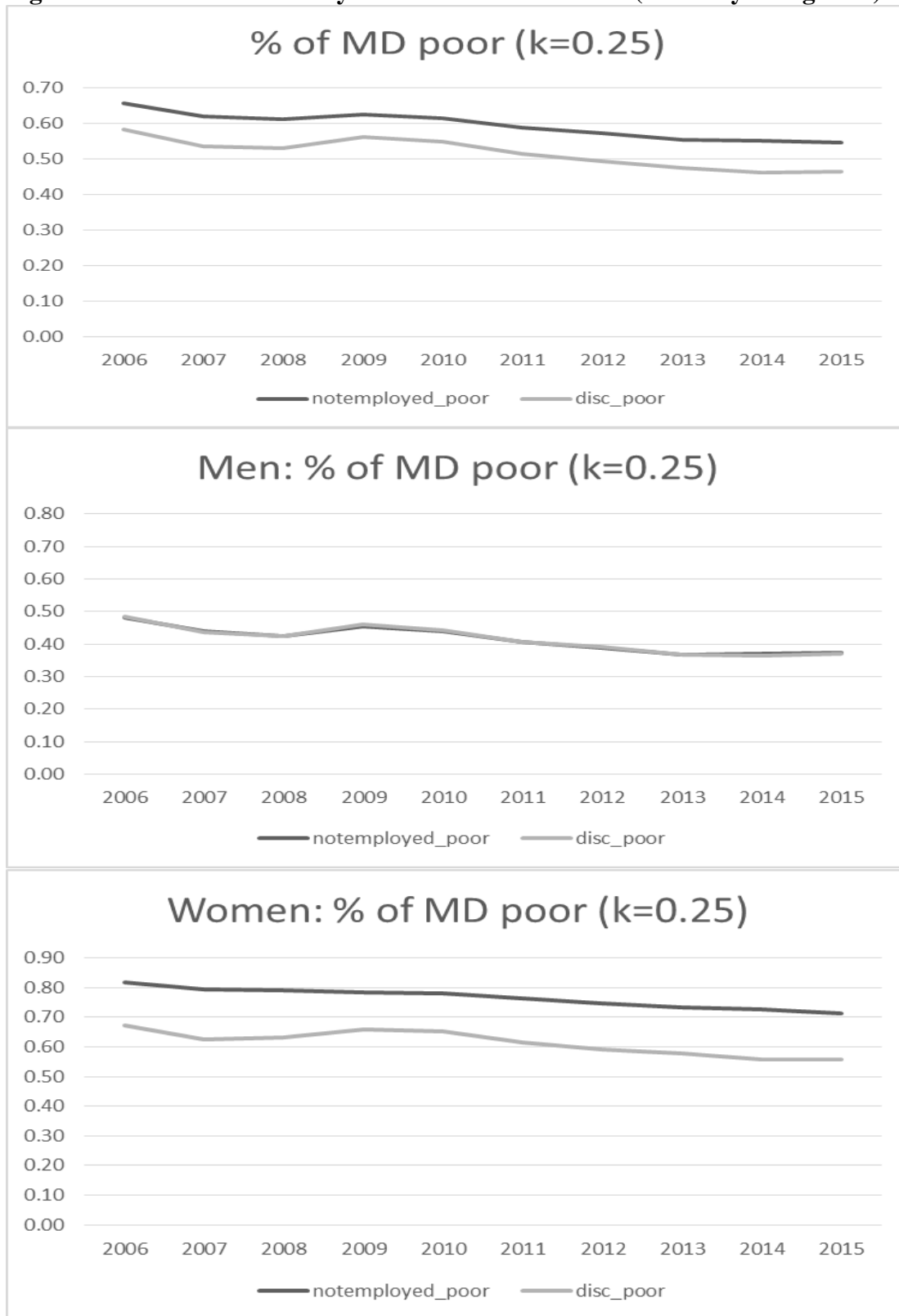


Figure A2: Contribution of Each Dimension to Individuals' Multidimensional Poverty (corollary to Figure 5)

