

Impact of social expenditures on multidimensional poverty in Turkey

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Abstract

Reducing poverty is a critical priority for developing countries. Despite the government allocating approximately 13% of the GDP to social support expenditures, poverty affects around 15% of the population in Turkey. However, there is a need for more research that measures the effects of social expenditures, which is a fundamental tool in the fight against poverty, while also considering the current developments in poverty measurement methods. This study aims to measure the impact of social support expenditures on poverty in Turkey. The study compares a multidimensional poverty approach to a one-dimensional approach. The effects of social support expenditures on households in Turkey were analyzed using econometric methods. The study finds that multidimensional poverty values are approximately 2.5 times higher than one-dimensional values. Government spending was found to have no impact on multidimensional poverty, while private expenditure had a relatively minor impact. The paper concludes by discussing the inefficiency and ineffectiveness of government social expenditures in Turkey.

Keywords: Poverty measurement, Multidimensional poverty, Turkey, Social expenditures

1. Introduction

In the recent past, research on the measurement of poverty has come to a point where poverty is considered a multidimensional phenomenon that requires to be measured accordingly. The “Multidimensional Poverty Index” (MPI) developed on this basis can be considered as an extension of the discussions by Amartya Sen from the 1970s and the approach put forward by the Foster-Greer-Thorbecke (FGT) approach in 1984. However, the foundations of the approach can be said to have been laid in Alkire (2007) and Alkire and Foster (2011). The approach developed by Alkire-Foster has quickly gained an important place in the literature (Arndt *et al.*,

2012; Batana, 2013; Battiston *et al.*, 2013; Foster and Horowitz, 2012; Gradín, 2013; Nicholas and Ray, 2012; Notten and Roelen, 2012; Nussbaumer *et al.*, 2012; Seth and Santos, 2018; Seth and Villar, 2017; Tonmoy Islam, 2014). Due to the specific sociological, historical, and other characteristics of different countries, poverty research conducted in various places through this approach has both contributed to the method and expanded its use.

Researches aiming to measure poverty through the multidimensional approach are quite new in Turkey. Calculation of multidimensional poverty in Turkey in the same way as Alkire-Foster did caused some specific problems from the point of missing or defective data, as it was the

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case for many other countries. For this reason, there were studies that used the Alkire-Foster approach in the calculation of Turkish MPI but suggested various adaptations. Acar and Başlevent (2014) calculated the Turkish MPI values for the period between 2007 and 2010 in 4 dimensions and for 15 indicators, including 4 indicators in the housing dimension and 2 indicators in the labour market dimension, in which they did not include the education dimension. On the other hand, Uğur (2015) calculated the Turkish MPI values only for the year 2010 in 3 dimensions and for 14 indicators in total, including 2 indicators in the Education and health dimension, 6 indicators in the Economic conditions and assets dimension, and 6 indicators in the Housing and living standard dimension. Similarly, Karadağ (2015) calculated the Turkish MPI values for the period between 2006 and 2012 with 4 indicators in the Basic Consumption dimension, 2 indicators in the Education dimension, 3 indicators in the Health dimension, 3 indicators in the Employment dimension, and 4 indicators in the Housing conditions dimension. Limanli (2016) calculated the Turkish MPI values for the period between 2006 and 2012 with 1 indicator in the Income dimension, 1 indicator in the Education dimension, 2 indicators in the Health dimension, 3 indicators in the Environmental Problems dimension, and 1 indicators in the Time dimension. Karahasan and Bilgel (2021) calculated the Turkish MPI values for the period between 2014 and 2017 with 7 indicators in the Housing dimension, 4 indicators in the Environment dimension, 2 indicators in the Education dimension, and 3 indicators in the Health dimension.

In this study, the authors also made a “Multidimensional Poverty” measurement for Turkey with certain improvements, including a wider period of measurement (2006-2016) and a higher number of indicators as much as allowed by the scope of the data set used.

In the study, in addition to the multidimensional measurement of poverty, social expenditure policies were also analyzed as one of the most important policy instruments of governments in their poverty reduction efforts. The literature on economics is quite rich in terms of research that tries to analyze the impacts of social expenditures

on poverty. However, those researchers generally used poverty approaches far from being multidimensional, and they most of the time focused on different types of social expenditures. The literature mainly contains studies that compared different types of social expenditures (government or private, in kind or in cash, etc.) (Chen *et al.*, 2017; Gibson *et al.*, 2011; Khera, 2014; Lusk and Weaver, 2017; Maitra and Ray, 2003; Miller and Neandis, 2015; Mitrut and Wolff, 2011; Nikolov and Bonci, 2020; Olinto and Nielsen, 2007; Payne, 1998), analyzed the impacts of social expenditures on a specific area (Barrientos and DeJong, 2006; Gertler, 2000; Ozturk and Kose, 2019; Sadoulet *et al.*, 2001), or analyzed the impacts of social expenditures on values calculated through one-dimensional poverty approaches (van de Berg and Cuong, 2011; Ertekin and Hayat, 2022; Jalan and Ravallion, 2000; Lloyd-Sherlock, 2006; Sarisoy and Koç, 2010). Notwithstanding a large amount of literature about the impact of social expenditures on poverty, relatively little attention has been paid to studying the new methods of poverty measurement. Thus, this study can be shown as one of the few pioneering researchers in the field.

The main purpose of this article is to analyze the effectiveness of social support programs in reducing poverty in Turkey. To achieve this goal, the article takes into account the latest developments in the field of poverty measurement. This sets it apart from previous studies analyzing social support expenditures based on a one-dimensional poverty approach for Turkey. The analysis reveals results that are significantly different from previous studies conducted by Ertekin and Hayat (2022) and Sarisoy and Koç (2010). This study demonstrates that when analyzing the effects of social assistance on poverty from a multidimensional perspective, the problems in the system become more evident. By taking a multidimensional approach to poverty, this research highlights how the shortcomings of the system become clearer when evaluating the impact of social assistance programs.

Finally, this study has made a two-way contribution to the literature: (1) Contribution was made to the adaptation of a “Multidimensional Poverty Index” calculation method specific

to Turkey as a developing country, and (2) the impacts of social expenditure policies on multidimensional poverty were tried to be analyzed for the first time. Thus, a new analysis and data source was established for policymakers to combine the recent developments in poverty measurement with the sociological structures specific to a country.

2. Social expenditures system in Turkey

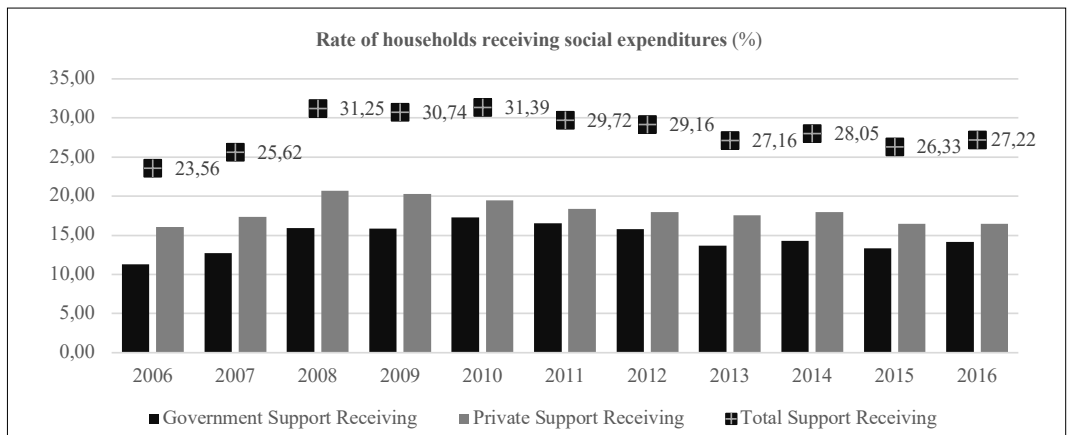
Social expenditures have been an important part of the Turkish economy recently. The share of social expenditures in Turkish GDP increased from 10.76% to 12.83% between 2006 and 2016 (TUİK, 2018). In parallel, the rate of families receiving social expenditures also increased in the same period. As can be seen in Figure 1, the rate of families receiving social expenditures rose from 23.5% in 2006 to 31.2% in 2008, the year in which the international financial crises erupted, maintained at the same level in 2009 and 2010, and then fell into a decline, decreasing to 27.2% as of 2016.

Social expenditures in Turkey can be analyzed into two distinct groups government and private social expenditures. In modern terms, the government social expenditure system of Turkey started to emerge in the 2000s (Bugra, 2008). In 2004, the Directorate General for Social Supports and Solidarity was established under the Prime Ministry to coordinate the social support efforts made

with the World Bank. This institution was subsequently transformed into the Ministry of Family and Social Policies, which meant the establishment of a social expenditures system at the ministry level for the first time in 2011. The name of the Ministry of Family and Social Policies was changed to the Ministry of Family, Labour, and Social Services (MoFLSS) in 2018.

The rate of citizens who benefit from government social expenditures increased from 11.32% to 14.18% between 2006 and 2016. These social expenditures can be listed as Patient care, Disability benefits, Pensions, Widows and orphans benefits, Family and child benefits, Unemployment benefits, Social exclusion benefits, and Administrative expenses. Citizens need to fulfill the necessary bureaucratic requirements to become eligible to receive these government social expenditures. The basic condition for becoming eligible for these social expenditures is the submission of the documents (medical reports, insurance records, etc.) demanded by public institutions to the relevant ministries. After an application is made by an individual, social expenditures investigation officers carry out household investigations and social circle investigations, and they analyze certain case-specific conditions to decide whether the individual is eligible to receive social expenditures. While these social expenditures are provided in cash most of the time, there are also in-kind expenditures provided by the government.

Figure 1 - Rate of households receiving social expenditures (%).



Source: The micro data set by Turkish Statistical Institute's (TUİK), income and living conditions research.

In addition to the government social expenditure system that has been established and developed in the last 20 years, private social expenditures have also been important for the Turkish people. As can be seen in Figure 1, the rate of households benefiting from private social expenditures increased from 16.07% to 16.50% between 2006 and 2016, which is higher than the rate of households receiving government social expenditures. The main reason for this is the private social expenditure network specific to Turkish society, resulting from the traditions of centuries. Private social expenditures are an area where non-governmental actors play an effective role through various motives, including kinship relations and philanthropy (Bugra and Candas, 2011).

3. Data and methodology

3.1. Data

The micro-sectional data set of the income and living conditions research

The main data set used in the study was the micro-sectional data set of the income and living conditions research, which is regularly collected by the Turkish Statistical Institute (TÜİK) on an annual basis. The main purpose of the collection of this data set is to determine household income and assets and the income-based poverty threshold. The households to be surveyed are selected to represent the prevailing circumstances in the country, and they are changed on a monthly basis. The sampling unit preferred for representation purposes is the household. The data set mainly consists of two parts defined as households and individuals. The household data include detailed variables related to household assets and other variables such as disposable income. The individual data, on the other hand, consist of socio-economic variables, including the ages, sexes, educational levels, and employment statuses of persons in the household, and their incomes and the sources of such incomes. The micro-sectional data set of the income and living conditions research was preferred as the data set to be used in this study since it represents the whole country, includes a relatively large population, and

offers detailed and comprehensive income and asset data for both households and individuals.

The micro-sectional data set of the income and living conditions research was utilized in this study, encompassing the period from 2006 to 2016. This dataset was utilized since the statistical data used in Turkey was first published in 2006. The data set includes details about 177,162 Turkish households in total. The scope of this study included three main sections. The first one was the calculation of income-based one-dimensional household poverty values. The second was the multidimensional household poverty values calculated on the basis of household employment, health, education, and assets. The third was the econometrical analysis for which various variables, including but not limited to the social expenditures provided by the government and non-governmental actors, region of residence, and educational level of the household head, were used.

The term “household income” refers to the annual disposable income of a household. In the analysis of the variables effective on the multidimensional poverty values of households, household income was studied in three categories as government social expenditures, private social expenditures, and household income without social expenditures. All monetary values, including income, were transformed into fixed prices by applying TÜİK’s Consumer Prices Index (2003=100), and all calculations were made based on these fixed values

The statistics for the variables used in this study are presented in Table 1. These variables were determined by examining previous research in the literature (Van den Berg and Cuong, 2011; Chen *et al.*, 2017; Gibson *et al.*, 2011; Mitrut and Wolff, 2011; Sarisoy and Koç, 2010; Waidler *et al.*, 2017). These variables will be used in the subsequent sections of the study for the analysis.

3.2. Methodology

One-dimensional poverty measurement

Before the emergence of the multidimensional approach, the methods most widely used in the measurement of poverty were the one-dimen-

Table 1 - Descriptive analyses.

<i>Variables</i>	<i>Description</i>	<i>Avg.</i>	<i>SD</i>
<i>Income w/o social expenditures</i>	Annual household income (excluding social expenditures) (TL 1,000)	33.59	28.60
<i>Government social expenditures</i>	Annual government household social expenditures (TL 1,000)	0.18	0.77
<i>Private social expenditures</i>	Annual private household social expenditures (TL 1,000)	0.87	3.39
<i>Household size</i>	Number of household members	2.69	1.26
<i>Household size²</i>	Square of the number of household members	8.94	9.85
<i>Age</i>	Age of the household head	48.95	15.10
<i>Age²</i>	Square the of the household head	2609.97	1578.74
<i>Occupation</i>	1 if there is anyone employed in the agricultural industry, otherwise 0	0.16	0.37
<i>Education</i>	The educational level of the household head	-	-
	Illiterate	-	-
	Literate	0.07	0.26
	Primary school	0.44	0.50
	Secondary school	0.10	0.31
	High school	0.08	0.27
	Technical high school	0.08	0.27
	University	0.13	0.33
<i>MPI</i>	Multidimensional poverty index	0.41	0.17
<i>Asset tax</i>	1 if at least one household member pays taxes for assets; otherwise 0 (house, car, etc.)	0.55	0.50
<i>Student</i>	1 if there is at least one household member studying, otherwise 0	0.23	0.42
<i>Year control</i>	Dummy variable for 11 years (except the first year)	-	-
<i>Region control</i>	Dummy variable for 11 geographical regions (except Istanbul)	-	-

Source: Calculated from the micro data set by Turkish Statistical Institute's (TUIK), income and living conditions research.

sional (monetary) methods. The one-dimensional (monetary) methods can be classified into two income-based and expenditure-based methods. In the one-dimensional (monetary) approach, different from the multidimensional approach, equivalence scales are used. The equivalence scale is an index that converts the current income or expenditure of a household into data comparable to household wealth levels (FAO, 2005) and allows them to be compared with the wealth level of a reference household. It is mainly based on consumer theory and economies of scale (Rio Group, 2006).

In scientific research and governmental calculations in Turkey, the equivalence scale called the OECD scale is used. This scale was devel-

oped by Hagenaaers *et al.* (1994) (Chanfreau and Burchardt, 2008), in which the value attributed to the household head is 1, while the values attributed to each additional adult and child household member are 0.5 and 0.3 respectively (OECD, 2012). The scale defines an adult as an individual at the age of 14 or higher.

In this study, the OECD equivalence scale was used for calculating the one-dimensional poverty values. Under the same method, half of the equivalent disposable income of a household was calculated as the poverty threshold. The rate of the number of households with income lower than this threshold in total number of households was determined as the poverty rate for the relevant year.

Multidimensional poverty measurement

The literature includes many researches that used the Alkire and Foster (2011) approach (Acar and Başlevent, 2014; Booysen *et al.*, 2008; D'Ambrosio *et al.*, 2011; Licona, 2016). However, the information about the indicators selected for the implementation of the approach is not available for every country. For this reason, researchers tended to define substitute dimensions

and indicators for their own research areas (Acar and Başlevent, 2014; Asselin and Vu, 2008; Bérenger and Verdier-Chouchane, 2007).

In this study, the multidimensional poverty index values of Turkey were calculated for the period between 2006 and 2016, with 4 different dimensions and 17 indicators. The indicators used, their weights, and their average and standard deviation values in the period of study are

Table 2 - The indicators used in multidimensional poverty calculation.

<i>Dimensions</i>	<i>Indicators</i>	<i>Description</i>	<i>Weight</i>	<i>Average</i>	<i>SD</i>
<i>Economic conditions and assets</i>	Hot water	1 if the household does not have access to hot water, otherwise 0	1/28	0.20	0.40
	Washing machine	1 if the household does not have a washing machine, otherwise 0	1/28	0.07	0.26
	Meat, chicken or fish consumption	1 if the household cannot consume meat, chicken or fish every two days; otherwise 0 (meat equivalents for vegetarians)	1/28	0.51	0.50
	Unexpected costs	1 if the household cannot cover unexpected costs, otherwise 0	1/28	0.52	0.50
	Heating	1 if the household cannot heat the house, otherwise 0	1/28	0.28	0.45
	New cloths	1 if the household cannot buy new clothes, otherwise 0 (other than second-hand clothes)	1/28	0.35	0.48
	Crime and violence in the neighborhood	1 if there is widespread crime and violence in the neighborhood, otherwise 0	1/28	0.10	0.30
<i>Housing</i>	Having a bathroom in the house	1 if there is no bathroom in the house, otherwise 0	1/20	0.06	0.24
	Having a toilet in the house	1 if there is no toilet in the house, otherwise 0	1/20	0.12	0.33
	House payments	1 if house payments (rent, housing loan, etc.) cannot be made regularly, otherwise 0	1/20	0.82	0.38
	Non-house payments	1 if non-house payments cannot be made regularly, otherwise 0	1/20	0.55	0.05
	Construction problems of the house	1 if there are problems such as a leaking roof, damp walls, or ruined windows, otherwise 0	1/20	0.40	0.49
<i>Education and health</i>	Chronic health problems	1 if there is at least one household member with a chronic disease, otherwise 0	1/12	0.40	0.49
	Health problems in the last 6 months	1 if at least one household member had a health problem preventing his or her daily activities in the last six months, otherwise 0	1/12	0.48	0.50
	Literacy	1 if there is at least one illiterate household, otherwise 0	1/12	0.27	0.44
<i>Employment</i>	Unemployment	1 if there is at least one unemployed household member who is able to work, otherwise 0	1/8	0.70	0.46
	Informal employment	1 if there is at least one informally employed household member, otherwise 0	1/8	0.36	0.48

Source: Calculated from the micro data set by Turkish Statistical Institute's (TUİK), income and living conditions research.

presented in Table 2. It should be noted that certain sociological characteristics of Turkish society were taken into consideration in the selection of indicators under the defined dimensions. For example, Turkish households are known to consider washing machines among the basic household goods. Thus, the absence of this asset in a household was reflected in the calculations. Similarly, in addition to the consideration of unemployed household members, any informal workers were also evaluated since informal employment is quite widespread in Turkey. In the data set used for the study, it is stated that there was at least one informally employed person in at least 37% of the households as of the period of data collection. In particular, informal employment is quite common among migrants whose population gradually increases in recent years (ILO, 2015). The indicators that were not included in the MPI were also addressed based on the same sensitivity. For example, the house floor construction indicator, widely used in the international literature, was not included in the calculations for Turkey since Turkish culture favors the use of carpets. Especially in the eastern provinces of Turkey, families do not prefer to renew floor structures even if they have adequate financial resources, and they instead use various types of carpets.

Impacts of social expenditures

If we assume that a household wants to maximize its wealth, the household problem can be formulated as follows (Maitra and Ray, 2003)¹ for cases where the household has only one decision-making unit or the household members agree on a common decision (Sadoulet and De Janvry, 1995):

$$W = W\{U(x; Q, e)\} \quad (3.1)$$

Here W represents wealth, U represents a benefit, x represents consumption on which benefit depends, Q represents household characteristics, and e represents the characteristics of the decision maker (generally the household head).

The purpose of the household is to maximize W . However, various points, including income and time constraints, should be taken into consideration in this maximization and the point on which this study focuses is income constraint. This constraint can be presented as follows:

$$p'x = \sum_{r=1}^3 I_r \quad (3.2)$$

Here, p represents goods price, I represents income, and r represents source of income. For the purposes of this study, the important item is the source of income which consists of three elements classified as government transfers, private transfers and other income ($r=1, 2, 3$).

The main focus of this study is the relationship between the different sources of income (I_r) and their impacts on multidimensional poverty. The main question needed to be considered from the point of the econometric measurement of such impacts is the endogeneity problem arising from the simultaneous bias between income and poverty. This problem arises due to the fact that social expenditures and household poverty have mutual effects on each other. Social expenditures are generally provided to poor households, which means that social expenditures are not provided randomly and poorer households have a higher probability of receiving social expenditures. On the other hand, social expenditures contribute to the level of wealth of a household, pointing to a simultaneous bias between social expenditures and poverty.

The problem of endogeneity has been dealt with in the literature in research on poverty and income (Giannetti *et al.*, 2009; Hagen-Zanker and Leon Himmelstine, 2016; Jensen, 2004), while the subject has been addressed indirectly due to the difficulty in finding suitable instrumental variables. In this study, as was done in the research by Maitra and Ray (2003) and Chen *et al.* (2017), the relationships between different income sources and, in particular, between social expenditures and poverty were dealt with through the three-stage least squares (3SLS) method.

¹ Maitra and Ray (2003) expressed the non-integrated household in their model presentations, while this study addresses the integrated household and it benefits only from the model presentation of the referenced research.

Here, the relevant equation system is put forward as follows²:

$$Y^h = f_1(Q_1^h, e_1^h, z_1^h; \beta_1) + u_1^h \quad (3.3)$$

$$S^h = f_2(Y_2^h, MPI_2^h, Q_2^h, e_2^h, z_2^h; \beta_2) + u_2^h \quad (3.4)$$

$$R^h = f_3(Y_3^h, S_3^h, MPI_3^h, Q_3^h, e_3^h, z_3^h; \beta_3) + u_3^h \quad (3.5)$$

$$MPI^h = f_4(Y_4^h, S_4^h, R_4^h, Q_4^h, e_4^h, z_4^h; \beta_4) + u_4^h \quad (3.6)$$

Here, MPI represents the multidimensional poverty index, S and R represent the government and private transfers respectively, Y represents income without social expenditures, Q represents household-specific variables, e represents individual-specific variables, z represents other control variables (such as years and region dummies), and u represents the error term. As can be seen in the equation system, social expenditures have an impact on the poverty level of households (equation 6) and vice versa (equations 4 and 5).

4. Result

4.1. Comparison between one-dimensional poverty and multidimensional poverty in Turkey

One-dimensional and multidimensional poverty values in Turkey were calculated as explained in the methodology section. The changes in these values over the years and for the selected variables are presented in Table 3 and Table 4 for one-dimensional and multidimensional poverty respectively. It is seen that one-dimensional poverty fell from 0.19 to 0.14, while multidimensional poverty fell from 0.46 to 0.38 between 2006 and 2016 in Turkey. As expected, these poverty values vary over the years and depend on region, household size, educational level and employment status. In almost all variables, multidimensional poverty values are higher than one-dimensional poverty values (around 2.5 times).

In Turkey, both one-dimensional and multidimensional poverty values increase from the east to the west. For the year 2016, while both ap-

proaches found Istanbul as the region with the lowest level of poverty, the second wealthiest region of the country was found to be Western Marmara in the MPI approach and Eastern Marmara in the one-dimensional poverty approach. Another important discrepancy between the results of the two approaches is about the poorest region of the country. For the year 2016, the poorest region of Turkey was Northeast Anatolia according to the MPI approach, although it was Southeastern Anatolia according to the one-dimensional poverty approach. While the difference between Northeastern Anatolia, the poorest region, and Southeastern Anatolia, the second poorest region, was quite small according to the MPI approach (0.47-0.45=0.02), the difference between Southeastern Anatolia as the poorest region and Northeastern Anatolia as the second poorest region was relatively higher according to the one-dimensional poverty approach (0.38-0.23=0.15).

The poverty values calculated based on the household size variable are similar in the one-dimensional and multidimensional approaches and the results suggest that the level of increases in parallel with household size, the only exemption to which are single-person households. According to the one-dimensional approach, for the year 2016, the poverty value of single-person households was higher when compared to two-person households (0.12>0.10). However, when the MPI values for single-person and two-person households are compared for the same year, it is seen that they are higher for two-person households (0.33>0.32).

The one-dimensional and multidimensional approaches generated similar results for the education variable, according to which the higher the educational level of the household head, the lower the poverty value of the household. However, under the education variable, the main difference between the two approaches manifested itself in households with a head who had a university or higher education. Although these households had the lowest poverty values in both approaches in all years of study, their pov-

² The time index t is not included for ease of presentation.

Table 3 - One-dimensional poverty values in Turkey.

<i>Variable / Year</i>	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	<i>Average OPI</i>
<i>Region</i>												
<i>Istanbul</i>	0.03	0.01	0.03	0.03	0.04	0.03	0.04	0.03	0.03	0.04	0.03	0.03
<i>Western Marmara</i>	0.13	0.11	0.11	0.14	0.13	0.11	0.13	0.09	0.09	0.12	0.09	0.11
<i>Aegean</i>	0.12	0.10	0.10	0.09	0.09	0.09	0.09	0.07	0.07	0.08	0.08	0.09
<i>Eastern Marmara</i>	0.07	0.05	0.05	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.06
<i>Western Anatolia</i>	0.10	0.07	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.06	0.06	0.07
<i>Mediterranean</i>	0.23	0.22	0.16	0.17	0.13	0.16	0.18	0.16	0.18	0.17	0.16	0.17
<i>Central Anatolia</i>	0.13	0.15	0.16	0.19	0.16	0.15	0.14	0.13	0.12	0.12	0.14	0.14
<i>Western Black Sea</i>	0.21	0.15	0.15	0.16	0.15	0.12	0.10	0.10	0.10	0.11	0.09	0.12
<i>Eastern Black Sea</i>	0.11	0.09	0.11	0.11	0.11	0.10	0.11	0.07	0.09	0.10	0.09	0.10
<i>Northeastern Anatolia</i>	0.35	0.29	0.31	0.35	0.32	0.31	0.35	0.35	0.30	0.28	0.23	0.31
<i>Eastern Anatolia</i>	0.36	0.35	0.33	0.40	0.35	0.36	0.38	0.33	0.33	0.32	0.27	0.34
<i>Southeastern Anatolia</i>	0.55	0.52	0.47	0.49	0.46	0.47	0.46	0.45	0.40	0.37	0.38	0.44
<i>Household size</i>												
<i>1</i>	0.15	0.12	0.10	0.13	0.12	0.12	0.13	0.12	0.12	0.12	0.12	0.12
<i>2</i>	0.17	0.14	0.14	0.15	0.13	0.13	0.13	0.12	0.12	0.11	0.10	0.13
<i>3-5</i>	0.19	0.17	0.18	0.19	0.18	0.17	0.19	0.17	0.17	0.17	0.15	0.17
<i>5+</i>	0.37	0.34	0.35	0.41	0.43	0.44	0.43	0.39	0.37	0.39	0.33	0.39
<i>Educational level of household head</i>												
<i>Illiterate</i>	0.40	0.35	0.36	0.40	0.36	0.37	0.37	0.32	0.33	0.32	0.31	0.35
<i>Literate</i>	0.30	0.27	0.30	0.32	0.30	0.30	0.30	0.29	0.29	0.30	0.27	0.29
<i>Primary school</i>	0.21	0.18	0.18	0.20	0.18	0.18	0.19	0.18	0.17	0.17	0.15	0.18
<i>Secondary school</i>	0.12	0.11	0.10	0.11	0.11	0.12	0.13	0.12	0.10	0.12	0.12	0.12
<i>High school</i>	0.07	0.07	0.06	0.06	0.05	0.08	0.08	0.09	0.09	0.07	0.08	0.08
<i>Technical high school</i>	0.05	0.05	0.05	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.06	0.05
<i>University</i>	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
<i>Employment</i>												
<i>Non-agricultural</i>	0.16	0.14	0.14	0.14	0.13	0.14	0.14	0.14	0.13	0.13	0.13	0.14
<i>Agricultural</i>	0.28	0.25	0.26	0.31	0.28	0.25	0.27	0.24	0.23	0.23	0.17	0.25
<i>Country average</i>												
	0.19	0.16	0.17	0.17	0.17	0.16	0.16	0.15	0.15	0.15	0.14	0.15

Source: Calculated from the micro data set by Turkish Statistical Institute's (TUIK), income and living conditions research.

Table 4 - Multidimensional poverty values in Turkey.

<i>Variable / Year</i>	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	<i>Average MPI</i>
<i>Region</i>												
<i>Istanbul</i>	0.38	0.37	0.37	0.38	0.37	0.38	0.36	0.36	0.34	0.36	0.33	0.36
<i>Western Marmara</i>	0.42	0.42	0.42	0.40	0.39	0.39	0.39	0.38	0.36	0.37	0.33	0.38
<i>Aegean</i>	0.43	0.42	0.40	0.39	0.37	0.38	0.37	0.36	0.35	0.37	0.34	0.37
<i>Eastern Marmara</i>	0.41	0.39	0.39	0.40	0.39	0.40	0.39	0.38	0.36	0.36	0.34	0.38
<i>Western Anatolia</i>	0.40	0.40	0.39	0.40	0.38	0.38	0.36	0.36	0.35	0.34	0.34	0.37
<i>Mediterranean</i>	0.46	0.45	0.43	0.42	0.42	0.42	0.42	0.41	0.40	0.40	0.39	0.41
<i>Central Anatolia</i>	0.47	0.46	0.47	0.46	0.45	0.44	0.43	0.43	0.40	0.39	0.39	0.43
<i>Western Black Sea</i>	0.46	0.44	0.46	0.44	0.45	0.43	0.42	0.42	0.40	0.40	0.39	0.42
<i>Eastern Black Sea</i>	0.46	0.45	0.44	0.44	0.44	0.47	0.46	0.44	0.42	0.40	0.40	0.44
<i>Northeastern Anatolia</i>	0.55	0.51	0.53	0.53	0.52	0.52	0.52	0.53	0.50	0.48	0.47	0.51
<i>Eastern Anatolia</i>	0.56	0.55	0.53	0.54	0.51	0.52	0.51	0.49	0.47	0.48	0.44	0.50
<i>Southeastern Anatolia</i>	0.58	0.58	0.55	0.55	0.54	0.52	0.52	0.53	0.49	0.47	0.45	0.51
<i>Household size</i>												
<i>1</i>	0.37	0.38	0.36	0.37	0.36	0.36	0.35	0.35	0.33	0.33	0.32	0.34
<i>2</i>	0.42	0.41	0.40	0.39	0.38	0.38	0.37	0.37	0.35	0.35	0.33	0.37
<i>3-5</i>	0.50	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.46	0.45	0.43	0.47
<i>5+</i>	0.62	0.59	0.61	0.61	0.62	0.62	0.61	0.60	0.58	0.57	0.56	0.60
<i>Educational level of household head</i>												
<i>Illiterate</i>	0.60	0.60	0.59	0.59	0.57	0.58	0.56	0.56	0.54	0.54	0.53	0.56
<i>Literate</i>	0.55	0.53	0.54	0.54	0.52	0.52	0.51	0.51	0.49	0.48	0.47	0.51
<i>Primary school</i>	0.48	0.47	0.46	0.46	0.46	0.46	0.45	0.45	0.43	0.43	0.41	0.45
<i>Secondary school</i>	0.42	0.41	0.42	0.41	0.40	0.41	0.40	0.40	0.38	0.38	0.37	0.39
<i>High school</i>	0.36	0.35	0.35	0.36	0.35	0.36	0.36	0.35	0.34	0.34	0.32	0.35
<i>Technical high school</i>	0.36	0.35	0.34	0.34	0.34	0.35	0.34	0.34	0.33	0.33	0.31	0.33
<i>University</i>	0.29	0.28	0.28	0.27	0.27	0.27	0.27	0.26	0.25	0.25	0.24	0.26
<i>Employment</i>												
<i>Non-agricultural</i>	0.44	0.42	0.42	0.42	0.41	0.41	0.40	0.40	0.38	0.38	0.36	0.40
<i>Agricultural</i>	0.54	0.52	0.53	0.52	0.51	0.52	0.51	0.52	0.50	0.49	0.48	0.51
<i>Country average</i>												
	0.46	0.44	0.44	0.44	0.43	0.43	0.42	0.42	0.40	0.40	0.38	0.41

Source: Calculated from the micro data set by

erty values were almost zero (0.01) according to the one-dimensional poverty approach, while the same varied between 0.24 and 0.29 in the multidimensional approach.

The values calculated through both methods were also similar under the employment variable. For the year 2016, the poverty value was 0.13 for households employed in the agricultural industry and 0.17 for households employed in other industries according to the one-dimensional poverty approach. On the other hand, while the change in the employment-based values calculated through the two methods was in parallel, the values calculated through the multidimensional approach were seen to be higher (0.36 and 0.48 respectively).

4.2. Impact of social expenditures

The results of the analysis carried out on the variables thought to be effective on the multidimensional poverty of households are presented in Table 5. While equation number 1 presents the results of the OLS model, equations number 2, 3, 4, and 5 present the results of the 3SLS model. Equation number 2 contains the coefficients of the variables affecting household income without social expenditures. Equation number 3 contains the coefficients of the variables affecting the government social expenditures received by households, while equation number 4 contains the coefficients of the variables affecting the non-government social expenditures received by households. Equation number 5 contains the coefficients of the variables affecting the multidimensional poverty values of households based on the 3SLS model.

The Breusch and Pagan (1980) test was also implemented for the analysis (Lagrange Multiplier). The results of the test suggested the rejection of the H_0 hypothesis (null hypothesis), which directed the analysis to the 3SLS technique. The Wu-Hausman test was also implemented for the analysis, the results of which suggested the rejection of the hypothesis that the government and private social expenditures received by households and household income without social expenditures were external to the multidimensional poverty of households. However, in equation number

4 for private social expenditures, the government social expenditures and household income without social expenditures variables were found to be statistically insignificant.

According to the results of the analysis, in the OLS model, private social expenditures and household income without social expenditures have a negative and statistically significant impact on multidimensional poverty. On the other hand, government social expenditures received by households have a positive and statistically significant impact on multidimensional poverty. Similarly, household size, age of the household head, square of the age of the household head, and occupation have a positive and statistically significant impact on multidimensional poverty. However, household size has a negative and statistically significant impact.

The 3SLS model provided similar results to the OLS model. This model also suggested that private social expenditures and household income without social expenditures have a negative and statistically significant impact, while government social expenditures received by households have a positive and statistically significant impact on multidimensional poverty. For other variables, household size, age of the household head, square of the age of the household head, and occupation have a positive and statistically significant impact on multidimensional poverty, while household size has a negative and statistically significant impact.

Robustness tests were implemented to analyze the sensitivity of the 3SLS model to different model specifications (Appendix). Firstly, it was taken into the consideration that the 3SLS model was probably not nonlinear. For this reason, square of the household size and square of the age of the household head were removed from the model. Secondly, the region variable was removed from the model and thirdly the year variable was removed. Then, it was thought that the extreme values in the data set might have affected the model. Thus, the lowest and highest 1st percentile of the income variable was removed in the fourth step, after which the lowest and highest 5th percentile was removed in the fifth step. In the sixth and last step, the effects of the economies of scale were considered. Household

Table 5 - The analysis of the factors affecting multidimensional poverty.

Variables	OLS		3SLS		
	MPI	Income w/o social expenditures	Government social expenditures	Private social expenditures	MPI
	(1)	(2)	(3)	(4)	(5)
MPI			2.0297*** (0.0432)	-5.8990*** (0.4956)	
Income w/o social expenditures	-0.0016*** (0.0000)		0.0022*** (0.0002)	-0.0160*** (0.0014)	-0.0016*** (0.0001)
Government social expenditures	0.0226*** (0.0004)			2.2020*** (0.1749)	0.4305*** (0.0059)
Private social expenditures	-0.0008*** (0.0001)				-0.0251*** (0.0006)
Household size	0.0781*** (0.0008)	9.2748*** (0.1766)	-0.1763*** (0.0066)	-0.1650*** (0.0542)	0.0741*** (0.0018)
Household size ²	-0.0046*** (0.0001)	-0.5709*** (0.0225)	0.0152*** (0.0007)	0.0233*** (0.0046)	-0.0059*** (0.0002)
Age	0.0038*** (0.0001)	1.1703*** (0.0285)	-0.0068*** (0.0008)	-0.0556*** (0.0043)	0.0020*** (0.0003)
Age ²	0.0000*** (0.0000)	-0.0092*** (0.0003)	0.0000 (0.0000)	0.0006*** (0.0000)	0.0000* (0.0000)
Occupation	0.0523*** (0.0009)	-0.8029*** (0.1920)	-0.0721*** (0.0055)	0.1108*** (0.0284)	0.0313*** (0.0019)
Asset tax			-0.0174*** (0.0019)		
Student dummy				0.4101*** (0.0234)	
Constant	0.1157*** (0.0034)	-21.0028*** (0.7546)	-0.0851*** (0.0208)	5.0334*** (0.0956)	0.1645*** (0.0076)
Education control	NO	YES	NO	NO	NO
Region control	YES	YES	YES	YES	YES
Year control	YES	YES	YES	YES	YES

Note: Total number of observations used in all equations was 177.162. While equation number 1 presents the results of the least squares model, equations number 2, 3, 4, and 5 present the results of the three-stage least squares model. All models included year and region dummies. The education control, showing the educational level of the household head, was included in equation number 2 only. The main variable here is the fact that educational level is taken into consideration in the calculation of MPI. In this way, education is included as a dependent variable among MPI variables. The values given in parenthesis are standard error values, while the asterisks show the levels of statistical significance. Here, one asterisk means a significance level of 10%, while two and three asterisks mean a significance level of 5% and %1 respectively.

income values were transformed into household equivalent income by use of the OECD equivalence scale. When the result is compared with equation number 5 in Table 5 for all model specifications, any significant change was not observed, which suggested that the analysis was robust against different model specifications.

In the study, the elasticity coefficient for income, government social expenditures and pri-

private social expenditures were also calculated in the OLS and 3SLS models (Table 6). The elasticity values of the income variable in the OLS and 3SLS models were found to be -0.1316 and -0.1276 respectively. The elasticity values of the government social expenditures variable in the OLS and 3SLS models were 0.0101 and 0.1923 respectively, while the elasticity values of the private social expenditures variable in the OLS and

Table 6 - MPI elasticity coefficient for the income, government expenditures and private expenditures.

	OLS	3SLS
Income w/o social expenditures	-0.1316*** (0.0008)	-0.1276*** (0.0048)
Government social expenditures	0.0101*** (0.0002)	0.1923*** (0.0026)
Private social expenditures	-0.0017*** (0.0002)	-0.0526*** (0.0013)

Note: Elasticity coefficients were calculated based on the average values. The values given in parenthesis are standard error values that were calculated with the delta method. The asterisks show the levels of statistical significance. Here, one asterisk means a significance level of 10%, while two and three asterisks mean a significance level of 5% and %1 respectively.

3SLS models were 0.0017 and 0.0526 respectively. Elasticity values for the government and private social expenditures variables are thought to have increased significantly, considering the problem of endogeneity.

In both the OLS and 3SLS models, government social expenditures received by households were found to have a positive and statistically significant impact on multidimensional poverty, which is discussed in the following section of the study.

5. Discussion

One of the main arguments of the multidimensional approach in measuring poverty is that poverty measurement approaches based on income or expenditures (one-dimensional approach) cannot be sufficient to comprehend poverty. However, this does not mean that the effect of income or expenditures is completely ignored in the multidimensional measurement of poverty. Some of the indicators selected for multidimensional poverty measurement are directly affected by household income. For this reason, household incomes are also included in the analysis of factors affecting multidimensional poverty in Turkey. As expected, it was concluded that multidimensional poverty decreases as household income increases. However, in both methods, the effect of household income in reducing multidimensional poverty seems to be quite limited (elasticity values were about -0.13 in both methods).

In order to reveal the impacts of social expenditures on multidimensional poverty in Turkey, the social expenditures received by households were analyzed under two groups government and private expenditures, in parallel with various examples in the literature (Van den Berg and Cuong, 2011; Mitrut and Wolff, 2011; Salmon, 2008). As a result of the analysis, it was calculated that private social expenditures reduce multidimensional poverty, while government social expenditures increase it.

The literature provides examples that suggest the negative impacts of social expenditures can occur on poverty. As a result of their research in Vietnam, Van den Berg and Cuong (2011) stated that social expenditures can have a negative impact on poverty due to various reasons (dependence on social expenditures, getting used to laziness, reduced investments due to the burden on the government budget, etc.). van de Walle (2004), on the other hand, put forward those government social expenditures might “miss” the poor and that they might be less successful than private social expenditures in reaching those in real need for various political or bureaucratic reasons. Our analysis indicates that rural poverty is significantly more prevalent than in other regions. In addition, Impiglia and Lewis (2019) emphasize the critical role of social protection mechanisms in alleviating rural poverty. It is therefore important to consider the possibility that government support may “miss” the issue of rural poverty and take appropriate measures to address this challenge. In addition to these researches, there are studies showing that there may be a “crowd-out” effect between government and private social expenditures. As a result of a research conducted in the United States, Payne (1998) found that government and private social expenditures can be alternatives to each other and that by choosing one of them, households can cause a negative effect on the other in the medium or long term. In addition, this problem, revealed as a result of the analyses of government social expenditures, might be resulting from the rate of informal employment. When it is considered that government social expenditures can reach formally employed persons easier compared to informally employed persons, government social expenditures may become less effective in countries such as Turkey where the

rate of households with at least 1 informal worker is around 37%.

In Turkey, there have been studies analyzing the effects of social support expenditures based on a one-dimensional poverty approach. These studies suggest that social support programs are effective tools for reducing poverty. For instance, Ertekin and Hayat (2022) calculated the impact coefficient of social support on poverty reduction to be approximately 0.20. Sarisoy and Koç (2010) calculated different coefficients for different social groups and concluded that social support programs reduce poverty across all groups. However, our study indicates that when taking a multidimensional approach to poverty, significantly different results are obtained compared to the existing literature. In fact, the effectiveness of state social support programs in reducing poverty is even a subject of debate.

The impacts of private social expenditures on multidimensional poverty were found to be significant and negative in both approaches, which is well in line with the literature and economic theory. However, the coefficients of private social expenditures, thus their impact on multidimensional poverty, were found to be quite low. This may be due to the fact that social expenditures are risky in terms of sustainability accessibility and that they are, due to their nature, far from considering poverty as a structural problem.

6. Conclusion

In this study, the multidimensional poverty approach was adapted to Turkey, MPI values were calculated for a period of 11 years through this approach, and these values were compared with the one-dimensional poverty values. As a result of these calculations and comparisons, it was found that MPI values are approximately 2.5 times higher than OPI values in Turkey (11-year average MPI is 0.41 while OPI is 0.15) and there are significant differences between OPI and MPI values in certain regions of Turkey (up to 3 times). Especially for families employed in the agricultural industry, a 3-fold difference was calculated between the MPI and OPI values. This makes the adequacy of OPI, a poverty measurement method, questionable in understanding the poverty

level of households employed in the agricultural industry. We conclude that alternative measures of poverty, such as the Multidimensional Poverty Index, could help improve the understanding of rural people's poverty.

Under the study, the impacts of the social expenditure system used in reducing poverty on multidimensional poverty were also analyzed. The analysis was carried out with 2 different econometric methods (OLS and 3SLS). In both econometric approaches, the results of the analysis revealed that private social expenditures received by households and household income without social expenditures have a negative impact on their multidimensional poverty, while government social expenditures have a positive effect. This suggests that the government social expenditure system in Turkey is inefficient and that the benefits it provides are quite limited.

We think that further research should focus on the impacts of specific government social expenditure policies on multidimensional poverty. In this way, more in-depth information can be provided for policymakers. We hope that this will be beneficial for policymakers in establishing and implementing sustainable development goals in developing countries such as Turkey.

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Appendix

Table A.1 - Robustness checks.

VARIABLES	(1) Nonlinearity	(2) Without region	(3) Without year	(4) Dropping 1 st percentile	(5) Dropping 5 th percentile	(6) Per-adult estimates
Income w/o social expenditures	-0.0019*** (0.0001)	-0.0017*** (0.0001)	-0.0016*** (0.0001)	-0.0020*** (0.0001)	-0.0021*** (0.0001)	-0.0023*** (0.0001)
Government social expenditures	0.3745*** (0.0056)	0.3953*** (0.0051)	0.4457*** (0.0062)	0.4090*** (0.0067)	0.4147*** (0.0092)	1.0544*** (0.0136)
Private social expenditures	-0.0217*** (0.0005)	-0.0254*** (0.0006)	-0.0284*** (0.0007)	-0.0305*** (0.0009)	-0.0417*** (0.0012)	-0.0563*** (0.0008)
Household size	0.0345*** (0.0006)	0.0726*** (0.0018)	0.0734*** (0.0019)	0.0725*** (0.0019)	0.0711*** (0.0021)	0.0601*** (0.0020)
Household size ²		-0.0059*** (0.0002)	-0.0058*** (0.0002)	-0.0056*** (0.0002)	-0.0058*** (0.0002)	-0.0032*** (0.0002)
Age	0.0024*** (0.0000)	0.0026*** (0.0003)	0.0016*** (0.0003)	0.0026*** (0.0003)	0.0023*** (0.0003)	0.0013*** (0.0003)
Age ²		0.0000 (0.0000)	0.0000*** (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000** (0.0000)
Occupation	0.0335*** (0.0017)	0.0282*** (0.0018)	0.0327*** (0.0019)	0.0291*** (0.0019)	0.0247*** (0.0020)	0.0427*** (0.0020)
Constant	0.2332*** (0.0040)	0.1397*** (0.0070)	0.1901*** (0.0077)	0.1718*** (0.0078)	0.1937*** (0.0087)	0.1954*** (0.0083)
Region control	YES	NO	YES	YES	YES	YES
Year control	YES	YES	NO	YES	YES	YES
Observations	177,162	177,162	177,162	173,616	159,446	177,162

Note: These calculations present the results of the three-stage model equation whose dependent variable is MPI. The 1st model was created through the removal of nonlinear household² and age² variables. In the 2nd and 3^d models, region and year dummies were removed respectively. In the 4th equation, the 1st and 99th percentiles of income were removed from the data set, while the 1st and 95th percentiles were removed. In the 6th equation, the analysis was made based on per-adult values by dividing the income and expenditures variables by the equivalence scale. The values given in parenthesis are standard error values. The asterisks show the levels of statistical significance. Here, one asterisk means a significance level of 10%, while two and three asterisks mean a significance level of 5% and %1 respectively.