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Gender and multidimensional poverty in Tunisia: An individual approach

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Abstract

This paper contributes to the expanding literature on multidimensional poverty and gender inequality in Tunisia by presenting an individual measure of multidimensional poverty. It also aims to estimate the gender disparities within multidimensional poverty indices. Our findings indicate that the overall gender gap in multidimensional poverty in Tunisia is less than 11%. Poverty appears to be feminised, with women experiencing more severe poverty than men, particularly among the elderly population. However, it is important to note that inequality among elderly individuals living in multidimensional poverty is masculinised. Furthermore, our analysis shows that, when we incorporate dimensions of employment for adults and social protection for the elderly, it becomes evident that Tunisian women are poorer than their male counterparts. Lastly, we find that female-headed households face greater poverty challenges compared to those led by men.

Key words: intra-household inequality, multidimensional poverty, gender gaps, Tunisia

1. Introduction

Poverty is a complex and multidimensional phenomenon that cannot be fully understood through income measures alone. Traditional assessments of poverty have typically relied on monetary thresholds; however, recent research increasingly highlights the limitations of income-based approaches in capturing the wide range of deprivations affecting human well-being (United Nations Development Programme and Oxford Poverty and Human Development Initiative [UNDP & OPHI] 2023). The multidimensional poverty perspective, rooted in Amartya Sen's capabilities framework, expands the focus to encompass essential dimensions such as education, health and living standards (Silber & Yalonetzky 2014). Many approaches to measuring poverty within a multidimensional

framework have been proposed in the literature. Most of these measures are based on households (Klasen & Lahoti 2016; Franco 2017), associating the household's multidimensional poverty condition with all its members. However, such measures often overlook intra-household inequalities and fail to consider gender disparities. A significant portion of inequality is produced within households, for example between children and adults or across different generations (Bradshaw *et al*. 2017). This can lead to underestimating the magnitude of poverty and inequality and result in a biased evaluation of social policies (Deaton 1997; Rodríguez 2016).

Given its far-reaching implications, household inequality warrants closer examination, especially concerning poverty differences by sex (Atkinson *et al*. 2002). There are compelling reasons to be concerned about gender inequalities across various dimensions related to well-being (Klasen & Lamanna 2009). Firstly, gender inequalities diminish the well-being of individuals and represent a form of injustice (Klasen & Wink 2003; Klasen 2007). Secondly, they negatively influence economic development (Klasen 1999; Klasen & Lamanna, 2009). Accordingly, Klasen (2007) argues that assessing individual poverty within a non-monetary multidimensional framework is more appropriate than relying solely on monetary measures. Attainments in non-monetary dimensions, such as health and education, are often reported at the individual level in household surveys, enabling a more precise understanding of deprivation.

Nevertheless, most multidimensional poverty measures are estimated at the household level (Duclos & Tiberti 2016). Consequently, these measures do not capture how deprivations are distributed within households and fail to reveal gender gaps in deprivation and multidimensional poverty (Pogge & Wisor 2016). Although some studies have examined individual-level multidimensional poverty and gender differences, these have typically focused on specific subgroups rather than the entire population.

To our knowledge, only a few papers have assessed individual-based multidimensional poverty across the entire population. The study by Klasen and Lahoti (2016) in India found that multidimensional poverty among women is 14 percentage points higher than among men when using an individual measure, but only two percentage points higher when using a household-based measure; they also suggest that neglecting intra-household inequality underestimates poverty and deprivation inequality by around 30%. Similarly, Espinoza-Delgado and Klasen (2018) examined the relationship between multidimensional poverty and gender in Nicaragua, finding that gender gaps in multidimensional poverty were less than 5% and that poverty does not appear to be feminised; rather, the elderly, as opposed to children, are the most disadvantaged age group.

For a long time, gender inequality has been assessed by comparing the poverty levels of female-headed households to those of male-headed households (Altamirano & Teixeira 2017). Despite the numerous reasons why female-headed households may experience greater deprivation and poverty, empirical evidence on the relationship between poverty and female-headed households remains ambiguous (Klasen *et al*. 2015).

Despite notable progress in women's legal rights and participation in Tunisia, significant gaps persist in understanding intra-household inequality and gender dynamics. Approximately 15.2% of households live below the poverty line (Institut National de la Statistique [INS] 2021), yet there is a lack of data on the distribution of resources within families, specifically between spouses and children. Although women increasingly contribute to household income, only around 20% to 30% reportedly have exclusive control over its use (World Bank 2019). Approximately 75% of women participate in major household decisions, yet their control over financial resources lags behind men by about 20 percentage points (United Nations Children's Fund [UNICEF] 2018). Vulnerable groups, including rural women, constitute over 40% of informal agricultural workers. They face higher unemployment rates (21.4% vs.

15.3% for men) and limited social protections (INS 2023). In addition, outdated surveys show that Tunisian women spend an average of eight hours daily on unpaid domestic work, compared to less than 1.5 hours for men, highlighting a persistent gendered burden (INS 2006).

This study analyses gender disparities in multidimensional poverty in Tunisia using an individual-level approach. The specific objectives are to (1) measure the incidence, intensity and inequality of multidimensional poverty across different age groups and genders; (2) assess the contribution of key dimensions such as education, health, living standards and employment to gendered poverty; and (3) identify the socioeconomic and regional determinants of poverty. By shifting the focus from households to individuals, this study provides policymakers with the evidence to design more effective and gender-sensitive poverty-reduction strategies that align with Tunisia's development goals. Using data specific to Tunisia, we will estimate multidimensional poverty, inequality and gender gaps. To achieve this, we employ the counting method proposed by Alkire and Foster (2011) and the measure of absolute inequality suggested by Alkire and Seth (2014). We also investigate the determinants of multidimensional poverty in Tunisia through logit regression analysis. To our knowledge, this is the first study to estimate gender differences in multidimensional poverty and inequality at the national level in Tunisia. The remainder of this paper is organised as follows: Section 2 describes the data and methodology employed, Section 3 presents the empirical results and their interpretations, and Section 4 concludes the study.

2. Data and methodology

2.1 Data

In this paper we utilise the Tunisia Labor Market Panel Survey (TLMPS), conducted in 2014 by the National Institute of Statistics in Tunis (INS). This nationally representative survey provides valuable information about households and individuals, particularly education, health, employment and living standards. Our study includes a sample of household members who completed a full interview, totalling 14 530 participants. We categorise the population into three distinct age groups: children (aged six to 17 years), adults (aged 18 to 59 years), and older adults (aged 60 years and over). To define these groups, we considered three criteria: first, the age of access to school, which is six years old; second, the definition of children as stated in the Convention on the Rights of the Child: "Every human being under the age of eighteen" (United Nations [UN] 1989, p. 2); and third, the legal retirement age in Tunisia, which is 60 years.

2.2 Multidimensional poverty measures

We employ the counting approach developed by Alkire and Foster (2011) to estimate multidimensional poverty individually. This method is advantageous due to its simplicity and flexibility compared to other multidimensional frameworks (Silber 2011; Thorbecke 2011). In addition, it explicitly considers the joint distribution of deprivations. However, the Alkire-Foster (AF) approach has several limitations. For instance, poverty dimensions are treated as perfect substitutes below the multidimensional poverty line (k). In contrast, beyond this threshold they are viewed as perfect complements, a premise that is difficult to justify theoretically (Rippin 2017). Furthermore, the AF measure does not account for inequalities among the poor when using ordinal data (Silber & Yalonetzky 2014).

2.2.1 The AF method

Let $Y = [y_{ij}]$ represent the *n x d* achievement matrix, where $y_{ij} \geq 0$ is the achievement of individual i in dimension j. For each dimension j, deprivation cutoffs, z_j, are defined. Let $z = (z_1, \ldots, z_d)$ be the row vector that includes the deprivation cutoffs. Given the achievement matrix y_{ij}, if the achievement of individual i in the jth dimension is less than the cutoffs ($y_{ij} \prec z_j$), then the individual is considered to be deprived of the dimension j. From the achievement matrix (y_{ij}) and the row vector (z), we obtain a deprivation matrix g_{ij}^0, such that $g_{ij}^0 = 1$ if $y_{ij} \prec z_j$, and $g_{ij}^0 = 0$ when $y_{ij} \geq z_j$, for j = 1,…,d and i = 1,…,n. Let $w_j = (w_1, \ldots, w_d)$ be the vector of weights that reflect the relative importance of each dimension j, such that $\sum_{j=1}^{d} w_j = 1$, and $w_j \succ 0$. The deprivation score constructed for each individual is obtained by adding their weighted deprivations, $C_i = \sum_{j=1}^{d} g_0^{ij}$. Also, a vector of deprivation for all dimensions is $C_i = (C_1, \ldots, C_n)$. If $C_i = 0$, the individual i is not deprived in any dimension; conversely, if $C_i = 1$, the individual i is deprived in all dimensions.

To identify the multidimensionally poor, the AF methodology specifies a poverty cutoff k, which represents the minimum deprivation score a person requires to be identified as multidimensionally poor. This poverty cutoff is implemented using an identification function, ρ_k, which takes on a value of 1 if the individual is poor, and a value of 0 otherwise. Formally, the function $\rho_k(y_i, z) = 1$ if $C_i \geq k$, and $\rho_k(y_i, z) = 0$ otherwise.

The identification step implies two types of censoring, each of which follows the application of two measures of cutoffs: deprivation and poverty. Firstly, we applied the deprivation cutoffs to the achievement matrix Y and constructed the deprivation matrix g^0. Each input in the achievement matrix Y below its respective deprivation cutoff, z, is replaced by 1, and 0 otherwise. Secondly, by applying the poverty cutoff k, we obtained the censored deprivation matrix, $g^0[k]$. Each element in the censored deprivation matrix is obtained by multiplying the corresponding element in g^0 by the identification function, $\rho_k(y_i, z)$. Formally, $g_{ij}^0[k] = g_{ij}^0 \cdot \rho_k(y_i, z)$ for all i and for all j. In other words, if individual i is multidimensionally poor, then the individual's deprivation information in all dimensions remains unchanged as in g^0. But if an individual is not poor, then their deprivation status in all dimensions becomes 0.

Foster *et al*. (2010) propose a set of multidimensional poverty measures to address the aggregation problem. The most straightforward measure is the multidimensional headcount ratio, also known as the incidence of multidimensional poverty (H):

$$H = \frac{\sum_{i=1}^{N} \rho_k(y_i, z)}{N} = \frac{q}{n}$$

Despite its simplicity, the multidimensional headcount ratio remains unchanged if a poor individual becomes private in a new dimension, and it does not convey any information about the intensity of poverty. These limitations are addressed by the intensity index, A:

$$A = \frac{1}{q} \sum_{i=1}^{q} C_i(k)$$

The intensity of multidimensional poverty (A) measures the average share of deprivation experienced by the poor. The adjusted poverty index, M_0, can be calculated as the product of the multidimensional

headcount ratio, H, and the intensity of poverty, A. This index provides information on the prevalence of deprivation and reflects the extent of deprivation experienced by individuals.

$$M_0 = \text{HxA} = \frac{q}{n} x \frac{1}{q} \sum_{i=1}^{q} C_i(k)$$

Then:

$$= \frac{1}{n} \sum_{i=1}^{n} C_i(k)$$

The adjusted poverty index, M_0, allows for the evaluation of subgroup contributions to overall poverty by utilising the decomposability of population subgroups, as described by Alkire *et al*. (2015). This method helps identify the specific contribution of each indicator to global poverty. To evaluate inequality among those who are multidimensionally poor, Alkire and Seth (2014) proposed a distinct measure of inequality known as I_q. This separate inequality measure can be computed using the following formula:

$$\mathrm{I_q} = \frac{4}{\mathrm{q}} \sum_{\mathrm{i=1}}^{\mathrm{q}} \left(\mathrm{C_i(k)} - \mathrm{A}\right)^2$$

2.2.2 Dimensions, indicators and deprivation cutoffs

According to Alkire *et al*. (2015), selecting indicators and dimensions should be rooted in normative, value-based decision-making. In alignment with this principle, we identified three equally weighted dimensions: education, health and standard of living. These dimensions are utilised by the global multidimensional poverty index (MPI) (Alkire & Santos 2014) and represent the most significant aspects of well-being, as noted by Stiglitz *et al*. (2009). Table 1 outlines this study's dimensions, indicators and deprivation cutoffs.

Education: Sen (2000) posits that education significantly contributes to capability deprivation. The Universal Declaration of Human Rights recognises it as a fundamental right. Education is vital for obtaining employment, enhancing the skills of disadvantaged individuals, improving working conditions and performance, and reducing gender inequalities. Furthermore, education provides individuals with the necessary skills and tools to meet their own needs and those of their children; ultimately, this boosts their well-being (Drèze & Sen 2002; Robeyns 2006). We assess whether children are on track to complete at least basic education by age 17 (a minimum of nine years of schooling). In Tunisia, children are expected to start school at age six. This means they should finish lower secondary education by 17, accounting for the possibility of failing two years, which may delay their progress. It is noteworthy that, since 1991, basic education has been mandatory for all children aged six to 16. This deprivation level aligns with the Sustainable Development Goals, which aim to ensure that "all girls and boys complete free, equitable, and quality primary and secondary education leading to relevant learning outcomes" by 2030 (UN 2015). In Tunisia, children are considered deprived of education if they are not attending primary school between ages six and 14, or have not completed at least lower secondary education by ages 15 to 17. For adults and the elderly, individuals are deemed deprived of education if they have not completed at least lower secondary education.

Health: Health is recognised as one of the most essential dimensions of well-being (Stiglitz *et al*. 2000) and plays a central role in the capability approach (Robeyns 2003; Stiglitz *et al*. 2010). Good health enhances economic productivity and contributes to economic growth, whereas poor health limits individuals' ability to engage in social activities and maintain their professions (Rippin 2016). In this study, measuring health was particularly challenging. The National Survey on Population and Employment (TLMPS), which was conducted in 2014, primarily collects general health information, rather than specific, direct health indicators, which complicated our efforts. Data limitations mean that health emerged as the most challenging dimension to quantify, especially since the survey does not include detailed health indicators relevant to our analysis. However, the survey does provide information on whether an individual suffers from one or more illnesses, enabling us to construct a health-functioning indicator based on chronic illness. Children are deemed deprived in the health dimension if they have experienced a chronic illness, infectious disease, diarrhoea or multiple illnesses over the past month. Adults and the elderly are classified as deprived of health if they have suffered from a chronic illness or multiple illnesses during that same period.

Standard of living: The standard of living refers to the material necessities, goods and wealth that a household, as a socio-economic unit, requires to lead a "decent" life. As Sen (1984) noted, the standard of living is connected to the concept of positive freedom, which encompasses material capabilities. Furthermore, empirical evidence indicates that quality of life indicators significantly contribute to multidimensional poverty, especially in poorer countries (Alkire *et al*. 2017; Dotter & Klasen 2017; Espinoza-Delgado & López-Laborda 2017). To measure the standard of living, we utilised four indicators: sources of drinking water, sanitation, housing, and access to information. However, the construction of individual deprivations for these indicators presents challenges, as many are experienced collectively within a household. According to Klasen (2007), it is often difficult to pinpoint the final beneficiary of these resources and to determine the extent to which individual members utilise them. As a result, we assumed that these indicators function as public goods, accessible equally to all household members (Klasen & Lahoti 2016).

Each individual is classified as either deprived or not deprived for each indicator based on the deprivation thresholds defined in Table 1. The first two indicators, concerning water and sanitation, are included in the global multidimensional poverty index (MPI) and align with the Sustainable Development Goals, which emphasise the need for "availability and sustainable management of water and sanitation for all people" (UN 2015). Mara *et al*. (2010) highlight that adequate sanitation, safe water and good hygiene are essential for promoting good health and social and economic development. The next indicator assesses the housing dimension (Santos & Villatoro 2018). It evaluates whether an individual resides in a dwelling with a precarious roof (such as thatch or palm leaf) and/or a dirt floor. Housing quality directly affects individuals' well-being (Klasen 2000) and can provide critical safety elements that influence health (Shaw 2004). Lastly, the standard of living is evaluated through an indicator of access to information, which checks if the household possesses at least one of the following sources of information: a radio, television or computer. Due to data constraints, we assumed that access to water, sanitation, information sources and certain durable goods implies effective utilisation of these resources, thereby ensuring overall well-being. To clarify the government's role in reducing the gender gap in multidimensional poverty in Tunisia, we estimated a four-dimensional index for adults and the elderly. This fourth dimension incorporates information on adult employment deprivation and access to social protection for the elderly. It captures essential aspects of well-being relevant to Tunisia, where significant gender gaps may exist (Robeyns 2003). An adult is considered unemployed if they are an unpaid domestic worker responsible for caring for children and parents, or managing household tasks. In contrast, an elderly person is identified as deprived of social protection if they lack access to any form of income or social security.

Table 1: Dimensions, indicators, and deprivation cut-offs

Dimensions	Indicators	Cut-offs	Weight
Education	Schooling achievement	**Children** are considered deprived of education if they have not attended primary school from six to 14 years old and are not on track to finish lower secondary school by 17 years old. **Adults** are deprived of education if they have not finished lower secondary school. **The elderly** are deprived of education if they have not completed lower secondary school.	1/3
Health	Health functioning	**Children** are considered deprived of health if they have suffered from a chronic illness, eruptive illness, diarrhoea or several diseases in the last month. **Adults** and the e**lderly** are considered deprived of health if they have suffered from a chronic disease or several diseases in the past four weeks.	1/3
Standard of living	Water	Do not have access to an improved drinking water source (unprotected well, unprotected spring, public tap, a cart with small cistern/barrel, surface water (river, dam).	1/12
	Sanitation	Have access to unimproved sanitation (latrine without slab or just open hole, buckets, hanging latrines, no toilet, or bush or field).	1/12
	Housing	Is living in a house with natural roof materials (waste, straw and palm) and/or with a dirt floor.	1/12
	Access to information	Does not have access to one of the following sources of information: radio, TV, computer.	1/12

3. Results and discussion

3.1 Association between indicators

The Spearman's rank correlation coefficients for the deprivation indicators are presented in Table 2. Overall, our analysis reveals generally weak correlations between the indicators examined. Specifically, the correlation between educational deprivation and the other indicators is relatively weak. According to Belzil and Hansen (2003), as well as Cameron and Heckman (2001), this may be attributed to various factors, such as individual abilities, self-motivation, expectations regarding the benefits of education, and the level of parental education, all of which can significantly influence educational outcomes. It furthermore is also important to note that quality of life indicators, particularly sanitation and access to information, show weak connections with the other indicators.

3.2 Aggregate deprivation by indicator

We first assessed the aggregate levels of deprivation for each age group, before calculating multidimensional poverty and inequality measures. Figure 1 illustrates the estimated proportion of individuals experiencing deprivation (the incidence of poverty) across six indicators. While deprivation levels vary among age groups, the deprivation profiles are quite similar.

In general, Figure 1 shows significant deprivation in education. The elderly population exhibits the highest levels of deprivation in this dimension, while children demonstrate the lowest. Our findings reveal that more than nine out of 10 elderly individuals in Tunisia have not completed lower secondary education, and over 60% of adults have also not finished this level of schooling. Interestingly, children present a low deprivation rate, of 13.67%, with nine out of 10 having attended primary school and progressing toward lower secondary education. This reflects Tunisia's education policy, which considers primary school attendance compulsory. For the entire population,

approximately one in two Tunisians is deprived of education, underscoring the need for a clearer vision in educational policy.

Table 2: Spearman correlation coefficients between deprivations by age group

Indicators	Group	Health	Housing	Water	Sanitation	Information
Education	Children	0.08*	0.091*	0.023	0.029	0.002
	Adults	0.14*	0.106*	0.109*	0.052*	0.012
	Elderly	0.162*	0.068*	0.042*	0.022	0.018
	Whole population	0.28*	0.088*	0.06*	0.024*	0.036*
Health	Children		0.012	0.022	0.001	-0.008
	Adults		0.005	0.008	-0.015	0.002
	Elderly		-0.068*	-0.066*	-0.05*	0.0003
	Whole population		0.008	-0.011	-0.024	0.035*
Housing	Children			0.323*	0.192*	0.041
	Adults			0.293*	0.159*	0.055*
	Elderly			0.34*	0.178*	0.102*
	Whole population			0.309*	0.171*	0.066*
Water	Children				0.231*	0.068*
	Adults				0.187*	0.101*
	Elderly				0.213*	0.163*
	Whole population				0.203*	0.068*
Sanitation	Children					0.033
	Adults					0.046*
	Elderly					0.156*
	Whole population					0.068*

Note: * = 1% level of significance
Source: Authors' estimates based on Economic Research Forum & National Institute of Statistics (Tunisia) (2016)

In addition, the health indicator shows the lowest deprivation rate among children and adults, at less than 2.5%. In contrast, this indicator has the second-highest deprivation rate among the elderly, with seven out of 10 elderly individuals suffering from a chronic disease or multiple diseases. Regarding living standards, all age groups faced significant deprivation in housing and access to drinking water. Conversely, deprivation in sanitation and access to information is relatively lower, with rates below 8%.

Tables 3 and 4 present the estimated adjusted headcount ratio (M_0) of females and males deprived in each indicator, and the absolute differences between the estimates for men and women. Table 3 indicates no significant educational gender gap among adults (1.66%) or the elderly (1.63%). Among children, however, the gender gap in education is the largest, at 7.12%, although females appear to be better off than males in terms of educational attainment. For the whole population, the gender gap in education is minimal, at 1.13%.

Furthermore, Tables 3 and 4 indicate that there are no significant relative differences between sexes in the health dimension for adults (2.11%) and the elderly (2.84%), while the disparity is greater among children (22%). This suggests that Tunisian women are more deprived than men in terms of health, a finding often regarded as a paradox, as women report suffering from more diseases despite having longer life expectancies (Case & Deaton 2005; Case & Paxson 2005).

We also observe that men generally have a higher quality of life than women, except in housing, access to drinking water for the elderly, and access to information for children and adults. While most gender gaps in quality of life are below 12%, exceptions include children, where the gaps for access to drinking water (19.23%), sanitation (53.33%) and information (25%) are significant. Among the elderly, the gap in access to information exceeds 30%. Gender gaps in living standards do not exceed

10% for the entire population, except for access to information, which surpasses 20%. Women are more likely to experience deprivation in living standards than men. It is important to note that the estimated gender gaps provide a comprehensive assessment of the deprivation that Tunisian women face compared to men, accounting for individual horizontal inequalities.

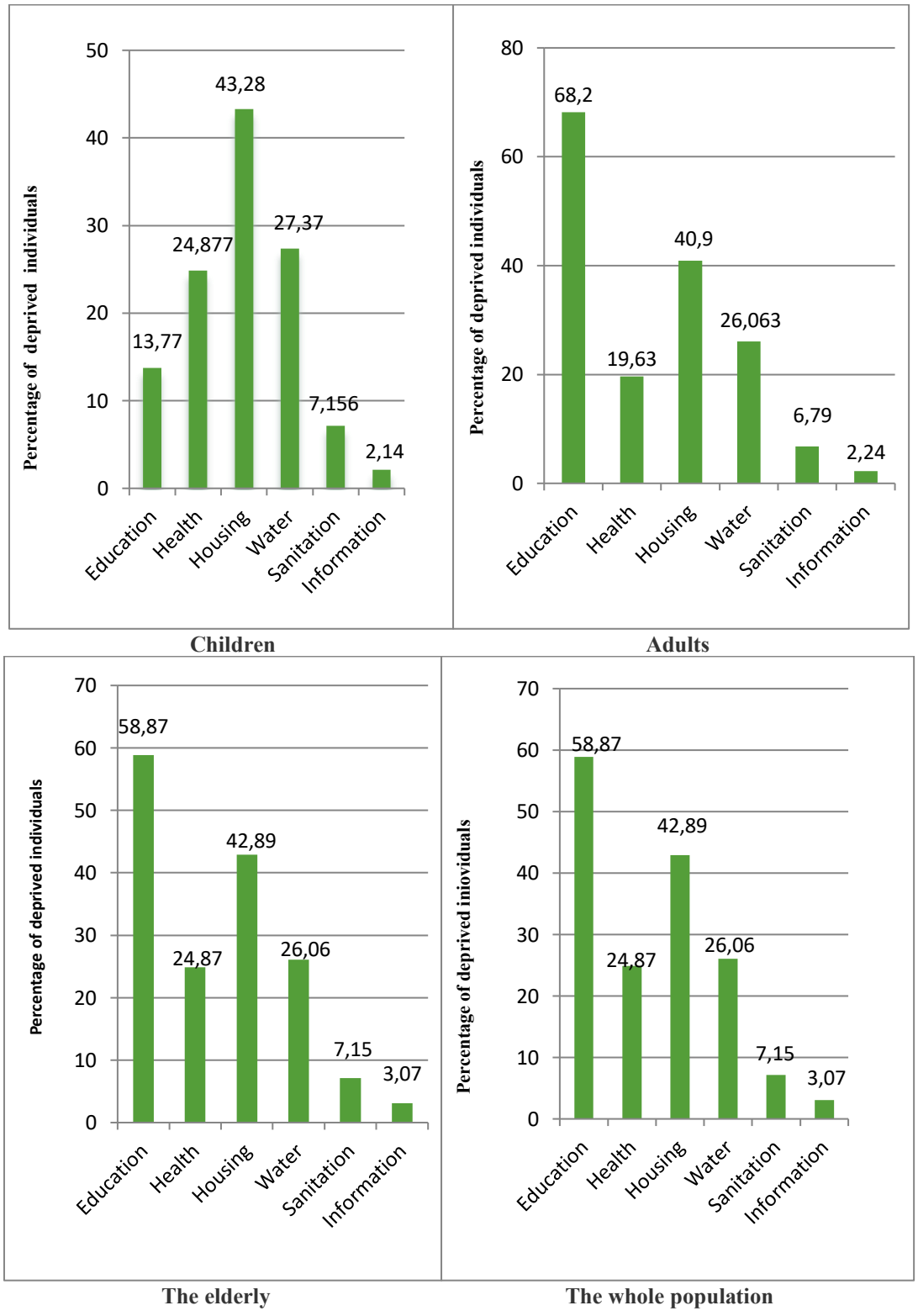

Figure 1: Percentage of individuals deprived in each indicator

Table 3: Adjusted headcount ratio (M_0) of men and women deprived in each indicator by age group and gender differences (k = 33%)

	Male		Female		Difference between male and female estimates
	M_0	Bootstrap SE	M_0	Bootstrap SE	Absolute
Children					
Education	0.737	0.015	0.688	0.015	4.77**
Health	0.090	0.014	0.110	0.015	0.86
Housing	0.099	0.005	0.110	0.005	2.27
Water	0.052	0.004	0.062	0.005	2.07
Sanitation	0.015	0.003	0.023	0.004	3.25***
Information	0.005	0.001	0.004	0.001	0.05
Adults					
Education	0.671	0.005	0.660	0.004	2.87***
Health	0.189	0.005	0.193	0.004	0.34
Housing	0.074	0.001	0.078	0.001	2.90***
Water	0.046	0.001	0.050	0.001	4.48**
Sanitation	0.013	0.0009	0.013	0.0007	0.03
Information	0.005	0.0005	0.004	0.0004	0.68
The Elderly					
Education	0.497	0.004	0.489	0.003	2.34
Health	0.387	0.003	0.398	0.003	2.92***
Housing	0.063	0.001	0.062	0.001	0.49
Water	0.035	0.001	0.033	0.001	1.43
Sanitation	0.009	0.0009	0.009	0.0009	0.00
Information	0.006	0.0008	0.008	0.0008	3.88**

Notes: SE = standard error; * = 1% level of significance, ** = 5% level of significance and *** = 10% level of significance

Table 4: Adjusted headcount ratio (M_0) of men and women deprived in each indicator and gender differences (k = 33%)

	Male		Female		Difference between male and female estimates
	M_0	Bootstrap SE	M_0	Bootstrap SE	Absolute
The whole population					
Education	0.612	0.003	0.604	0.003	2.32
Health	0.255	0.003	0.257	0.003	0.19
Housing	0.071	0.001	0.074	0.001	2.17
Water	0.042	0.001	0.045	0.001	2.76***
Sanitation	0.011	0.0006	0.012	0.0006	0.13
Information	0.005	0.0004	0.006	0.0004	0.33

Notes: SE = standard error; * = 1% level of significance, ** = 5% level of significance and *** = 10% level of significance

3.3 The incidence and the intensity of multidimensional poverty

Using a poverty threshold of 33.33%, Table 5 presents estimates of the multidimensional headcount ratio (H), the intensity of multidimensional poverty (A), and the adjusted headcount ratio (M_0). It also highlights the significance of gender differences in absolute terms. The standard errors were estimated using the bootstrap technique proposed by Efron (1981), employing 1 000 stratified bootstrap replications. The first two measures helped determine the incidence and intensity of multidimensional poverty, while the adjusted headcount ratio was used to calculate the individual base multidimensional poverty index (MPI).

The findings indicate significant variability in the incidence of poverty and the MPI among different age groups in Tunisia. Notably, elderly individuals emerge as the most vulnerable group regarding multidimensional poverty (in terms of incidence, intensity and the MPI). Statistically significant

gender gaps exist within each group concerning multidimensional poverty; however, in relative terms, these gaps are estimated to be less than 11% for all age groups, except for children. Specifically, elderly individuals face the largest gender gap in the MPI (10.31%), whereas children experience the smallest gap (1.59%). It is important to note that the observed gender gaps favour men across all groups.

Furthermore, the analysis reveals that adult men and women tend to experience similar intensity levels of multidimensional poverty. In contrast, for children and the elderly, girls and women show higher intensity levels of poverty compared to boys and men. Consequently, we can conclude that, among adults, the size and direction of the estimated gender gaps in the MPI are influenced primarily by the differences in poverty incidence. Among the elderly and children, these gaps are mainly determined by differences in poverty intensity.

Overall, the results indicate that gender gaps in multidimensional poverty in Tunisia are less than 11%. In addition, the data suggests that poverty is feminised: Tunisian men display better outcomes regarding the incidence of poverty (7.26%), poverty intensity (3.28%), and the MPI (10.78%) compared to women.

Table 5: Multidimensional poverty measures by age group and gender, and gender differences (k = 33%)

	Male		Female		Significance of gender differences
Subgroup	**H (%)**	**Bootstrap SE**	**H (%)**	**Bootstrap SE**	**Absolute**
The multidimensional headcount ratio (H)					
Children	14.70	0.009	14.50	0.008	0.03
Adults	68.73	0.006	72.39	0.006	17.24*
Elderly	92.27	0.006	95.79	0.005	13.41*
Whole population	59.06	0.005	63.35	0.006	21.01*
b	**Male**		**Female**		**Significance of gender differences**
Subgroup	**A**	**Bootstrap SE**	**A**	**Bootstrap SE**	**Absolute**
The intensity of multidimensional poverty (A)					
Children	0.428	0.002	0.441	0.007	0.12
Adults	0.475	0.004	0.489	0.005	3.65***
Elderly	0.630	0.003	0.670	0.004	13.87*
Whole population	0.518	0.004	0.535	0.001	4.67**
	Male		**Female**		**Significance of gender differences**
Subgroup	**M_0**	**Bootstrap SE**	**M_0**	**Bootstrap SE**	**Absolute**
The adjusted headcount ratio (M_0) : MPI index (H*A)					
Children	0.063	0.003	0.064	0.003	0.06
Adults	0.327	0.003	0.354	0.003	23.47*
Elderly	0.582	0.007	0.642	0.005	42.96*
Whole population	0.306	0.003	0.339	0.003	37.35*

Notes: SE = standard error; * = 1% level of significance, ** = 5% level of significance and *** = 10% level of significance

3.4 Inequality among the multidimensionally poor

According to Jenkins and Lambert (1997), inequality is one of three dimensions of poverty that has been overlooked in the analysis of multidimensional poverty. This work aims to provide insights into the absolute inequality of deprivation scores among multidimensionally poor individuals in Tunisia. The findings are summarised in Table 6.

Overall, the results indicate an inverse relationship between the level of inequality among the poor and the individuals' age. Specifically, our analysis reveals that the most significant inequality in deprivation scores is found among girls in the child age group, while the smallest inequality is observed among older women.

Regarding gender gaps, our results first show that, among older individuals, the gender gap in inequalities is markedly larger than the gap seen in multidimensional poverty (29% compared to 4%). In addition, inequality among multidimensionally poor men appears higher than that among women, except in the child demographic. Furthermore, the gender gap observed among both adults and the elderly tends to favour women.

We also find that the overall gender inequality gap, estimated at 5% in relative terms, favours women and is primarily influenced by the disparity among the elderly (29%). Therefore, in Tunisia, unlike the trends seen in the incidence of multidimensional poverty, inequality appears to be predominantly masculine: multidimensionally poor men experience more severe poverty compared to their female counterparts.

Table 6: Inequality among the multidimensionally poor (I_q) by age group

	Male		Female	
	I_q	Bootstrap SE	I_q	Bootstrap SE
Children	0.380	0.004	0.382	0.004
Adults	0.260	0.004	0.254	0.002
Elderly	0.180	0.004	0.140	0.003
Whole population	0.313	0.002	0.300	0.002

Notes: SE = standard error; * = 1% level of significance, ** = 5% level of significance and *** = 10% level of significance

3.5 Gender gaps in poverty using an enhanced multidimensional poverty measure

The estimates for the enhanced multidimensional poverty measure, which includes employment (for adults) and social protection (for the elderly) as a fourth dimension, are presented in Tables 7 and 8, respectively. Each dimension has been assigned an equal weight (25%), and we set the second threshold at 25%. This aligns qualitatively with the previously used threshold of 33.33%. Thus, individuals are classified as multidimensionally poor if they are deprived in at least one full dimension, making the new results comparable to previous findings.

Overall, the results clearly indicate that the inclusion of dimensions in which women experience relatively greater deprivation leads to significant gender gaps. Specifically, when we incorporate employment information, domestic work and social protection in the three-dimensional index (which includes education, health and living standards), gender gaps are found to increase. Consequently, multidimensional poverty becomes feminised; women are more likely to be classified as multidimensionally poor than men.

Table 7: Multidimensional poverty measures among adults, considering employment as the fourth dimension

Measure	Male	Bootstrap SE	Female	Bootstrap SE
Incidence (H%)	82.6	0.007	94	0.004
Intensity (A)	0.375	0.005	0.506	0.006
MPI (M_0)	0.31	0.003	0.476	0.003
Inequality (I_q)	0.24	0.003	0.189	0.003

Note: SE = standard error

Table 8: Multidimensional poverty measures among the elderly, considering social protection as the fourth dimension

Measure	Male	Bootstrap SE	Female	Bootstrap SE
Incidence (H%)	95.07	0.006	99.05	0.002
Intensity (A)	0.461	0.004	0.594	0.003
MPI (M_0)	0.439	0.007	0.589	0.005
Inequality (I_q)	0.217	0.003	0.166	0.003

Note: SE = standard error

3.6 Analysis of the determinants of multidimensional poverty

To further our previous analysis, we examined the determinants of multidimensional poverty in Tunisia by estimating logit regression models. In these models, the dependent variable is coded as 1 if an individual is classified as multidimensionally poor, and 0 otherwise. Specifically, we estimated two regression models: the first (M1) analysed the probability of an individual being identified as multidimensionally poor using a three-dimensional measure. In contrast, the second (M2) focused on the same probability based on a four-dimensional measure.

In both regressions, we included several explanatory variables: the individual's sex (male or female), age, area of residence (urban or rural), region of residence (represented by five dummy variables: centre west, centre east, north west, south east and south west), household size, along with its square, the sex of the head of household, and marital status (with three dummy variables for married, divorced and widowed individuals). We furthermore incorporated interaction variables to capture the combined effects of area and region of residence. The results of these estimations are detailed in Table 9.

The findings indicate that the gender variable is statistically significant, suggesting that an individual's sex is indeed related to the likelihood of being multidimensionally poor. Utilising the three-dimensional measure (which includes health, education and standard of living), the analysis reveals that women in Tunisia are more likely to be multidimensionally poor than men. This trend is further confirmed when the multidimensional poverty measure is expanded to include aspects of employment and social security, with gender exhibiting an even stronger effect on poverty probability, validating our initial conclusions.

Both regression models demonstrate a positive correlation between an individual's age and the likelihood of being considered poor. This observation aligns with our main findings, which indicate that the highest poverty rates are observed among older adults and the elderly. Furthermore, those residing in rural areas are significantly more likely to experience poverty compared to their urban counterparts. This result is consistent with the research conducted by Alkire and Santos (2014) and Santos and Villatoro (2018), highlighting an issue that warrants special attention from policymakers. In addition, the analysis shows that individuals living outside the northern region (which includes the capital, Greater Tunis, as well as Nabeul and Bizerte) face a higher probability of being classified as poor. This likelihood is particularly pronounced for individuals residing in central rural areas, specifically the Centre West and North-West regions.

Our results also reveal a positive and significant relationship between household size and the likelihood of being classified as poor. Regarding the sex of the head of the household, both models suggest that this variable significantly influences poverty likelihood, indicating that female-headed households are at a higher risk of poverty compared to male-headed households. Thus, our findings reaffirm the notion that women are more likely to experience poverty than men, as supported by Chant (2008), Klasen *et al*. (2015) and Bradshaw *et al*. (2018). Moreover, the results indicate that married

individuals, all else being equal, tend to have a greater probability of being classified as poor compared to those who are living alone or are divorced.

Table 9: Results of the logit regressions

Poverty	**M 1**		**M 2**	
Explanatory variables	**Coefficient**	**Robust SE**	**Coefficient**	**Robust SE**
Gender (base: male)				
Female	0.207*	0.044	0.395*	0.050
Age	0.074*	0.002	0.052*	0.002
Area of residence (base: urban)				
Rural	0.776*	0.082	0.994*	0.088
Region of residence (base: north)				
Centre west	0.058	0.140	0.647*	0.153
Centre east	-0.202**	0.089	-0.120	0.084
North west	0.221	0.140	0.394*	0.135
South east	0.742*	0.101	0.873*	0.110
South west	-0.034	0.145	-0.177	0.138
Household size	-0.276*	0.060	-0.396*	0.081
Square of the household size	0.025*	0.005	0.033*	0.007
Gender of the household head (base: male)				
Female	0.804*	0.184	0.492*	0.326
Marital status of the household head (base: single)				
Married	0.463*	0.063	0.285*	0.078
Divorced	-0.469	0.349	-0.144	0.434
Widowed	-0.148	0.233	-0.170	0.326
Interaction: rural (centre west)	-0.204	0.165	0.748*	0.200
Interaction: rural (centre east)	0.127	0.126	-0.097	0.130
Interaction: rural (north west)	0.024	0.164	0.722*	0.188
Interaction: rural (south east)	-0.634*	0.149	-0.104	0.191
Interaction: rural (south west)	-0.400	0.207	-0.024	0.215
Constant	-3.239*	0.219	-1.552*	0.267
Number of observations	14 102		14 102	
Wald $chi^2(21)$	3 337.50		1 907.2	
Prob. > chi^2	0.0000		0.0000	
Pseudo R^2	0.3248		0.2303	
Log pseudolikelihood	-6 377.29		-5 051.282	

Notes: SE = standard error; * = 1% level of significance and ** = 5% level of significance

4. Analysis of robustness

To assess the robustness of our findings, we modified the multidimensional poverty cutoffs (k) and the weighting structures (w). Specifically, we planned to estimate multidimensional poverty using a two-dimensional poverty line set at 66.66%, and to explore five alternative weighting structures. The results are detailed in Tables 10, 11, 12 and 13.

Our analysis reveals that men's multidimensional poverty, measured by the multidimensional poverty index (MPI) and its components – incidence and intensity – is significantly lower than that of women. This indicates that multidimensional poverty in Tunisia appears to disproportionately affect women. In addition, we observed that the magnitude of gender disparities in poverty and inequality is sensitive to changes in weighting patterns. In some instances, the direction of these gaps may even shift from the reference points. Furthermore, we found that changes in weighting structures affect the levels of different poverty measures; however, the ranking of age groups regarding poverty and inequality remains consistent. The analysis highlights that the elderly are the most vulnerable age group in terms of poverty, while children are the most vulnerable regarding inequality.

Table 10: Multidimensional poverty incidence (H %) in Tunisia, using six alternative weighting structures

	K = 33%			K = 66%		
	H (%)			H (%)		
Weighting framework	**Children**	**Male**	**Female**	**Children**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	14.6	14.70	14.50	1.16	1.165	1.160
Living standard was weighted at 50%, while education and health each was weighted at 25%	13.36	12.70	14.04	0.425	0.380	0.460
Education was weighted at 50%, while health and living standard each was weighted at 25%	13.87	14.15	13.58	2.07	1.83	2.32
Health was weighted at 50%, while education and living standard each was weighted at 25%	5.21	4.55	5.91	1.13	1.10	1.16
Living standard was weighted at 20%, while education and health each was weighted at 40%	14.52	14.65	14.39	1.13	1.10	1.16
Education and health each was weighted at 50%; living standard was not considered	14.52	14.65	14.39	1.13	1.10	1.16
Weighting framework	**Adults**	**Male**	**Female**	**Adults**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	69.32	67.22	71.33	17.38	15.91	18.60
Living standard was weighted at 50%, while education and health each was weighted at 25%	47.32	43.92	50.16	4.32	4.18	4.44
Education was weighted at 50%, while health and living standard each was weighted at 25%	68.54	66.21	70.49	19.44	17.87	20.78
Health was weighted at 50%, while education and living standard each was weighted at 25%	30.89	28.35	33.01	17.35	15.91	18.56
Living standard was weighted at 20%, while education and health each was weighted at 40%	70.69	68.70	72.35	17.28	15.80	18.51
Education and health each was weighted at 50%; living standard was not considered	70.69	68.70	72.35	17.28	15.80	18.51
Weighting framework	**Elderly**	**Male**	**Female**	**Elderly**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	92.96	90.67	95.27	69.20	62.84	75.45
Living standard was weighted at 50%, while education and health each was weighted at 25%	82.91	77.75	87.98	17.27	16.05	18.46
Education was weighted at 50%, while health and living standard each was weighted at 25%	90.71	87.00	94.36	69.77	63.22	76.20
Health was weighted at 50%, while education and living standard each was weighted at 25%	77.46	72.93	81.90	69.05	62.61	75.37
Living standard was weighted at 20%, while education and health each was weighted at 40%	93.90	92.04	95.72	68.97	62.53	75.30
Education and health each was weighted at 50%; living standard was not considered.	93.90	92.04	95.72	68.97	62.53	75.30
Weighting framework	**The whole population**	**Male**	**Female**	**Total**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	61.31	59.06	63.35	22.88	20.96	24.63
Living standard was weighted at 50%, while education and health each was weighted at 25%	45.54	42.18	48.60	5.73	5.44	6.00
Education was weighted at 50%, while health and living standard each was weighted at 25%	59.27	56.54	61.75	24.39	22.28	26.30
Health was weighted at 50%, while education and living standard each was weighted at 25%	33.13	30.59	35.44	22.83	20.90	24.59
Living standard was weighted at 20%, while education and health each was weighted at 40%	61.42	58.99	63.28	22.78	20.83	24.55
Education and health each was weighted at 50%; living standard was not considered	61.42	58.99	63.28	22.78	20.83	24.55

Table 11: Adjusted headcount ratio (M_0) and MPI, using six alternative weighting structures

	K = 33%			K = 66%		
	M_0			M_0		
Weighting framework	**Children**	**Male**	**Female**	**Children**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.064	0.063	0.064	0.0089	0.008	0.009
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.059	0.055	0.059	0.0034	0.0031	0.0036
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.080	0.081	0.080	0.015	0.014	0.017
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.027	0.023	0.027	0.009	0.009	0.009
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.069	0.069	0.069	0.009	0.009	0.01
Education and health each was weighted at 50%; living standard was not considered	0.078	0.078	0.078	0.0113	0.011	0.0116
Weighting framework	**Adults**	**Male**	**Female**	**Adults**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.306	0.292	0.32	0.128	0.118	0.137
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.235	0.218	0.250	0.0339	0.032	0.034
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.421	0.403	0.436	0.154	0.142	0.164
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.195	0.180	0.208	0.139	0.128	0.149
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.381	0.365	0.394	0.146	0.133	0.156
Education and health each was weighted at 50%; living standard was not considered	0.439	0.422	0.454	0.172	0.158	0.185
Weighting framework	**Elderly**	**Male**	**Female**	**Elderly**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.534	0.501	0.567	0.514	0.467	0.559
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.484	0.450	0.517	0.136	0.125	0.146
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.677	0.639	0.713	0.562	0.510	0.613
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.594	0.552	0.634	0.557	0.505	0.607
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.693	0.658	0.727	0.583	0.529	0.636
Education and health each was weighted at 50%; living standard was not considered	0.814	0.772	0.855	0.689	0.625	0.753
Weighting framework	**The whole population**	**Male**	**Female**	**Total**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.323	0.306	0.339	0.169	0.156	0.182
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.238	0.219	0.254	0.045	0.042	0.047
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.385	0.363	0.404	0.195	0.178	0.210
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.227	0.210	0.242	0.184	0.168	0.198
Living standard was weighted at 20%, while education and wealth each was weighted at 40%	0.362	0.343	0.379	0.192	0.176	0.207
Education and health each was weighted at 50%; living standard was not considered	0.420	0.399	0.439	0.227	0.208	0.245

Table 12: Multidimensional poverty intensity (A), using six alternative weighting structures

	K = 33%			K = 66%		
	A			A		
Weighting framework	**Children**	**Male**	**Female**	**Children**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.4384	0.4286	0.4414	0.7672	0.6867	0.7759
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.4416	0.4328	0.4202	0.8000	0.8158	0.7826
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.5768	0.5724	0.5891	0.7246	0.7650	0.7328
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.5182	0.5055	0.4569	0.7965	0.8182	0.7759
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.4752	0.4710	0.4795	0.7965	0.8182	0.8621
Education and health each was weighted at 50%; living standard was not considered	0.5372	0.5324	0.5420	0.9999	0.9999	0.9999
Weighting framework	**Adults**	**Male**	**Female**	**Adults**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.4414	0.4344	0.4486	0.7365	0.7417	0.7366
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.4966	0.4964	0.4984	0.7847	0.7656	0.7658
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.6142	0.6087	0..6185	0.7922	0.7946	0.7892
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.6313	0.6349	0.6301	0.8012	0.8045	0.8028
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.5390	0.5313	0.5446	0.8449	0.8418	0.8428
Education and health each was weighted at 50%; living standard was not considered	0.6210	0.6143	0.6275	0.9954	0.9999	0.9995
Weighting framework	**Elderly**	**Male**	**Female**	**Elderly**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.5744	0.5526	0.5952	0.7428	0.7432	0.7409
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.5838	0.5788	0.5876	0.7875	0.7788	0.7909
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.7463	0.7345	0.7556	0.8055	0.8067	0.8045
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.7668	0.7569	0.7741	0.8067	0.8066	0.8054
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.7380	0.7149	0.7595	0.8453	0.8460	0.8446
Education and health each was weighted at 50%; living standard was not considered	0.8669	0.8388	0.8932	0.9990	0.9995	0.9999
Weighting framework	**The whole population**	**Male**	**Female**	**The whole population**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.5268	0.5181	0.5351	0.7386	0.7443	0.7389
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.5226	0.5192	0.5226	0.7853	0.7721	0.7833
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.6496	0.6420	0.6543	0.7995	0.7989	0.7985
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.6852	0.6865	0.6828	0.8060	0.8038	0.8052
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.5894	0.5815	0.5989	0.8428	0.8449	0.8432
Education and health each was weighted at 50%; living standard was not considered	0.6838	0.6764	0.6937	0.9965	0.9986	0.9980

Table 13: Inequality among the multidimensionally poor (Iq), using six alternative weighting structures

	Iq		
Weighting framework	**Children**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.381	0.380	0.382
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.280	0.276	0.283
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.487	0.488	0.486
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.410	0.406	0.413
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.499	0.499	0.498
Education and health each was weighted at 50%; living standard was not considered	0.066	0.065	0.068
Weighting framework	**Adults**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.257	0.260	0.254
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.248	0.252	0.244
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.224	0.230	0.220
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.333	0.335	0.330
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.265	0.267	0.263
Education and health each was weighted at 50%; living standard was not considered	0.148	0.144	0.151
Weighting framework	**Elderly**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.16	0.180	0.140
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.178	0.194	0.161
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.129	0.151	0.107
Health was weighted at 50%, while education and living standard each was weighted at 5%	0.186	0.209	0.162
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.151	0.172	0.129
Education and health each was weighted at 50%; living standard was not considered	0.112	0.129	0.093
Weighting framework	**The whole population**	**Male**	**Female**
Each dimension (education, health and living standard) was given an equal proportion (33.3%)	0.306	0.313	0.300
Living standard was weighted at 50%, while education and health each was weighted at 25%	0.273	0.278	0.267
Education was weighted at 50%, while health and living standard each was weighted at 25%	0.288	0.299	0.278
Health was weighted at 50%, while education and living standard each was weighted at 25%	0.378	0.384	0.372
Living standard was weighted at 20%, while education and health each was weighted at 40%	0.331	0.339	0.324
Education and health each was weighted at 50%; Living standard was not considered	0.170	0.168	0.171

5. Conclusions

Individual-based measures of multidimensional poverty consider intra-household inequalities and are gender-sensitive, as they differentiate the poverty situation of individuals from that of the household. In this paper, we contribute to the literature on multidimensional poverty and gender inequality by proposing an individual multidimensional poverty measure for Tunisia. Our findings reveal that the incidence of multidimensional poverty in Tunisia is approximately 59%, indicating a significant

issue. In addition, multidimensionally poor individuals typically experience deprivation in more than 50% of the indicators analysed.

Using a three-dimensional index (which includes education, health and standard of living), we observed that multidimensional poverty in Tunisia appears to be feminised. We estimated the gender gaps to be less than 11%; men tend to be better off than women concerning the incidence of poverty (7.26%), the intensity of poverty (3.28%), and the multidimensional poverty index (MPI) (10.78%). However, inequality among the multidimensionally poor generally favours men, especially among the elderly, where the gap reaches 29%. Our analysis indicates that the gender gap in inequalities in Tunisia is around 5% in favour of women. This means that multidimensionally poor men endure more severe poverty compared to their female counterparts. When we include a fourth dimension – employment, domestic work and social protection – the gender gaps in Tunisia widen considerably. This further confirms that poverty is clearly feminised. Our investigation of the determinants of multidimensional poverty in Tunisia demonstrates that women are more likely to be multidimensionally poor than men. The results also show that the gender of the household head is an important factor. Female-headed households are at greater risk of being multidimensionally poor compared to male-headed ones.

Given these findings, we that recommend policymakers implement multidimensional poverty-reduction strategies that explicitly incorporate gender-sensitive approaches. Priority should be given to designing and expanding targeted social protection programmes for elderly women, who display the highest levels of deprivation and vulnerability. Furthermore, policy interventions should aim to enhance women's access to decent and secure employment. They should also address the burden of unpaid domestic and care work. Both measures are crucial for reducing gender disparities. Strengthening adult and lifelong learning opportunities, particularly for women in rural and socioeconomically disadvantaged areas, is also essential to address the persistent educational deficits among older cohorts. Finally, regionally targeted development policies should be formulated and implemented. These will help reduce the heightened vulnerability in rural and inland areas and contribute to lowering spatial inequalities.

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