

A multidimensional poverty indicator for Portugal

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Abstract

This article proposes a multidimensional poverty indicator applied to Portugal, based on the methodology of Alkire and Foster (2011). The indicator aggregates 21 variables that cover dimensions such as participation in the labor market, education, material deprivation, social deprivation, health and housing. According to this methodology, multidimensional poverty in Portugal has declined continuously since 2014. In 2020, the proportion of the population in multidimensional poverty was 15.4% (5.8% in severe poverty). A multidimensional approach allows identifying individuals who are not included in the usual indicators of poverty and social exclusion in Portugal. These segments of the population have particularly adverse living conditions and a low degree of subjective well-being. (JEL: I31, I32)

“Peace, the bread
housing
health, education”
[own translation]

Liberdade (Freedom) (1974), Sérgio Godinho

1. Introduction

Poverty has a multifaceted nature. Everyday reality shows how the trajectories and experiences of people in poverty have multiple dimensions. In 1984, the Council of the European Union defined the poor as “persons, families and groups of persons whose resources (material, cultural and social) are so limited as to exclude them from a minimal acceptable way of life in the Member State in which they live” (Council, 1985). This definition is both absolute (the exclusion of an acceptable way of life) and relative (since the assessment depends on the reality of each country). Additionally, it considers that deprivation of both monetary and non-monetary resources is at the

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root of exclusion. This complexity has been gradually incorporated into the European statistical system, with the progressive inclusion of new indicators aiming to encompass the different faces of poverty (Fusco et al., 2010 and Guio et al., 2012). This is ongoing work (Aaberge and Brandolini, 2015).

In order to complement the traditional measures of poverty and social exclusion in the European Union, several multidimensional indicators were proposed in recent years (see, for example, Nolan and Whelan, 2010, Whelan et al., 2014, Alkire and Apablaza, 2017, Alkire et al., 2021). This article contributes to this literature and presents a new multidimensional poverty indicator, which is applied to the Portuguese economy. This indicator encompasses dimensions such as participation in the labor market, material deprivation, social deprivation, health and housing. Individuals identified as poor in this multidimensional perspective do not coincide with those identified in the standard indicators used in the European Union. In this sense, there is value in adopting a multidimensional perspective in the analysis of poverty. This conclusion also reinforces the importance of designing policies that seek to act on the various dimensions of poverty in Portugal. This multidimensional approach thus complements recently published analyses for understanding poverty in Portugal, of a quantitative and qualitative nature (see, for example, Rodrigues et al., 2016, and Diogo et al., 2021).

The article is organised as follows. Section 2 presents a brief analysis of the poverty indicators commonly used in the European Union. Section 3 describes the database and the variables used in defining multidimensional poverty. Section 4 presents the Alkire and Foster's (2011) methodology for building a multidimensional poverty indicator and applies it to the Portuguese reality. Section 5 presents a socio-economic characterization of individuals experiencing multidimensional poverty and section 6 describes some representative indicators of their living conditions. Section 7 presents the main conclusions of the article.

2. An analysis of the main poverty and social exclusion indicators in the European Union

The main indicator for monitoring poverty and social exclusion in the European Union is the population at risk of poverty or social exclusion (abbreviated as AROPE). This is an aggregate indicator, made up of three sub-indicators:

- The population at risk of poverty (AROP), which corresponds to the population whose equivalised disposable income¹ is below the poverty line, defined as 60% of the median equivalised disposable income in the country.

1. Equivalised income is obtained dividing total household income by the number of "equivalent adults", using the OECD modified equivalised scale. Here, the first adult has a weight of 1.0, the remaining adults have a weight of 0.5 and children until the age of 14 get a weight of 0.3. For example, in case of a household with two adults and two children, the household income would be divided by 2.1. This equivalised income would then be attributed to each household member.

- The population in severe material and social deprivation, which, in the new definition adopted in 2021, corresponds to the population experiencing an enforced lack of at least seven of the following thirteen items: a) Capacity to face unexpected expenses (without resorting to a loan); b) Capacity to afford paying one week of vacation, per year, away from home; c) Capacity to avoid arrears; d) Capacity to have an adequate diet; e) Ability to keep the home adequately heated; f) Have access to a car; g) Replace worn-out furniture; h) Replace worn-out clothes; i) Have two pairs of properly fitting shoes; j) Spend a small amount of money each week on him/herself; k) Participate regularly in leisure activities; l) Meet friends/family for a drink/meal at least once a month; m) Have an internet connection.
- Population living in households with very low per capita work intensity: persons under the age of 65 who, in the income reference period, lived in households in which the persons aged 18 to 64 reported having worked, on average, less than 20% of their total work-time potential (excluding students and retirees).

A person is at risk of poverty or social exclusion if she meets at least one of the conditions described above, that is, if she lives at risk of poverty or in severe material and social deprivation or in households with very low per capita work intensity. Figure 1 shows the distribution of the population at risk of poverty or social exclusion in Portugal in 2020. These figures were calculated with data from the Survey on Income and Living Conditions of Households (INE, 2021). The figure highlights several important traits, which are also observed in other European countries (see Rodrigues and Andrade, 2010 and Fusco et al., 2010). Firstly, the results calculated with the union of the three sub-indicators are radically different from those that would be obtained with their intersection. In the Portuguese case, in 2020, around 2 million individuals were at risk of poverty or social exclusion, but less than 100,000 lived in households where the three sub-indicators were simultaneously observed. Second, individuals at risk of poverty constitute the vast majority of those at risk of poverty or social exclusion. In the Portuguese case, more than 1.2 million individuals were at risk of poverty without experiencing severe material and social deprivation or low work intensity. Third, a significant fraction of individuals experiencing severe material and social deprivation do not live either at risk of poverty or in households with low work intensity. In Portugal, this fraction amounts to 42%.

This low intersection between the three poverty indicators is related to several factors (see Perry, 2002 and Fusco et al., 2010). First, monetary income may not reflect the true capability of individuals to have access to economic resources or to translate those resources into a full participation in the life of society (Sen, 1983). The existence of past savings, access to non-monetary sources of income or the possibility of resorting to loans or support from family and friends limit the contemporary relationship between low income and material deprivation. Second, while the information on material and social deprivation refers to the year of the survey, data on household income and work intensity refer to the year prior to the survey, so they do not necessarily reflect the contemporaneous situation of individuals. This lag is important as there are significant transitions to and from poverty or deprivation. On average in the European Union,

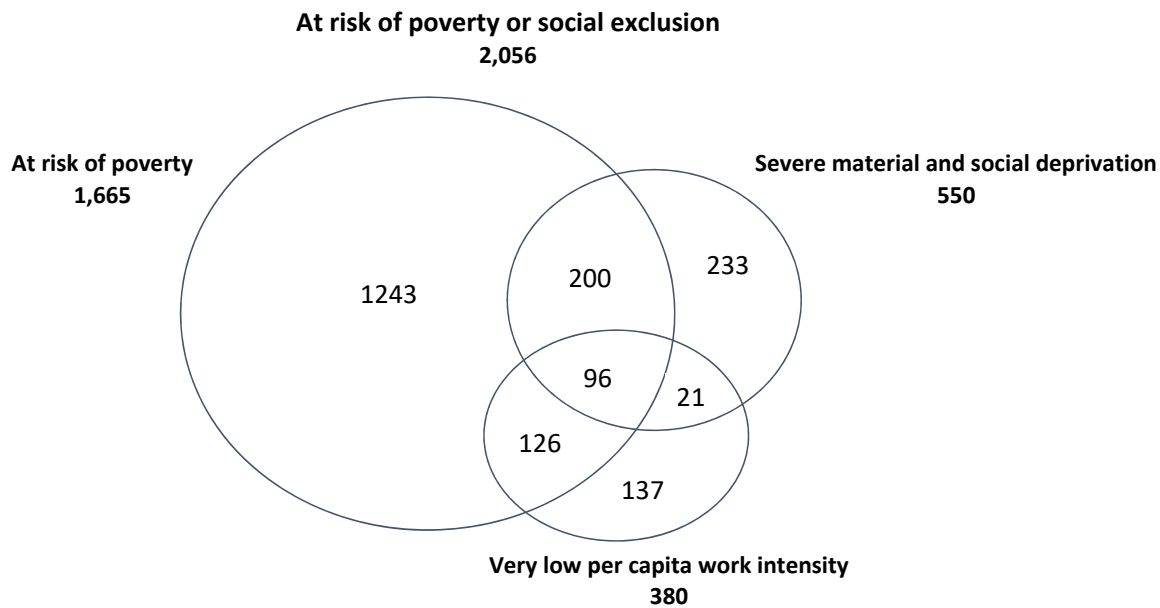


FIGURE 1: Breakdown of the population at risk of poverty or social exclusion (Portugal, 2020). Thousands of individuals.

Source: Eurostat.

Note: The size of the circles is merely illustrative and is not drawn to scale.

only around 30% of individuals who are at risk of poverty in a given year remain at poverty for four years. A similar percentage is recorded for individuals in severe material deprivation (Alkire et al., 2021). Third, there are known measurement errors in the reporting of monetary earnings, namely at the extremes of the distribution (Fusco et al., 2010). At the same time, the assessment of deprivation is anchored on subjective perceptions, which can be biased, particularly in case of very persistent deprivation situations. The combination of these measurement errors in the various indicators can contribute to the low overlap between them.

Finally, it is important to mention that the at-risk-of-poverty indicator has an eminently relative nature, that is, an individual is explicitly compared with the median of the income distribution in the respective country. In this sense, it fails to explicitly capture situations of deprivation or exclusion, which are more related to permanent income and the ability to translate that income into an effective participation in the life of society. These situations of absolute deprivation tend to be more reliably captured by the indicator of severe material and social deprivation (for a discussion of the relationship between absolute and relative concepts of poverty, see Sen, 1983).

3. A multidimensional approach based on EU-SILC information

The risk of poverty or social exclusion indicator is calculated with the union of the three sub-indicators that compose it. It thus aggregates individuals with very different situations of deprivation and exclusion. Additionally, it does not cover several

dimensions of households' living conditions whose importance is unquestionable. Some of these dimensions are present in the European Union Statistics on Income and Living Conditions (EU-SILC) database, which is used to calculate poverty and inequality statistics in the European Union. This database aggregates, at a European level, the various surveys conducted by national statistical institutes (in the Portuguese case, the *Inquérito às Condições de Vida e Rendimento das Famílias*, ICOR,² conducted by INE). The wealth of information available in the EU-SILC survey creates an opportunity to complement the current indicators with a multidimensional analysis of a broader scope.

Table 1 presents the 21 variables used in this article to calculate the multidimensional poverty indicators. The choice of variables is anchored in the information available in EU-SILC and seeks to encompass dimensions whose deprivation corresponds to an effective exclusion in the Portuguese society. For each variable, a criterion was defined to determine the individuals who are in a situation of deprivation, inspired by the literature and the categorization available in the database. Taken in isolation these variables do not necessarily reflect poverty situations; it is the combination of a significant number of deprivations that will make it possible to identify individuals in multidimensional poverty. For ease of exposition, the indicators were aggregated into 5 dimensions: (i) labor market participation, (ii) material deprivation, (iii) social deprivation, (iv) health and (v) housing. These dimensions are interdependent and therefore should not be considered in isolation. The microeconomic data that allow these calculations are available for the period 2014-2020. Table 1 includes, in the last column, the percentage of individuals in a situation of deprivation in each of the variables in 2020.

Participation in the labor market is an important dimension determining a situation of multidimensional poverty, not only for the dignity that this participation confers to each individual, but also for the potential to generate monetary income, essential for a full participation in the life of society. This dimension includes the (in)ability to work associated with health limitations, the prevalence of unemployment situations in a household (with more than half of the adults in this condition) and the individual's level of education. For the definition of exclusion associated with education, the broad criterion used was the completion of compulsory education prevailing at the time the individual was of school age. Unfortunately, the information in the database does not allow the identification of individuals with 6 completed years of schooling, which limits the application of this criterion to a significant part of the population, given that this was the compulsory schooling prevailing between 1964 and 1985. In these cases, a strict version of exclusion was chosen, considering that completion of primary education would be a sufficient indicator of non-exclusion. Even under this strict view, around 10% of the population is identified as being deprived of education in 2020.

In the case of material deprivation, almost all of the indicators are already present in the official indicator of material and social deprivation. It should be noted that, in all cases, material deprivation explicitly results from an enforced lack, not being

2. In 2020, the ICOR surveyed 11367 households, corresponding to 27698 persons, whose results can be extrapolated to the population as a whole through survey weights.

Domain	Indicator	Deprivation criteria	% of deprived population in 2020
Labor market participation	(1) Ability to work	The individual spent 12 months (in the previous year) unable to work due to long-standing health problems	1.5
	(2) Unemployed households	Households where more than half of the adults are in unemployment	3.6
	(3) Education	Individual between 17 and 19 years-old only with primary school, between 20-29 only with lower secondary, between 30-49 only with primary school and over 49 without primary school completed.	10.2
Labor market participation	(4) Capacity to face unexpected expenses	Without capacity to face unexpected expenses amounting to the poverty line (without taking a loan)	30.7
	(5) Capacity to afford paying holidays away from home	Without capacity to afford paying for one week annual holiday away from home, supporting all expenses for all household members	38.0
	(6) Capacity to being confronted with payment arrears	Arrears on mortgage or rental payments, utility bills, hire purchase instalments or other loan payments, due to economic difficulties.	5.4
	(7) Food	Without capacity to afford a meal with meat, chicken, fish or vegetarian equivalent every second day	2.5
	(8) Own car	Without capacity to afford access a car/van for personal use	4.4
	(9) Clothing and footwear	Without capacity to afford replacing worn-out clothes by some new ones or having two pairs of properly fitting shoes	8.5
	(10) Computer	Without capacity to afford a computer	5.8
Social deprivation	(11) Spending a small amount of money each week on him/herself	Without capacity to afford spending a small amount of money each week on him/herself	10.5
	(12) Having regular leisure activities	Without capacity to afford having regular leisure activities	11.1
	(13) Getting together with friends/family	Without capacity to afford getting together with friends/family for a drink/meal at least once a month	7.7
	(14) Having internet connection at home	Without capacity to afford having internet connection	3.5
Health	(15) General health	Self-perceived general health is "very bad"	3.0
	(16) Limitation in activities because of health problems	"Severe limitations" in activities because of health problems	7.6
	(17) Unmet medical or dentist examination	Unmet medical or dentist examination because "could not afford to"	8.4
Housing	(18) Warm home	Without capacity to afford keeping home adequately warm	17.4
	(19) Pollution	Existence of pollution, grime or other environmental problems in the neighborhood	13.2
	(20) Crime	Existence of crime, violence or vandalism in the neighborhood	6.6
	(21) Overcrowding	Overcrowded household (Eurostat definition)	8.9

TABLE 1. Variables used in the computation of the multidimensional poverty indicator

Source: Calculations based on ICOR 2020.

associated with a free choice of individuals. This dimension includes the inability to pay an unexpected expense (an amount close to the monthly monetary poverty line), the inability to pay for a week's vacation away from home, the inability to meet financial commitments, the inability to have adequate food, the unavailability of an own car, the inability to replace clothing or footwear (in this case aggregating these two variables of the official Eurostat deprivation indicator) and deprivation of a computer due to economic difficulties (this being the only variable not included in the official indicator). With regard to the social deprivation dimension, the indicators used are also found in the material and social deprivation indicator calculated by Eurostat. Specifically, social deprivation is measured based on the ability to spend a small amount of money each week, participating in leisure activities, being able to meet regularly with friends and family and having access to the internet at home. In all these cases, once again, deprivation must result from financial reasons and not from an unrestricted choice.

Limitations in health are fundamental as they condition an individual's full participation in society (Sen, 1983). In this dimension, the indicators analysed are the

global perception of health (with deprivation identified only in cases where perceived health is “very bad”), the existence of strong limitations to the development of daily activities for health reasons and the lack of access to medical or dental care due to financial reasons. Finally, in the housing dimension, deprivation is associated with the inability to keep the house adequately warm – an indicator also present in the calculation of material and social deprivation –, the existence of pollution or crime problems in the area where the household lives, and overcrowding, defined on the basis of Eurostat criteria.

The individual information from the EU-SILC survey only covers the population aged 16 and over. Thus, in the case of variables that focus on the household as a whole, the situation of the household was applied to all members, regardless of age. In the case of individual-related deprivation indicators, children under the age of 16 in a given household were considered to be deprived if more than half of the individuals aged 16 and over in the household were deprived.³

A conspicuous absence from the list of indicators in Table 1 is a variable that explicitly reflects the family’s monetary income. This absence contrasts with most studies on multidimensional poverty and with the official indicator of poverty and social exclusion in the European Union described in Figure 1.⁴ This choice is anchored in three main arguments. Firstly, if monetary income is a source of exclusion for individuals, this fact is already reflected in most of the indicators described above. Note that the deprivation reported by individuals is always due to financial constraints. In this sense, monetary income is already explicitly considered in the analysis. If low income does not translate into a situation of exclusion - for example because it is temporary or due to past savings or the existence of non-monetary income - then the level of income should not be reflected in the multidimensional poverty indicator. Secondly, as mentioned above, monetary income is observed with a time lag compared to the deprivation indicators described in Table 1. In this sense, the multidimensional indicator resulting from the aggregation of the 21 variables will more reliably reflect the situation of individuals in the year of the inquiry. Thirdly, including the level of monetary income would raise questions about the appropriate income threshold to consider. The poverty line used in official statistics is tied to the evolution of median income, which may not reflect the evolution of situations of deprivation and exclusion in the population.

3. The exceptions to this rule were indicators (1) and (15), referring to the individual’s inability to work and global health perception. The results of these indicators were not extrapolated to children.

4. All qualitative results reported in the following sections would be robust to the inclusion of a 22nd indicator, corresponding to individuals identified as being at risk of poverty according to the Eurostat definition. In quantitative terms, the changes would not be substantial. These results are made available by the author upon request.

4. A multidimensional poverty indicator for Portugal, based on Alkire and Foster (2011)

Equipped with a set of indicators that portray various facets of poverty, the question that arises is how to coherently combine these different variables in an aggregate indicator (see Aaberge and Brandolini, 2015). A direct solution would be to adopt a criterion of union or intersection of the indicators, that is, to assess how many individuals are deprived of at least one indicator and how many individuals are deprived of all indicators (Atkinson, 2003). However, as is well known, these criteria result in implausible levels of multidimensional poverty rates. For Portugal, in 2020, the union criterion calculated based on the 21 indicators would identify 64% of the population as poor, while the intersection criterion would identify 0% of the population as poor.

In this context, an appealing solution for the calculation of multidimensional poverty indicators is the methodology proposed by Alkire and Foster (2011). This methodology has a lot of flexibility and allows exogenously defining the cut-offs from which an individual is considered to be in deprivation (for each variable) and in multidimensional poverty (for the full set of variables).

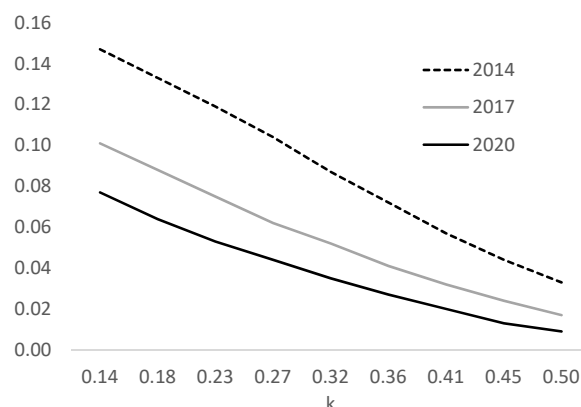
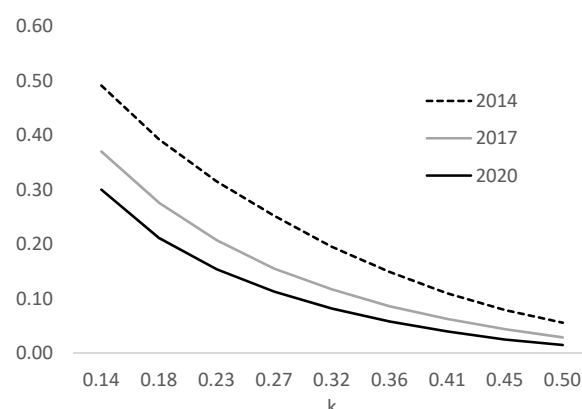
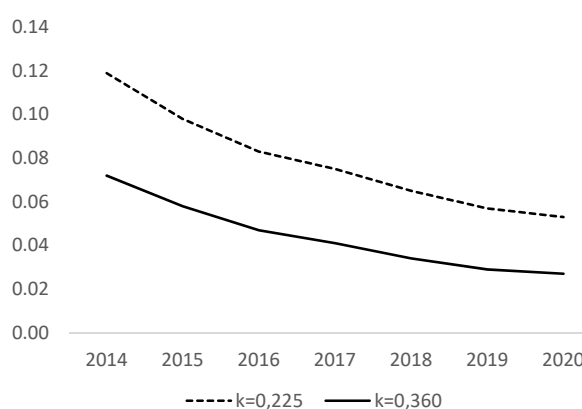
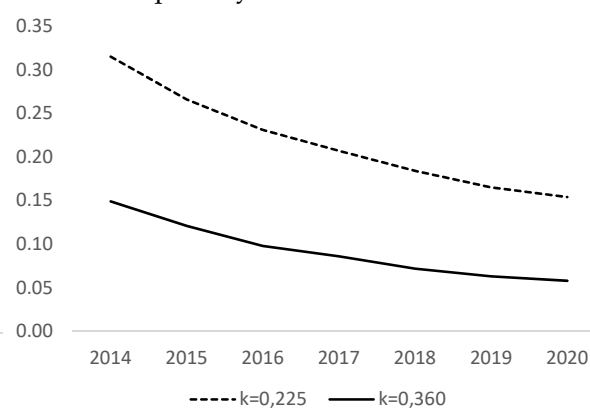
The methodology will be briefly presented here (for a formal description, see Alkire and Foster, 2011a). Starting from a set of variables that describe the domains of deprivation, it is first necessary to define the cut-offs that determine, for each variable, whether an individual is in deprivation. Table 1 describes in the third column the cut-offs adopted in this article for each of the 21 variables. Then, for each variable, a value of 1 or 0 is assigned to each individual, reflecting whether or not the individual is deprived. These values are summed for each individual, weighting the different variables with a set of appropriate weights. Here, in line with most of the literature, each of the 21 variables will be weighted equally (below it will be shown that the results are robust to alternative formulations of these vectors of weights). If that sum exceeds a certain cut-off, designated k , the individual is considered to be poor. The proposed multidimensional poverty indicator is called M_0 and results from the product of two scalars: (i) the proportion of individuals who are multidimensional poor (H) and (ii) the average deprivation share of those individuals. The indicator satisfies several desirable axiomatic properties, as demonstrated in Alkire and Foster (2011).⁵

To implement the methodology, four elements are thus necessary: (i) the list of variables that make up the multidimensional poverty indicator; (ii) the cut-offs that define, for each variable, whether an individual is in deprivation; (iii) the weights used to weight the different indicators; (iv) the cut-off k that determines whether a given individual lives in a situation of poverty.

Figure 2 presents the multidimensional poverty indicator M_0 for different values of k , for three years: 2014, 2017 and 2020.⁶ Figure 3 presents, for each of the years,

5. The indicator M_0 satisfies, among others, the following axioms: replication invariance, symmetry, poverty focus, deprivation focus, weak monotonicity, normalisation and subgroup decomposability (see Alkire and Foster, 2011).

6. The calculations were implemented with the command `mpi` in Stata (see Pacifico and Pöge, 2015).

FIGURE 2: M_0 for different poverty cut-offs k FIGURE 3: Multidimensional poverty rate (H) for different poverty cut-offs k FIGURE 4: Evolution of M_0 for two selected poverty cut-offs k FIGURE 5: Evolution of the poverty rate (H) for two selected poverty cut-offs k

Source: Calculations based on ICOR data.

Notes: M_0 is the multidimensional poverty indicator, based on the methodology of Alkire and Foster (2011). H is the proportion of individuals living in multidimensional poverty. k is the cut-off beyond which an individual is considered poor in multidimensional terms.

the proportion of individuals living in multidimensional poverty (H), which can be called the multidimensional poverty rate. To guide the reading of these figures, we can take the cut-off $k=0.32$ as an illustration. This cut-off implies that individuals with an accumulated sum of deprivations (weighted with equal weights) greater than 0.32 would be identified as poor. In 2014, with this cut-off, the multidimensional poverty index was 0.087 and about 19.5% of the population would be identified as living in multidimensional poverty. By 2020, these values had dropped to 0.035 and 8.2%, respectively. Looking at all the information in the different curves, it can be concluded that there was an unambiguous decrease in multidimensional poverty in Portugal between 2014 and 2020, regardless of the poverty cut-off used.

Figure 4 shows the evolution of the M_0 indicator for two selected k cut-offs, equal to 0.225 and 0.360. In the base version with identical weights for each of the 21 variables, these thresholds correspond to identifying as poor those individuals with at least 5

deprivations or at least 8 deprivations, respectively.⁷ This calibration will be useful for the exercises developed in the next section of this article. The figure reinforces the conclusion that multidimensional poverty decreased continuously from 2014 to 2020. This profile was observed not only in the multidimensional poverty indicator but also in the associated poverty rate (Figure 5). This improvement was not concentrated in a subset of variables. In fact, over this period, there was a decline in the percentage of the population in deprivation in all 21 variables that make up the indicator.

Since the multidimensional poverty indicator is decomposable, it is possible to verify the most relevant dimensions determining multidimensional poverty. In 2020, for $k=0.225$, the contributions of each of the dimensions described in Table 1 to determine multidimensional poverty were the following:⁸ participation in the labor market (6%), material deprivation (43%), social deprivation (22%), health (10%), housing (19%). These relative contributions have not changed substantially since 2014. This result confirms that the material and social deprivation indicators used by Eurostat represent the largest contributions to the identification of situations of multidimensional poverty, which is also not surprising because they correspond to the majority of the variables in the analysis. Nevertheless, the remaining indicators also present non-negligible contributions, which suggests there is added value in expanding the conceptual scope of the official indicator of material and social deprivation.

The M_0 indicator can also be used to make international comparisons of multidimensional poverty in the European Union. This assessment should be carried out with some caution, given that the calibration of some variables – for example the one relating to education – explicitly took into account the Portuguese reality and does not necessarily reflect the norm in other countries. Within the framework of the methodological options adopted, it is possible to assess whether there is a clear dominance in the different measures of poverty among the various countries. Figures 6 and 7 show the results for selected euro area countries.⁹ In this set of countries, Greece stands out with the highest multidimensional poverty and Spain also presents relatively high figures. At the opposite extreme are Finland, the Netherlands and Germany. Portugal is in an intermediate position, with levels of multidimensional poverty similar to Italy, France and Belgium. This grouping of countries is consistent with that obtained in the official indicators of poverty or social exclusion. Note that in some cases there is no clear dominance in the distributions. For example, compared with Belgium, the multidimensional poverty indicator in Portugal is higher for low values of k and lower for values of k greater than 0.35.

An important issue when computing multidimensional poverty indicators is the way in which the different variables are weighted. In a sense, this weighting corresponds to the relative value assigned to each of the variables in determining a situation of multidimensional poverty. The difficulty in defining these weights is particularly strong

7. Note that, in the first case, $4/21=0.190$ and $5/21=0.238$. In the second case $7/21=0.333$ and $8/21=0.381$.

8. These percentages are very close for different values of k .

9. The results for Germany and Italy refer to 2019, which is the last year for which the microeconomic data are currently available.

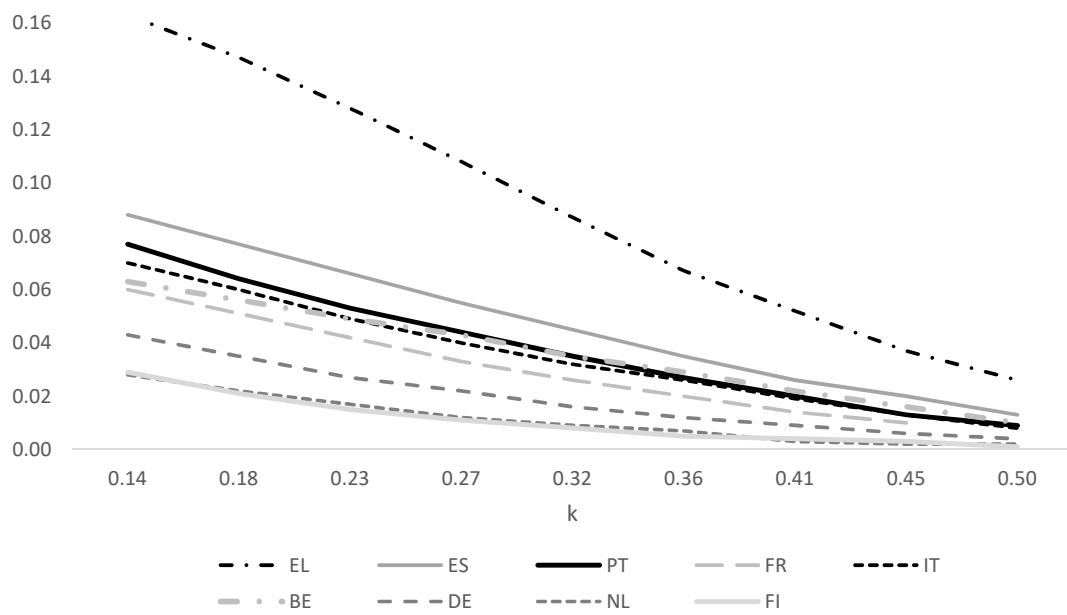


FIGURE 6: M_0 for different poverty cut-offs k

Notes: Calculations based on EU-SILC data. M_0 is the multidimensional poverty indicator, based on the methodology of Alkire and Foster (2011). H is the proportion of individuals living in multidimensional poverty. k is the cut-off beyond which an individual is considered poor in multidimensional terms.

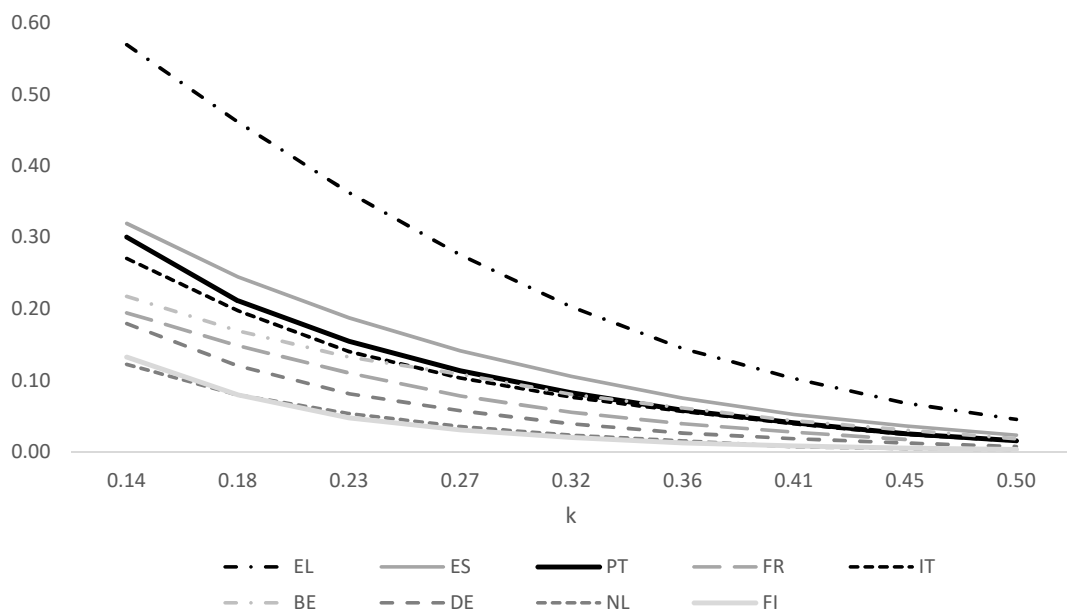


FIGURE 7: Multidimensional poverty rate (H) for different poverty cut-offs k

Notes: Calculations based on EU-SILC data. M_0 is the multidimensional poverty indicator, based on the methodology of Alkire and Foster (2011). H is the proportion of individuals living in multidimensional poverty. k is the cut-off beyond which an individual is considered poor in multidimensional terms.

when the dimensions are very heterogeneous (for example, when we want to value in relative terms variables referring to the individual's health and variables referring to the participation in the labor market). Additionally, the fact that there is an interconnection – direct or indirect – between the various deprivations makes this exercise of relative weighting very subjective. These difficulties underlie the usual option of assigning the same weight to all the variables that make up the multidimensional poverty indicators.

Even so, several authors use different vectors of weights, with three main options proposed in the literature. A first option is to assign identical weights to each of the dimensions identified in Table 1. In this case, each of the 5 dimensions would have a weight of 0.2 in the computation of the indicator and each of the indicators within each dimension would have an identical weight (this is for example the approach in Alkire and Apablaza, 2017). In our analysis, this solution avoids any bias that may arise from the fact that the number of material deprivation indicators is higher than the number of indicators in the other dimensions. However, this type of weighting is debatable considering that all dimensions contribute in an interconnected way to situations of multidimensional poverty. A second option is to weight each of the indicators inversely with their prevalence in the population. The idea here is to give greater weight to the rarer facets of deprivation which, in this sense, may be more relevant to the identification of true deprivation and exclusion situations. A third option is to assign weights taking into account how society perceives the different deprivations (Guio et al., 2009 and Dickes et al., 2010). Unfortunately, there are no surveys that allow this latter solution to be implemented here, given the large scope of the indicators used in the current analysis.

In order to assess the robustness of the results, we evaluated whether a different choice of weights alters the set of individuals identified as poor. Specifically, we started from the baseline methodology, with equal weights for all indicators, and identified the multidimensional poor for a given value of k . Then, we calculated the same percentage of poor individuals using two alternative weighting methods: (i) identical weights for each deprivation dimension and (ii) weights inversely proportional to the population frequency. Finally, we assessed the concordance across vectors of weights, that is, whether they identify the same individuals as being poor or not poor. The procedure was repeated for several plausible levels of k . The conclusion of this exercise is that the different vectors of weights basically identify the same individuals as poor and non-poor. The level of agreement is typically greater than 98% and, in various combinations, greater than 99%. This conclusion supports the adoption, in the next section, of a procedure in which identical weights are assigned to all variables.

5. A characterization of multidimensional poverty in Portugal

This section seeks to characterize the individuals classified as poor in Portugal in a multidimensional perspective. Who are these poor? What are their socioeconomic characteristics? Are they significantly different from the population at risk of poverty or social exclusion?

Number of deprivations	% of the population	Cumulative % of the population	Taxonomy
0	35.9	35.9	
1	21.3	57.2	
2	12.9	70.1	
3	8.9	78.9	
4	5.7	84.6	
5	4.1	88.7	Moderate multidimensional poverty
6	3.1	91.8	
7	2.4	94.2	
8	1.8	96.0	Severe multidimensional poverty
9	1.5	97.5	
10	1.0	98.5	
11	0.7	99.1	
12	0.4	99.5	
13	0.2	99.8	
14	0.1	99.9	
15	0.1	100.0	
16	0.0	100.0	
17	0.0	100.0	

TABLE 2. Breakdown of the Portuguese population, by degree of multidimensional poverty (2020)

Source: Calculations based on ICOR 2020.

Note: In 2020, there were no individuals with at least 18 deprivations simultaneously.

The focus thus shifts to the individuals in poverty. Here, it is important to recall the result obtained in the last section that the computation of multidimensional poverty with a vector of identical weights for the different deprivations broadly identifies the same individuals vis-à-vis other plausible weighting methods. This allows us to move directly from the threshold k of the methodology proposed by Alkire and Foster (2011) to the number of deprivations experienced by each individual. For example, in a database with 21 indicators, all k 's greater than 0.190 ($=4/21$) and lower than 0.238 ($=5/21$) correspond to identifying as poor those individuals deprived of at least 5 indicators.

In the space defined by the number of deprivations experienced by each person, it is still necessary to define the number of deprivations above which an individual is identified as multidimensional poor. In this article, we propose a breakdown of multidimensional poverty into two groups, according to the number of deprivation indicators: the population living in moderate multidimensional poverty (between 5 and 7 deprivation indicators) and the population living in severe multidimensional poverty (8 or more indicators of deprivation). This way of assessing the intensity of multidimensional poverty allows making a bridge with the official indicators of material and social deprivation. Table 2 presents the taxonomy adopted, as well as the distribution of the population by number of deprivations.

It would be possible to classify individuals differently, altering at the margin the number of deprivations that determine the multidimensional poverty thresholds. A simple way to assess the plausibility of choosing these thresholds is to randomly choose 5 or 8 indicators from the list of 21 variables used in the analysis. We argue that this identification always leads to cases that effectively reflect situations of exclusion in the

Portuguese society. It should be underlined that this subjective assessment includes elements of an absolute nature – since we are evaluating the absolute exclusion from a set of indicators – and relative, since the plausibility of the thresholds must be framed in the reality of the country under analysis. In this sense, this application is close to the definition of the Council (1985) presented in the beginning of this article.

It is also important to assess the extent to which the individuals identified in multidimensional poverty are deprived in variables pertaining to each of the five dimensions defined in Table 1. These dimensions are interconnected and an individual in multidimensional poverty would be expected to live with deprivation in several dimensions simultaneously. The results of the analysis point precisely in this direction. In 2020, all individuals in multidimensional poverty were deprived in at least two dimensions of the analysis (9.3% in two, 40.1% in three, 39.4% in four and 11.2% in the five dimensions). In the case of individuals in severe multidimensional poverty, almost all report deprivations in at least three dimensions (20.9% in three, 54.9 in four and 23.5% in five).

The multidimensional poverty rate calculated using these criteria is somewhat lower than the official indicators of poverty and exclusion in Portugal. The individuals identified as poor also differ between concepts. Table 3 seeks to summarize the degree of overlap of the individuals identified with five concepts: the at-risk-of-poverty rate (AROP), the at-risk-of-poverty or social exclusion rate (AROPE), the material and social deprivation rate,¹⁰ the severe material and social deprivation rate, the multidimensional poverty rate and the severe multidimensional poverty rate.¹¹ The table shows that the degree of overlap between the multidimensional poverty rate and the AROP and AROPE indicators is relatively low. In 2020, 15.4% of individuals were in multidimensional poverty, but only 6.5% were simultaneously multidimensional poor and at risk of poverty (AROP) and only 9.3% were simultaneously multidimensional poor and at risk of poverty or social exclusion (AROPE). In contrast, the multidimensional poverty rate shows a relatively high degree of overlap with the material and social deprivation rate, which is not surprising given that they share a significant number of underlying indicators. However, even in this case, the individuals identified do not coincide (the intersection corresponds to 11.9% of the population, which compares with a material and social deprivation rate of 12.9% and with a multidimensional poverty rate of 15.4%). A similar conclusion emerges when comparing the severe multidimensional poverty rate and the severe material and social deprivation rate, with the intersection covering 4.4% of the population, which compares

10. The material and social deprivation rate corresponds to the share of the population experiencing at least five of the thirteen items used to compute the severe material and social deprivation rate.

11. Note that the material and social deprivation rate and the at-risk-of-poverty or social exclusion rate calculated in this article differ slightly from the official statistics. This discrepancy, always below 0.2 pp, may be associated to the fact that in this article we use all individuals, including those that did not answer specific questions relevant to our analysis. It was assumed that the non-response corresponds to an absence of deprivation.

	At risk of poverty rate (AROP)	At risk of poverty or social exclusion rate (AROPE)	Material and social deprivation rate	Severe material and social deprivation rate	Multidimensional poverty rate	Severe multidimensional poverty rate
At risk of poverty rate (AROP)	16.2	16.2	5.8	2.9	6.5	3.2
At risk of poverty or social exclusion rate (AROPE)		20.2	8.5	5.5	9.3	5.1
Material and social deprivation rate			12.9	5.5	11.9	5.7
Severe material and social deprivation rate				5.5	5.5	4.4
Multidimensional poverty rate					15.4	5.8
Severe multidimensional poverty rate						5.8

TABLE 3. Breakdown of the population, according to the different concepts of poverty (2020). In percentage

Source: Calculations based on ICOR 2020.

Reading notes: The main diagonal shows the proportion of the population that meets the criteria for each of the definitions. For example, 12.9% of the population was in material and social deprivation (3rd line of values). Cells off the main diagonal represent the intersection between the various groups. For example, 2.9% of the population was simultaneously at risk of poverty (1st line of values) and in severe material and social deprivation (4th column of values).

with a severe material and social deprivation rate of 5.5% and a severe multidimensional poverty rate of 5.8%.

In the previous section, it was concluded that multidimensional poverty in Portugal declined continuously and robustly since 2014. Figure 8 again shows the evolution of multidimensional poverty in Portugal between 2014 and 2020, with a breakdown by degree of multidimensional poverty, as defined above. The information in this figure is basically identical to that in Figure 5 and shows that the decrease in multidimensional poverty in Portugal was more pronounced in its most severe facet.

In turn, Figure 9 compares the evolution of the multidimensional poverty rate with that of official poverty indicators. The message that emerges from reading the various indicators is mixed. While the at-risk-of-poverty rate shows a slight fall over the period, which was interrupted in 2020, the remaining indicators suggest a stronger decline, which lasted in 2020. It should be noted that the profile of the multidimensional poverty rate follows closely the trend in the rate of material and social deprivation.

Table 4 presents the multidimensional poverty rate according to the region, degree of urbanization, gender, age, schooling, household composition and activity status. The table includes the breakdown into moderate and severe poverty and, for comparison, the corresponding statistics for the at-risk-of-poverty rate (AROP), the poverty or social exclusion rate (AROPE) and the material or social deprivation rate. In 2020, the multidimensional poverty rate, defined as the proportion of the population experiencing at least five of the 21 deprivations under analysis, was 15.4%. The severe multidimensional poverty rate, defined as the proportion of the population experiencing at least eight of the 21 deprivations, was 5.8%. Thus, about 1.5 million people lived

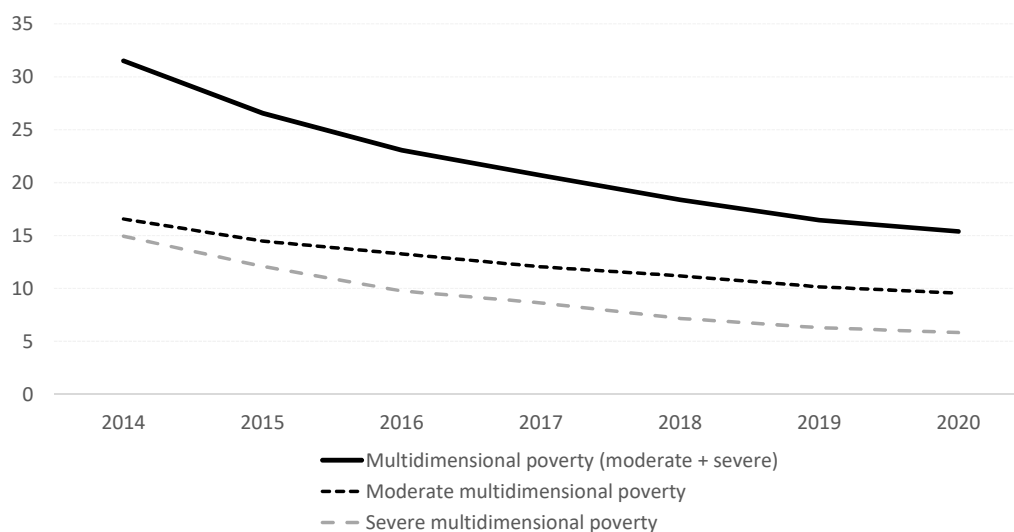


FIGURE 8: Evolution of the multidimensional poverty rate in Portugal (% of total population)

Source: Calculations based on ICOR 2020.

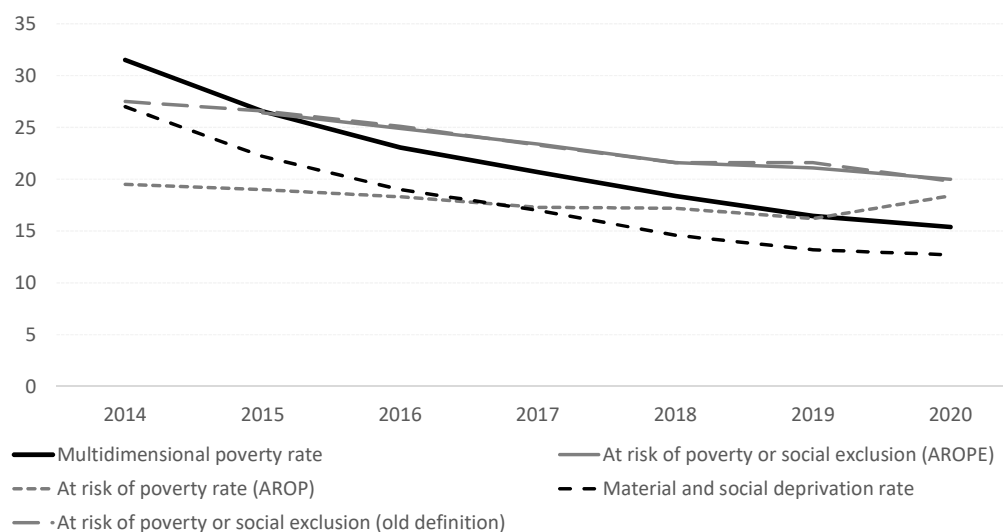


FIGURE 9: Evolution of several poverty indicators in Portugal (% of total population)

Source: INE and calculations based on ICOR 2020.

in multidimensional poverty, of which about 600,000 were in severe multidimensional poverty.

The highest multidimensional poverty rate was recorded in the Autonomous Regions and the lowest rate in Lisbon. In the case of severe multidimensional poverty, the lowest rates are in the Centre, Lisbon and Alentejo, and the highest rates in the Algarve and the Autonomous Regions. In terms of the degree of urbanization, it is in rural areas that the greatest multidimensional poverty is observed. With regard to gender, the multidimensional poverty rate is higher for women.

	Multidimensional poverty			For memory		
	Moderate	Severe	Total	AROP	AROPE	Material and social deprivation
Total	9.6	5.8	15.4	16.2	20.2	12.9
Region						
North	9.8	5.8	15.5	18.1	22.0	13.5
Center	10.3	5.0	15.3	16.6	20.4	12.5
Lisbon	7.5	5.0	12.5	11.1	14.9	10.1
Alentejo	9.3	5.5	14.8	16.9	20.1	11.5
Algarve	11.1	10.0	21.1	17.7	23.9	17.6
Azores	15.4	12.0	27.4	28.5	33.7	24.4
Madeira	15.9	10.9	26.8	26.3	33.0	24.2
Degree of urbanization						
Dense	8.6	5.0	13.6	13.3	17.0	11.4
Intermediate	9.5	6.3	15.7	16.6	20.8	13.6
Low	11.4	6.9	18.3	21.1	25.4	14.7
Gender						
Male	8.9	5.2	14.1	15.6	19.3	11.6
Female	10.2	6.4	16.6	16.7	21.0	14.0
Age						
0-17	6.9	3.9	10.9	19.1	21.6	10.1
18-34	8.6	5.6	14.2	13.9	17.9	11.5
35-64	8.9	5.6	14.5	15.3	19.8	12.4
>=65	13.7	7.8	21.5	17.5	21.5	17.0
Schooling						
Below secondary	14.3	9.7	24.0	21.9	27.2	19.4
Secondary	7.0	3.0	10.0	11.5	15.5	9.0
Tertiary	2.2	0.8	3.0	4.7	6.7	2.9
Household composition						
Households with only 1 individual	12.6	11.0	23.5	24.1	29.4	19.2
Other households without children	10.9	6.4	17.2	13.7	18.9	14.3
Households with 1 adult and children	9.8	7.7	17.5	25.5	32.1	16.2
Households with several adults and children	7.7	4.2	11.9	16.1	18.4	10.0
Working condition (age>=18)						
Employed	6.9	2.7	9.6	9.9	11.8	8.1
Employees	7.1	2.8	9.9	7.7	9.8	8.3
Self employment	5.7	1.6	7.3	28.4	28.7	6.2
Unemployed	15.8	16.8	32.6	33.1	43.3	28.8
Retired	12.7	7.3	20.0	15.7	20.4	15.9
Other inactive	14.0	11.9	25.9	27.7	37.4	20.5

TABLE 4. Characterization of multidimensional poverty in Portugal in 2020 (% of total population)

Source: Calculations based on ICOR 2020.

In terms of age, multidimensional poverty has an increasing profile, with a higher incidence in the elderly. The multidimensional poverty rate in children differs from the evidence obtained with the AROP and AROPE indicators, but is also revealed in the material and social deprivation indicators. The higher incidence of multidimensional poverty among the elderly is partly related to the greater material and social deprivation of older populations, as well as to the impact of the new dimensions covered in this study, in particular health. In turn, the lower incidence among the youngest may be related to the fact that the material and social deprivation indicators are not designed

to cover the specific situation of children. This situation is expected to change soon, based on the conclusions of the special module of EU-SILC dedicated to children, which started in 2021 (Guio et al., 2012).

With regard to schooling, its impact on multidimensional poverty is indisputable. Of the individuals (over 16 years old) with higher education, only 3% lived in a situation of multidimensional poverty and 0.8% in severe poverty. With regard to the household composition, the greater vulnerability of families with only one individual (where the elders prevail) and of single-parent families stands out, as in the official poverty indicators.

Finally, in terms of activity status, the highest rates of multidimensional poverty (severe and total) are recorded among the unemployed and other inactive individuals. About a third of the unemployed live in a situation of multidimensional poverty and 16.8% in a situation of severe poverty. In turn, 9.6% of employed individuals also live in multidimensional poverty (2.7% in severe poverty). The incidence of multidimensional poverty is higher among employees than among the self-employed, in contrast to the evidence obtained with the AROP and AROPE indicators. Participation in the labor market mitigates but does not eliminate the probability of living in a situation of poverty (Diogo, 2021). In fact, when we break down individuals over 18 years living in multidimensional poverty by activity status, 31% are employed, 16.7% are unemployed, 32.6% are retired and 19.7% are other inactive (in the case of severe poverty, these percentages are, respectively, 22.6%, 22.6%, 31.2% and 23.6%).

6. The living conditions and well-being of the poor in Portugal

In this section, we analyze the living conditions of the poor in the following dimensions: the quality of the individuals' health, the ability to achieve their goals, the ability to keep the house warm, to buy clothes and to have adequate food, digital inclusion, home ownership and equivalent adult income. This characterization is not exhaustive, but aims to be a first exploration of the wealth of information in the EU-SILC database. Table 5 presents the indicators of living conditions for the total population (column (1)), for individuals in multidimensional poverty, broken down by degree of multidimensional poverty (columns (2) to (4)), as well as for individuals at risk of poverty (column (5)), at risk of poverty or social exclusion (column (6)) and in material and social deprivation (column (7)).

In terms of perceived health status, 30.4% of individuals in multidimensional poverty report living with "poor" or "very poor" overall health, which compares with 11.3% of the total population. This percentage rises to 37.6% in the case of severe poverty. In the case of AROP, AROPE or materially and socially deprived individuals, these percentages are equally high, but lower than those for multidimensional poverty (19.0%, 20.3% and 26.6%, respectively).

With regard to the ability to achieve their goals ("make ends meet"), 65.4% of individuals in multidimensional poverty report having a lot of difficulties in this aspect (80% in the case of severe poverty), which compares with 20.5% of the total population.

This percentage is higher than that observed in AROP and AROPE individuals (42.5% and 45.1%, respectively) and close to individuals in material and social deprivation.

With regard to the ability to have an adequately heated home, to replace clothes and shoes and to have adequate nutrition, the same pattern arises, with very high percentages of deprivation in the multidimensional poor, much higher than in the AROP and AROPE populations, and close to those in material and social deprivation. The reality is particularly dire for individuals in severe multidimensional poverty. 70.2% of these individuals are unable to keep their home adequately warm, 71.6% are unable to replace clothes or shoes and 21.6% are deprived of basic nutritional needs.

An increasingly relevant dimension of inclusion in contemporary societies, and which has been accentuated by the recent pandemic, is the ability to digitally participate in the life of society. When assessing the degree of digital exclusion (computer ownership or internet access), 36.2% of the population in multidimensional poverty is digitally excluded, which compares with 7.5% in the population as a whole. More than half of the population in severe multidimensional poverty is digitally excluded.

With regard to homeownership, about 60% of the population in multidimensional poverty owns their home. This percentage is lower than the average of the population in Portugal and globally close to the one obtained for the remaining concepts of poverty and social exclusion.

Finally, in terms of income per equivalent adult, individuals at risk of poverty are, by definition, those with the lowest annual income per equivalent adult in the population. On average, the poor from a multidimensional perspective earn an equivalent annual income of €7561.1 (€6743.4 in the case of severe multidimensional poverty). This value compares with €4643.3 for the population at risk of poverty. Many households with monetary income above the poverty line are thus in multidimensional poverty. More specifically, around 57% of individuals in multidimensional poverty have incomes above the poverty line, which amounted to €6480 in Portugal in 2019. On the other hand, around 60% of individuals below the poverty line are not in multidimensional poverty. These facts attest that being below the monetary poverty line is neither a necessary nor a sufficient condition for an individual to live in poverty.

This conclusion is reinforced when we analyse the individuals who are identified as poor according to the AROP and AROPE criteria, but who are not in multidimensional poverty (columns (8) and (9)). According to Table 3, these individuals correspond, respectively, to 9.7% and 10.9% of the population. In the set of indicators in Table 5, these individuals are indistinguishable from the average of the population as a whole. The deprivation and social exclusion prevailing in the AROP and AROPE population are thus concentrated in the segments that we have identified as multidimensional poor. This conclusion is not so pronounced in the case of individuals in material and social deprivation who are not in multidimensional poverty (column (10)), who represent only 1.0% of the population. This result suggests that material and social deprivation indicators can provide a reasonable approximation to individuals in multidimensional poverty.

Information from the EU-SILC ad hoc module on well-being indicators, conducted in 2018, also contains relevant data to this discussion. In this module, individuals over

16 years of age were asked about their well-being perceptions and about their emotions. Table 6 presents some selected results based on this ad hoc module, and is organized with the same structure as Table 5. The main conclusion that emerges from the table is that there is a strong negative association between the degree of multidimensional poverty and the degree of subjective well-being of individuals. People living in poverty have lower life satisfaction, less trust in others, feel more depressed and alone, and are less able to ask for material or non-material help from people outside the household. The indicators for the population in severe multidimensional poverty (column (3)) are always more adverse compared to those in moderate multidimensional poverty (column (2)) and to the overall population. For example, on a scale of 0 to 10, people in severe multidimensional poverty reported an average happiness rating of 4.1, which compares with 6.7 across the total population. In another example, only 65% of people in severe multidimensional poverty reported being able to ask for material help, compared to 87% of the total population.

The AROP or AROPE population excluding individuals in multidimensional poverty again presents values close to the population mean. This conclusion reinforces the idea that multidimensional poverty more reliably captures the core of situations of absolute deprivation and need in the Portuguese population. Once again, this dichotomy exists, but is less pronounced, in the case of individuals in material and social deprivation.

		Total population	Multidimensional poverty			AROP	AROPE	Social and material deprivation	Excluding population in multidimensional		Social and material deprivation
			Moderate	Severe	Total				AROP	AROPE	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Percentage of the population		100.0	9.6	5.8	15.4	16.2	20.2	12.9	9.7	10.9	1.0
With general health "bad" or "very bad"	% in each group	11.3	26.0	37.6	30.4	19.0	20.3	26.6	11.9	11.5	11.9
With great difficulty (1 or 2) to "make ends meet"	% in each group	20.5	56.5	80.0	65.4	42.5	45.1	65.3	24.0	22.9	31.6
Without ability to keep home adequately warm	% in each group	17.4	47.5	70.2	56.1	33.8	37.2	60.2	16.8	15.9	48.2
Without capacity to have new clothes or shoes	% in each group	8.5	31.9	71.6	46.9	24.8	29.5	55.0	3.9	3.5	25.7
Without capacity to regularly afford a decent meal	% in each group	2.5	6.5	21.6	12.2	7.2	8.1	13.8	1.1	1.0	4.1
Digitally excluded (without computer or internet) for financial reasons	% in each group	7.5	23.4	57.2	36.2	20.5	23.0	38.2	6.1	5.5	10.0
Homeowner	% in each group	77.3	67.3	46.9	59.6	67.4	66.6	57.2	76.1	77.3	63.9
Equivalent income	euros	12696.1	8060.0	6743.4	7561.1	4643.3	5754.3	7403.9	4708.7	5522.9	8447.8
Average number of deprivation indicators	number	2.1	5.8	9.7	7.3	4.3	4.8	7.5	1.9	1.9	4.0

TABLE 5. Living conditions of individuals in poverty

Source: Calculations based on ICOR 2020.

		Total population	Multidimensional poverty			AROP	AROPE	Social and material deprivation	Excluding the population in multidimensional poverty		
			Moderate	Severe	Total				AROP	AROPE	Social and material deprivation
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Overall life satisfaction: 0 (not at all satisfied) - 10 (completely satisfied)	Average in each group	6.7	5.3	4.1	4.8	5.6	5.5	4.8	6.6	6.7	6.2
Trust in others: 0 (no trust) - 10 (full trust)	Average in each group	5.2	4.5	4.1	4.3	4.7	4.6	4.3	5.5	5.1	4.7
Feeling down or depressed: 1 (always) - 5 (never)	Average in each group	3.7	3.2	2.7	3.0	3.3	3.3	3.0	3.7	3.7	3.7
Feeling lonely: 1 (always) - 5 (never)	Average in each group	4.3	3.9	3.5	3.7	3.9	3.9	3.7	4.3	4.3	4.5
Being able to ask for material help	% in each group	86.9	77.0	64.5	72.0	80.0	78.4	69.9	90.5	90.2	81.3
Being able to ask for non-material help	% in each group	94.4	88.9	80.7	85.6	90.1	88.9	83.9	96.2	96.1	89.7

TABLE 6. Well-being indicators (2018)

Source: Calculations based on the *ad hoc* module in ICOR 2018.

7. Conclusions

This article proposed a multidimensional poverty indicator applied to the Portuguese reality. This indicator aggregates 21 variables that cover dimensions such as the participation in the labor market, material deprivation, social deprivation, health and housing. According to this methodology, multidimensional poverty in Portugal decreased continuously between 2014 and 2020. In 2020, the proportion of the population in multidimensional poverty stood at 15.4%, with 5.8% of the population living in severe multidimensional poverty. In the European context, Portugal is in an intermediate position, with a multidimensional poverty rate close to that of Belgium, France and Italy, lower than that of Spain and Greece, and higher than that of Germany, Finland and the Netherlands.

This multidimensional approach identifies segments of the population that are not captured in the usual indicators of poverty and social exclusion. Nonetheless, the official indicators of material and social deprivation are a good approximation of the living conditions of the population in multidimensional poverty.

This article characterized some dimensions of the quality of life of the population living in multidimensional poverty. The results reveal situations of great fragility in important segments of the Portuguese population. Absolute exclusion is also associated with negative subjective perceptions regarding personal well-being. It is the actual freedom to participate effectively in the life of society that becomes restricted (Sen, 1984). The indicator now presented is experimental in nature. In this sense, it intends to be a seed for new research, aimed at improving the conceptual robustness in terms of the choice of variables and the relative weights applied to the different indicators. Ultimately, a multidimensional view of poverty can be a useful complement to the current indicators defined in the European framework, not only in the identification of the population in poverty but also in the design of policies for its eradication.

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