COUNTING THE POOR IN ITALY AND THE EU

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Abstract. *In this paper, we survey some popular methods for measuring poverty in a community. We include a method for detecting 'relative' versus 'absolute' poverty as well as 'extreme' poverty. We also consider alternative ways to measure poverty: material deprivation, at risk of poverty or social exclusion and variants of these methods. The analysis shows that each method has its own technical and logical properties that make it appropriate for use with specific informative targets, demonstrating that poverty indicators should not be used as if they all represent the same concept. Our analysis ends with suggestions concerning plausible relationships between measurement methods and the social purposes of the measures.*
Keywords: Poverty measures; Relative poverty; Absolute poverty; Extreme poverty; Material deprivation; Social exclusion

1. INTRODUCTION

Poverty is an intuitive concept that can be defined as lacking the financial resources to satisfy certain individual or community needs. However, when asked to pinpoint who in a community is poor, one may answer that a homeless person is certainly poor or that certain deprived villages in a faraway country are poor. Thus, everybody can identify situations of extreme poverty, but even an expert may find it puzzling to classify other less poor groups, which constitute the large majority of the poor.

An insufficient amount of money is the main reference for measuring poverty. However, poverty is also not having access to school and not knowing how to read. Poverty is not having a job; it is fear of what will be in the future, living one day at a time. Definitely, poverty is a complex and fuzzy concept that requires well-articulated reasoning.

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In what follows, we specify the properties of a set of poverty measures with respect to the possible uses of the measure itself. Specifically, we define the technical and rational features that can make a poverty measure more appropriate than other competitive measures within a social-political scope.

The remainder of this paper is organised as follows. In Section 2, we present various approaches for measuring poverty. Only measures possessing properties that are relevant to social studies and official statistics are considered to conduct a systematic review of the data available on the subject matter. Section 3 links the inner properties of these measures to information that is relevant for social policy decisions. Section 4 highlights the social policy aims that each poverty measure could satisfy. Section 5 concludes the paper.

2. POVERTY MEASUREMENT APPROACHES

Relative poverty

Relative poverty is a general concept, because a person or family is considered poor when compared to a reference population: one is considered relatively poor if one has an income lower than a significant part of the population currently living in the same territory (Townsend, 1954). The reference to income makes the poverty concept flexible enough for people to choose if, when and how to achieve or integrate the goods and services they need but cannot access because of a lack of money.

In Italy, the 'relatively poor' are those whose income is below the poverty line, which is defined as 60% of the median income of the population in the area. Istat, the Italian Institute of Statistics, annually publishes two poverty thresholds—also called lines—and correspondingly, two poverty rates: one for individuals and another for families below the lines. With reference to families, a poverty line refers to a conventional family of two people, but corrective measures for larger families are applied. See Section 3.1 for more details.

The European Union (EU) statistical office, Eurostat (https://ec.europa.eu/eurostat/), has suggested a new relative measure, *at risk of poverty*, aimed at subrogating the relative poverty measure. The at-risk-of-poverty rate is the percentage of persons in the total population who

are at risk of poverty because their equivalised disposable income,[2] as calculated after social transfers, is below a certain threshold.

Specifically, the at-risk-of-poverty rate is computed for within-EU comparisons by counting the households possessing an income below 60% of the median equivalised income disposable to households in the same country before all social transfers. Each household member is considered to have the same equivalised income. When comparing the poverty thresholds of different EU member states, the thresholds are standardised according to purchasing power standards that, when controlling for differences in price levels between countries, convert different national currencies into a common expenditure currency.

The reference population for both the Istat and Eurostat measures consists of all persons living in private households. Thus, persons sleeping in collective households, in institutions or rough, are generally ignored in general statistics. To compute the at-risk-of-poverty rate, Eurostat uses data from the EU-SILC (Statistics on Income and Living Conditions) survey.[3]

Absolute poverty

Absolute poverty is an alternative concept: 'absolutely poor' is defined as a person or a family with insufficient resources to live with dignity in a given area at a given time. This inspiring concept refers to the minimum amount of money necessary for a family of a given size and composition to achieve a 'basket' of goods and services qualifying a decent lifestyle in the area. The absolute poverty threshold, which is expressed in monetary terms, is immediately operative because the prices of items composing the

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[2] Income is to be equivalised to redistribute it within the household. The equivalised disposable income is calculated in three steps: 1) all monetary incomes received from any source by each member of a household are added up; 2) to reflect the differences in a household's size and composition, the total (net) household income is divided by the number of 'equivalent adults', using the so-called OECD-modified equivalence scale, which gives a weight to all members of the household; and finally, 3) the resulting figure, the equivalised disposable income, is attributed equally to each member of the household (Atkinson et al., 2017).

[3] https://ec.europa.eu/eurostat/statistics
explained/index.php/EU_statistics_on_income_and_living_conditions_ (EU-SILC)_methodology_-_monetary_poverty

basket can be summed and allow social control on both the demand and supply sides of income.

Defining the basket is crucial to defining the threshold. A basket is a priori defined in monetary terms in all its components and may vary in space and time in parallel with the varying concept of a decent life. The concept of what makes life 'decent' may also vary in different population groups, for instance, people leaving alone versus couples with children.

This relativity could be seen as analogous to that of relative poverty, though in a poverty measurement survey, the number of absolutely poor people is computed by counting those who are below the a priori given poverty line. Instead, the relatively poor are those below the line computed after the collection of the other residents' income data.

In Italy, Istat (2009) has published measures of absolute poverty since 2005. The Italian basket includes goods and services that an expert committee considers essential for ensuring an acceptable minimum standard of living for a household with given characteristics residing in Italy. For instance, it includes having decent accommodations, two decent meals a day, the possibility of autonomous transport, access to health and education services, and so on, that a family would need. Instead of the necessary basket, the expert committee could directly evaluate the amount of money that is sufficient for a decent life.

The European Commission has not computed a similar measure for EU countries[4] (see Section 3.2 for more details).

Material deprivation

Another way of measuring poverty is through *material deprivation*. The basic idea is that if one does not possess certain goods and services that are relevant to living standards, then that person is considered poor (Townsend, 1979). In response to a study by Guio (2009), the EU defined a set of nine basic goods or services any European citizen should access (European Commission, 2010):

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[4] In this paper, we circumscribe our analysis to EU countries, ignoring on purpose out-of-Europe comparisons because the measures of poverty strikingly differ in developing compared with developed countries (United Nations, World Bank).

- Five types of economic strain a household could not afford: (1) covering unexpected expenses; (2) taking a one-week holiday away from home in a year; (3) paying arrears (mortgage or rent, utility bills or hire purchase instalments); (4) eating a meal with meat, chicken or fish every second day; and (5) keeping the home adequately warm.
- Four types of durables the household could not afford (if it wanted to): (6) having a washing machine; (7) owning a colour television; (8) having a telephone; and (9) possessing a personal car.

The material deprivation and absolute poverty approaches are similar in that both imply the definition of a basket of goods and services while periodically updating the basket. Yet the definition of a basket of goods and services as well as the poverty threshold received criticism (among others, Bradshaw and Mayhew, 2010). Therefore, the EU appointed another commission to update the list of goods and services. This commission (Guio et al., 2017) studied those indicators describing the quality of housing and stated that the housing indicators could be added to the other deprivation indicators because they were rather independent of each other. In other words, the housing quality items define a second dimension of deprivation that is not included in the economic ones involved in the previous indicators of economic strain and durable goods.

In 2017, an updated EU list was issued that contains six items from the previous list (numbers 1–5 and 9) and seven new ones (https://www.poverty.ac.uk/world/european-union-2017). The new items concern the following:

- (1) Replacing worn-out clothes with new ones; (2) having two pairs of properly fitting shoes; (3) spending a small amount of money each week on oneself; (4) enjoying regular leisure activities; (5) getting together with friends/family for a drink/meal at least monthly; (6) having an internet connection; and (7) replacing worn-out furniture.

Poverty and social exclusion
The EU publishes another measure that includes both poverty and social exclusion: the *at-risk-of-poverty or social exclusion rate*. This measure is derived from the union intersection of the relative poverty rate, material

deprivation rate and unemployment rate of a community at a given time. It aims to evaluate the extent of *social exclusion*, which is a wider concept than poverty.

The union-intersection rule implies that the three composing rates may overlap. Thus, similar to all measures of poverty, this rate includes people who are at high risks of social exclusion, of being poor, deprived and unoccupied and those who are only deprived and unoccupied or facing another combination of difficulties.

Extreme poverty

Extreme poverty is another poverty concept. An 'extremely poor' person can be defined as a person who is close to the bottom line of income distribution and constitutes a social group whose necessities require urgent help. [5]

It is easy to identify the *homeless* as extremely poor, but we could enlarge this concept to include all those who use public services that are intended for the homeless (soup kitchens, shower stalls, public dormitories, etc.) or to families persistently and severely deprived and below the poverty line. We refer to the possibility of introducing another analytic dimension: the *persistence of poverty*, which implies that people who are below the poverty line for consecutive time spans are poorer than those who fall into poverty at a single point in time who or just occasionally do so and then recover (Bane and Ellwood, 1986; Whelan et al., 2002; Aaberge and Mogstad, 2007).

Therefore, we should also study *chronic poverty*, a concept that refers to persons or families that systematically or for long periods of time are in poverty (Fabbris and Sguotti, 2013). A person may be chronically poor either in a relative or absolute sense. The EU-SILC survey can

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[5] The concept of extreme poverty crosses with that of absolute poverty. The experts of the United Nations (1995) had mainly the developing countries in mind when they stated, '*Absolute poverty is a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but access to services*'. Also the World Bank's approach to poverty refers to a similar minimalistic principle (Ravallion et al., 2008).

generate a persistent poverty measure over a four-year period (OECD, 2008; European Commission, 2010).

Despite its urgency, the extreme poverty concept is rarely ascertained by national and European statistical offices. In Section 3.7, we examine various measures of this concept.

Psychological poverty

For completeness, we also introduce a subjective or *psychological* approach to poverty. The basic idea of this approach is that the poor are those who perceive themselves as poor. This approach is very different from those previously introduced. The reference is not income or a basket of items but rather a subjective perception: one's interpretation of the relevance (quantity, quality, persistence, etc.) of one's own income or basket availability either in absolute terms or with respect to others' incomes or baskets.

This approach, which could be relevant if used in tandem with an objective measure of poverty, requires specific research and therefore will not be dealt with in the following.

3. PROPERTIES OF POVERTY MEASURES

The title of the present paper refers to 'counting' the poor. Counting refers to the possibility of classifying each person or family as poor or non-poor. This classification is relevant if we refer to the possibility of intervening in and solving individual poverty problems.

Alternatively, interventions to fight poverty may refer to the general population or the totality of a social group. The poverty rate inherent to a community or social group can be expressed in terms of the probability that poverty will affect the concerned population or the percentage of people likely affected by poverty in that community/group. On one hand, this approach does not count the poor; on the other hand, it is in line with the hypothesis that policies are carried out at the broad community rather than individual level.

The properties of the poverty measures that are examined in what follows relate to their possible use. The distinctive properties of relative poverty are presented in Section 3.1, absolute poverty in Section 3.2, the

intensity of poverty in Section 3.3, material deprivation in Section 3.4, at risk of poverty in Section 3.5, at risk of poverty or social exclusion in Section 3.6 and extreme poverty in Section 3.7.

3.1. RELATIVE-POVERTY RATE

The peculiar property of the relative measure of poverty is that it depends on the median of income distribution. The median is a rather steady-in-time centrality parameter and, with reference to income, represents what the median citizen earns. Therefore, the following considerations apply:

- The median value can be considered the most representative value of the income distribution at hand because a possible increase in the median value means that a large percentage of the population, not just a few extreme income earners, had an income increase.[6]
- A time series of median values is usually quite steady and the poverty line consistently flat over time, making the latter a fair reference for mean-run policies for income integration.
- The poverty rate can be estimated not only directly through the data collected with an income survey but also by combining the parameters of the income distribution, which are fairly stable over time. The latter possibility particularly favours an early estimation of thresholds and rates and academic studies.

The main concern regarding a relative measure of poverty is that it depends on the shape of the distribution, which entails the following:

- The poverty rate is insensitive to constant increments of income spread over the population, because if everybody becomes richer, the poverty line shifts accordingly and the poverty rate remains unchanged. This is because the shape of the income distribution is similar throughout the world and over time. For the same reason, the poverty rate does not change if the whole population becomes proportionally poorer. Moreover, during economic downturns, when many low- and middle-income families lose income and

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[6] This may not be the case if we consider the mean, instead of the median, as a centrality parameter. For instance, a mean increase could be obtained because either only the better-off had an income increase or only the poor became poorer. Instead, if the central part of the income distribution for two comparable years did not change, the two medians would be the same.

better-off families maintain or improve their standard of living, the relative poverty rate could paradoxically decrease (see, for instance, the years 2008–2011 in Figure 1).

- The relative poverty rate is almost constant over time, no matter the country; therefore, the rates of two countries do not mirror the difference in terms of income but instead in terms of 'relative poor people' of the countries. A poor person in one country could have an income twice as high as a poor person in another country, provided the median citizen in the former country has an income twice as high as the median citizen in the latter country.[7]

- The definition of the threshold at 60% of the median income is conventional. It has been fixed at 60% for the national country thresholds to provide a common reference. Indeed, the 60% proportion was defined as an EU reference. To make worldwide comparisons, the OECD, among others, fixes the poverty line at 50% of the country's median income (https://data.oecd.org/natincome/net-national-income.htm). Some European countries (Croatia, France, Germany, Latvia, Lithuania, Luxembourg, Malta, Romania, Spain and the UK) use, for national statistics on poverty, lower relative thresholds at 40% or 50% of the median equivalent income.

- In Italy, the relative poverty rate of families was steady at around 11% from 2005 to 2011 and showed higher values from 2011 on. In 2017, the rate rose to 15.6% and then dropped for two consecutive years. Instead, the individual poverty rate remained steady at around 13% until 2011 and was then artificially deflated in 2014 by a computational change before finally sharply increasing from 2017 on (Figure 1).

- The absolute poverty rate of families varied within a short range at or right above 4% until 2010; then it started increasing with the rise of absolute poverty in Italy, reaching 6.9% in 2017 and 7.5% in 2021. If the system had remained the same as before 2014, the 2021 rate would have been close to or above 10% (Figure 1).

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[7] A symptomatic example is reported by the European Commission (2010): the relative poverty threshold for a couple with two children in Estonia in 2008 was, in terms of purchase parity, 9,770 euros per year, and in the UK, it was 24,380 euros per year. Nevertheless, the at-risk-of-poverty rate in both countries was 19%.

- In line with Sen (1983), the relative rate is a difficult measure for people to understand. The precariousness of this rate is clearer if the time series of relative and absolute rates are compared: during tough economic times, the absolute poverty rate reasonably increases, while the relative rate may not grow accordingly and could be overcome by the absolute one.

- Income may not be as good an indicator of command over resources as expenditure, not least because it does not take into account the capacity to borrow, saving use, gifts, social assistance[8] and the value of family production for its own consumption.

The uncertainty about the poverty line induced Istat to define two more measures involving people or families close to the line, either above or below it. Persons 20% above the standard line—that is, between 60% and 72% of the median income—are considered 'almost poor', while those 20% below the line are considered 'scarcely poor' (Istat, 2017). Units above and below the almost poor are certainly non-poor and certainly poor, respectively. These two additional measures make sense only if they are published together with the pertinent poverty line.

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[8] Several countries have linked their national poverty threshold to their minimum income (social assistance scheme) or other benefits. This situation may interfere with the definition of a threshold and could suggest the necessity to refer to disposable income, which is the basis of the at-risk-of-poverty rate, instead of just income.

Figure 1. Relative- and absolute-poverty rates in Italy according to type of population, 2005–2017 *(in 2014, the estimation system changed[9])*
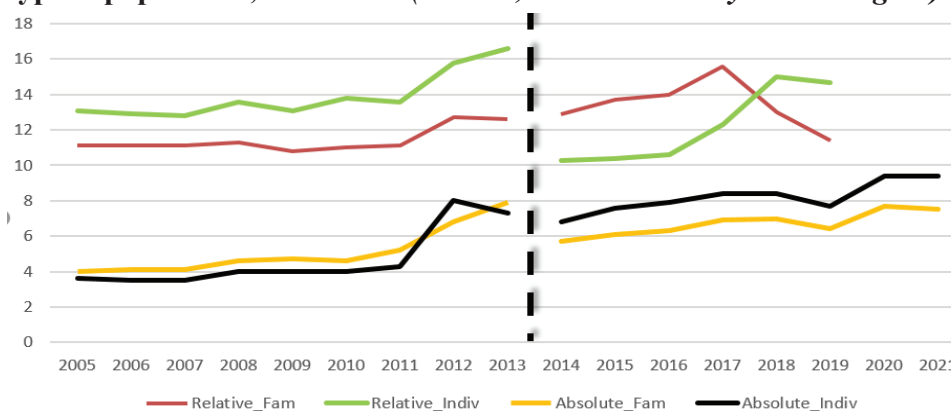
3.2. ABSOLUTE-POVERTY RATE

In a given country, for a series of absolute poverty rates to be comparable, the low-income families of that country should share the same basket of goods and services over a certain timespan. This is realistic in the short term. A long-term comparison, however, requires a regular update of the basket. This can be done by either consulting an expert commission and/or by adopting a time-dependent formula and parametrically updating the threshold values of the sets under comparison.

Scapin (2015) successfully surveyed a panel of experts (local administrators, politicians, charity representatives and academics) to obtain their views regarding the different needs and thresholds of various groups of families. In addition, Istat set a parametric function linking the needs of social groups living in differently developed regions. The poverty threshold can be interactively computed as a combination of four parameters: geographical area, municipality size, family composition and year.[10] More

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[9] Until 2013, the reference data came from the survey on family consumption; since 2014, the data have come from the survey on family expenditure (Istat, Statistiche Report, https://www.istat.it). Istat estimated the new system rates for some years before the system change: the differences are relevant for the family absolute rates (2011: 4.3%; 2012: 5.6%; 2013: 6.3%) and dramatic for the individual relative rates (2011: 9.9%; 2012: 10.8%; 2013: 10.4%).

[10] See: https://www.istat.it/it/dati-analisi-e-prodotti/contenuti-interattivi/soglia-di-poverta.

complex functions could be created if we hypothesise that other characteristics are relevant to poverty.

In principle, the absolute-poverty rates of two Western countries that share the same basket of goods and services could also be compared. However, a common basket implies that the two countries also agree on the political use of the threshold(s). In Europe, it is difficult to imagine such an agreement arising from a Eurostat framework.

Absolute rates are relevant for within-country analysis. The regional partition of the country into regions—or the identification of family groups with different thresholds—are matters of social-political intervention if national or local governments or charity organisations are willing to intervene in the more deprived regions. Absolute rates are relevant for within-country analyses. The partition of a country into regions—or the identification of family groups with different thresholds— is a matter of social-political intervention if the national or local governments or charitable organisations are willing to intervene in the more deprived regions.

Once a family's income level is ascertained, the way of computing absolute poverty allows for analysing the possible subsidies to reach the threshold of the group to which the family belongs in that year.

3.3. INTENSITY OF POVERTY

Poverty rates involving a simple count of units below the poverty line are insensitive to what happens below the line. This is why Istat also computes the *poverty gap rate*, which is also called the *intensity of poverty* (http://www.istat.it/dati/catalogo/20090422_00/), representing how poor the poor are. It estimates the relative amount of money needed for all people below the poverty line to reach that line. The higher the intensity, the poorer the poor are.

In Italy, the intensity rate has been stable for a long time at 20–24%. It was 20.9% in 2017 and 23.8% in 2019 but has varied according to geographical partitions and types of families. For a local administrator, it is a useful tool to pinpoint the areas and population groups whose incomes are lower.

In symbols, let us consider the income, *Y*, of a given country, whose median, *Me(Y)*, is the income possessed by the country's central income

earner. The poverty threshold, $T(Y)$, which in our case is defined as $T(Y) = 0.6\ Me(Y)$, enables the identification of N^* ($N^* < N$) units not exceeding the threshold. N and N^* can refer to both individuals and families. The relative poverty rate, R_1, is the proportion of units below the poverty threshold:

$$R_1 = \frac{N^*}{N},$$

while the poverty gap, R_2, is the budget necessary for all units below the poverty line to reach the line:

$$G(Y) = \sum_{i}^{N*} T(Y) - y_i\ = N^*T(Y) - \sum_{i}^{N*} y_i\ \ (i = 1, \dots, N^*),$$

where y_i is the income observed at unit i ($i = 1, \dots, N$) and the summation applies to just the first N^* units ordered according to income.

The amount $G(Y)$ can be relativised by dividing it by its maximum, $T(Y)N^*$, giving the intensity of the poverty rate:

$$R_2 = G(Y)/Max(G(Y)) = G(Y)/[T(Y)N^*],$$

which varies between 0 and 1.

Even an individual intensity of poverty could then be computed:

$$R_{2i} = 1 - \frac{y_i}{T(Y)}\ \ (i = 1, \dots, N^*).$$

Similarly, it is possible to compute an (*absolute*) *poverty gap rate*, calculated as the amount of money needed for people below the absolute poverty line to reach the line and thus not be considered poor. In this case, the income threshold for a household in group h is T_h ($h = 1, \dots, H$), to which the household income, Y_i, refers. Unit i is in poverty if its equivalised income is below the threshold of the group of households to which that unit belongs, that is to say, if $Y_i - T_h < 0$.

The absolute poverty rate, R_3, is the proportion of units below the absolute poverty threshold, N^{*a}, and is computed in the same way as R_1— that is, $R_3 = N^{*a}/N$—and the poverty gap estimate is the budget necessary for all units below the poverty line to reach their threshold. The intensity of absolute poverty is computed using the same formula as for relative poverty.

3.4. MATERIAL DEPRIVATION RATE

The material deprivation rate can be used to compare countries, provided that the basket of goods and services is equivalent for all involved countries. This is possible if the basket is 'normative' in the sense that a European household is labelled as materially deprived if it does not access a common standard of goods and services.

The peculiarity of the material deprivation approach is that the basket functions as a physical standard. Bradshaw and Mayhew (2010) argued that for the EU policy to eradicate social exclusion, the challenge is to raise the living standards of the poor in poorer countries, and to achieve this, the EU should adopt at least an absolute-type indicator. The material deprivation basket shares with the absolute poverty basket the characteristic that items are physical entities, with the difference being that those in the latter basket are evaluated in monetary terms.[11]

Pooling deprivation indicators into a single indicator implies defining a composite index. Indeed, Guio's (2009) analyses support the idea that the economic strain and durable indicators of the basket could be treated as a composite deprivation index. The set of items involving the quality of housing, which the basket that Eurostat revised in 2017 contains, enriches the composite index.

Experts have disputed the definition of the deprivation threshold. The larger the basket, the more uncertain the threshold. One of the criticisms of the deprivation approach is that not having some items could be a lifestyle choice of someone who is perfectly capable of purchasing these items. Therefore, the count should be limited to the items a person cannot afford. Other items may be of secondary priority in the household budget, which people may plan to acquire after some time. One of the reasons why a colour television was removed from the 2017 item list is that

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[11] The experience of the deprivation threshold computation (European Commission, 2010) suggests that in richer countries, a substantial proportion who are defined as 'poor' being below the at-risk-of-poverty threshold are lacking no deprivation items and state they do not have difficulty making ends meet. Moreover, Bradshaw and Mayhew (2010) have created an exercise of crossing the 60% at-risk-of-poverty rates with the 4+ material deprivation rate based on 2008 EU-SILC data for EU member countries, finding that for most countries, the two rates are highly consistent, hence highlighting a common latent factor; however, some countries (Latvia, Spain, UK, Italy, Greece and Hungary) show a second dimension uncorrelated with the previous one.

people could have technical alternatives to it, such as projectors or phones, or items may be possessed but broken. Other items, such as getting together with friends/family for a drink/meal at least monthly, could be an aspect of an inward-looking lifestyle.

Before 2017, there were two thresholds: one for *deprivation*, which was evaluated by three missing items, and another for *severe deprivation*, which was evaluated by four or more missing items. After 2017, the *material and social deprivation* rate became the proportion of the population experiencing an enforced lack of at least five out of thirteen deprivation items and *severe deprivation* involving seven or more items (https://ec.europa.eu/social/BlobServlet?docId=19228&langId=en).

A problem with the deprivation rate is that the instability of the basket and its multidimensionality. This suggests that the basket requires periodic updating and that alternative ways of evaluating the data other than merely counting the missing items should be studied (Whelan et al., 2008).[12]

Another problem is that, for policy purposes, the items must be transformed into monetary values. Generally, policy cannot intervene at the level of item supply, but it can and usually does intervene by providing income. For the indicator to be a useful tool with which to intervene at the individual or group level, a threshold defining a household as poor *and* deprived could be adopted. This rationale has been adopted by some European countries (among others, Ireland).

In symbols, the estimation of a material deprivation rate is a sensible operation only if the B ($B = 13$) items at unit i ($i = 1, \ldots, N$) of the N-sized population represent a common underlying construct, θ, which Eurostat calls 'material deprivation'. Of course, some units of the population may not be deprived, while others will have degrees of deprivation.

Let us consider unit i with a deprivation level θ_i and a vector of dichotomous items $\boldsymbol{Y}_i$ representing θ, where $Y_{ij} = 1$ if household i possesses item j, and 0 otherwise. The count of the items that the household possesses,

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[12] An item could be weighted with the proportion of households that do have it (European Commission, 2010). The effect of this would be to give more weight to the lack of an item in a small minority of households. The underlying justification for this is that because most people have it, lacking it means greater deprivation.

$y_i = \sum_j^B Y_{ij}$, is an empirical score sufficient for estimating the unit deprivation level θ_i.

The deprivation threshold, *T(Y)*, is the minimum number of missing items in a deprived household. If household i ($i = 1, …, N$) has a number of missing items Θ_i equal to or larger than $T(Y^d)$ it is considered deprived. So, the deprivation threshold enables the identification of N^{*d} ($N^{*d} < N$) deprived households in the population. The material deprivation rate, $R_4 = N^{*d}/N$, is the proportion of households at or above the deprivation threshold:

$$N^{*d} = \sum_i^N G(Y_i) \ where \ G(Y_i) = 1 \ if \ T(Y) \geq y_i \ and \ 0 \ otherwise.$$

To estimate R_4, instead of simply counting the (not) possessed items, which implies that items are independent and equally important, we could assume that items have different weights with respect to the underlying one-dimensional poverty construct for that population and that the estimate of θ for unit i, θ_i, is a weighted combination of the items measured at unit i, y_{ij} (Walker, 2015):

$$\widehat{\theta_i} = \sum_j^B \hat{\beta}_j y_{ij} \ (i = 1, …, N),$$

where $\hat{\beta}_j$ is the weight assigned to item j ($j = 1, …, B$). One possibility is that deprivation items are rated according to severity by a selected panel of experts.[13] Another is that item weights are estimated through a factor analysis of preference data after statistical standardisation.

If more than one dimension underlies the deprivation items—as has generally been taken for granted since the 2017 reform—a composite indicator could be constructed that summarises the underlying factors. The construction of a composite indicator requires further insights into the nature of the deprivation items.

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[13] The importance of consulting experts in assessing the exchangeability of items is well known to scholars. According to Ravallion (2011), 'those with a stake in the outcomes will almost certainly be in a better position to determine what weights to apply than the analyst calibrating a measure of poverty'.

3.5. AT-RISK-OF-POVERTY RATE

The at-risk-of-poverty rate is a new Eurostat proposal to subrogate the relative poverty rate. It is computed for both individuals and households. The difference between this measure and the traditional one, as computed by Istat, is relevant. With reference to 2017, the new measure for Italy is 20.3%, which is comparable with an Istat relative poverty estimate of 12.3%.

To gain a sense of the representativeness of Eurostat estimates, the German at-risk-of-poverty rate for 2017 was 16.1% and the Greek rate was 20.2%.[14] Moreover, in Italy, over the past 10 years, the minimum was 18.4% in 2008 and the maximum was 20.6% in 2016. We leave it to experts to evaluate how realistic it is that the rate of poverty in Italy is about the same as in Germany.

We can conclude that, for a given country, this poverty measure varies moderately over time, similar to the relative poverty rate, but is much higher than the relative poverty rate. In addition, at a given time point, the differences between country levels may be small even if the country levels are high. The little between-country differentiation does not help the European Commission assign countries resources to fight poverty in a way that is proportional to the effective needs of these countries.

To measure the poverty threshold of EU countries, 60% of the median is the standard. The at-risk-of-poverty rate is the measure on which the EU particularly relies. However, it is not free from criticism:

- This measure is not easy for the general population or technical poverty experts to understand. Its computational refinement makes its meaning vague and detached from poverty intervention. This reduces its power as a poverty measure (Bradshaw and Mayhew, 2010).
- It refers to disposable income instead of living standards or expenditures. The income-based concept ignores the capacity to borrow, dissaving, gifts and the value of home production. Indeed, the capacity to borrow and use savings depends on the duration of economic difficulties and the exceptionality of the household's

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[14] See:
https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tessi010&plugin=1.

situation. Gifts, charity and considerable family support depend on the household's social umbrella. Home production is very important in rural areas and in families with older adults. Thus, despite its refined definition of 'equivalised disposable income before all social transfers excluding pensions that are below the at-risk-of-poverty thresholds calculated after social transfers' (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:At-risk-of-poverty_rate), it is too narrow a concept to describe the command capacity regarding the household's resources.

- The reference threshold as 60% of income is arbitrary, although this criticism applies to all measures based on indirect measures of social uneasiness. Moreover, the EU indicator uses an OECD equivalence scale to adjust income to household needs with respect to family composition, while the OECD itself has abandoned this scale and adopted an equivalence scale based on the square root of the number of people in the household, which is believed to be more science based (OECD, 2008).

Eurostat also computes a *persistent at-risk-of-poverty* rate, which covers persons who have been living in private households for four years and who have been on the EU-SILC panel for all four relevant years.

In statistical terms, *mutatis mutandis*, all that has been mentioned for the relative poverty rate is valid for the at-risk-of-poverty rate. The difference is in the denomination of the basic variable, which is equivalised income for the former rate and equivalised disposable income before all social transfers, and so forth, for the latter rate.

3.6. AT-RISK-OF-POVERTY OR SOCIAL EXCLUSION RATE

The union-intersection of three indicators of household uneasiness—poverty (formerly, relative poverty rate, currently, at-risk-of-poverty rate), deprivation (the severe material deprivation rate) and unemployment (jobless rate)—should amount to the risk level of social exclusion of the households of an area at a reference time (Eurostat, 2020). This risk is estimated by the *at-risk-of-poverty or social exclusion* rate. Figure 2 shows the union intersection among the three basic estimates for the EU.

Figure 2. Millions of persons at risk of poverty or social exclusion in the EU, 2017

(*Source:Eurostat,https://twitter.com/EU_Social/status/10525087907744808 96/photo/1*)
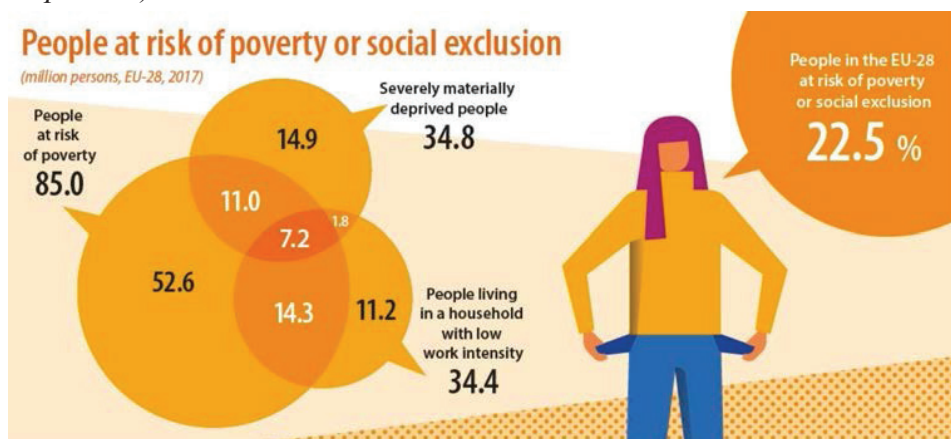
The rate is the most comprehensive of the measures described in Section 3. Thus, it may be considered a measure of social exclusion including poverty.

Some rates allow for better understanding what the indicator is aimed at highlighting[15]: 22.5% of the EU population (in absolute terms: 112.9 million people) was at risk of poverty or social exclusion in 2017, and this figure comes from merging the 16.9% of the population at risk of poverty, 9.3% of the population aged 0–59 years living in households with very low work intensity and 6.9% severely materially deprived population. The analogous figures for Italy were 28.9%, 20.3%, 11.8% and 10.1%, respectively. It is evident that the overall rate construction is dominated by the at-risk-of-poverty rate, which overlaps with both material deprivation

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[15] The data in Figure 2 are in millions of persons, while the comments refer to friendlier rates. The peculiar construction of the overall rate should be noted: it is the union intersection of three rates (corresponding to the total surface covered by three bubbles) whose denominators are heterogeneous. In fact, the low work intensity rate is computed as a proportion of the population aged 0–59 years living in households, while the other two rates are computed as a proportion of the whole population.

and unemployment, but material deprivation and unemployment alone each add a quota of social exclusion.

To better understand what the indicator shows, let us compare the at-risk-of-poverty and social exclusion rates of Italy and Germany in 2017. Italy's rate is 28.9% and Germany's is 19%, but the difference between the at-risk-of-poverty rates of the two countries is much less: 20.3% for Italy and 16.1% for Germany. These data show that the at-risk-of-poverty rate does not differentiate countries that differ in terms of the material deprivation and employment of their populations.

The eclecticism of the social exclusion principle has produced several variants that constitute targets of Europe 2020 and 2030 strategies. To promote social inclusion, in particular through reducing poverty, EU leaders have called for further work to be undertaken on appropriate indicators of this target, covering the dimensions of relative poverty, material deprivation and a more dynamic aspect among the following: labour market exclusion, poverty anchored at a point in time and in-work poverty.

3.7. EXTREME POVERTY RATE

Those who are *extremely poor*, according to the OECD (2008) and the European Commission (2010), are persons and families that are persistently and severely deprived *and* below the poverty line. Yet there is no agreement in the EU regarding the estimation procedure of the extreme poverty rate in a country. The European Commission (2010) has limited its recommendations to either basing the estimate on deprivation indicators alone or constructing a composite indicator on the basis of the overlap between deprivation indicators and living on an income below a budget standard threshold.

Let us first examine the *homeless* phenomenon, which is the most extreme condition of the extreme poverty group. A homeless person is someone without a house to sleep in, though the full definition varies according to where these people sleep. Homeless people can sleep in the street or in buildings not designed for human habitation but also in public dormitories or other communal facilities, in temporary accommodation in a hotel or guesthouse or in accommodation temporarily provided by friends

or relatives.[16] Eurostat (2004) reported other possibilities stemming from a European survey on key witnesses of the homeless phenomenon at the national level. The variety of national concepts is so large that, despite a rough estimate of the EU homeless rate at or below 0.5%, in Germany, that estimate is above 20%.

Some countries have tried to count the homeless in their national censuses, though with uncertain results.[17] Country statistics are also collected and systematised by the European Observatory on Homelessness, which has published two statistical updates on the extent and profile of the homeless in the EU (Edgar, 2009; Busch-Geertsema et al., 2014). However, there are no periodic European statistics on the homeless, nor are single countries' statistics made comparable within this framework (see Edgar, 2009; Stephens et al., 2010).

Aiming to find a minimum common multiplier for defining and then measuring the national homeless phenomenon, Eurostat (2004) has suggested to overcome the current definition of homeless, which refers to an individual status, and elaborate indicators of the wider concept of 'insecure housing conditions and homelessness', which refers to housing conditions. Furthermore, Edgar (2009) and Amore et al. (2011) proposed adopting measures of 'at risk of homelessness' or 'housing exclusion', instead of a homelessness rate.

Nevertheless, we propose to evaluate the homelessness phenomenon by estimating the number of people who sleep either rough or in public dormitories, because these people are in more dramatic conditions. Indeed, people sleeping in shelters or rough areas can be seen as a very socially relevant problem. Even if limited in number, this group is not to be confused in statistical terms with other people who can be the

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[16] The way people without their own home sleep allows for distinguishing between the roofless and houseless. A person is *roofless* if they live in a shelter, hotel, hostel of other type of institution or temporary accommodation paid for through social welfare benefits; they are *houseless* if they live in temporary accommodations for the homeless (Busch-Geertsema et al., 2014).

[17] As an example, the rolling French census of 2011 listed 16,339 homeless in municipalities with more than 10,000 inhabitants. According to Busch-Geertsema et al. (2014), this figure is an underestimate because INSEE/INED surveys on French homelessness have indicated some 86,000 homeless people in 2001 and 141,500 in 2012.

target of general socioeconomic policies as the homelessness phenomenon requires specific policies.

Moreover, the interviews conducted by Martini et al. (2007) evinced that such deep poverty is a non-return condition—that is, no interviewed person was able to return to 'normality'. For this type of studies, *normal life is the threshold*. Other studies (Culhane et al., 1994) have instead shown that point-in-time counts of homeless people tend to underestimate the probability of exiting that condition.

To estimate the homeless population in the daytime, the so-called oasis method could be applied. This entails counting those who attend certain sites (soup kitchens, shower stalls, public dormitories, centres for clothing distribution, etc.) to address their primary biological needs. This method consists of sampling the sites of the concerned area and counting how many people frequent them at a given point in time. Alternatively, data on service users can be collected either from service personnel or service registers.[18] Given the stationary condition of this population group, it is possible both to keep a record of service use and combine register-based data with survey data.

The simultaneous count requires many contemporaneous observers to avoid double counting and the risk of non-poor or people occasionally in need being confused with the poor. Moreover, the oasis method may ignore the homeless and living rough who, during the observation period, did not frequent the sampled structures, the Roma and other mobile groups and unregistered or ethnic minority people hosted in institutions, prisons, hospitals, hostels or camps. Moreover, for linguistic or social reasons, these people, when contacted, tend to elude surveys (CPRC, 2001).

The oasis method could also be applied in the street because everybody sleeps somewhere at night. However, for a street survey, it may be necessary to apply area sampling, which is a more complex estimation

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[18] There are registers of people receiving support from charitable organisations and local authorities. Busch-Geertsema et al. (2014) reported that a nationwide survey on homelessness has been conducted in Denmark since 2007. These national counts are realised by asking all local service providers and authorities who are in contact with or have knowledge of homeless people to fill out a short individual questionnaire for each homeless person during a 'count week'. The survey covers homeless shelters, addiction treatment centres, psychiatric facilities, municipal social centres, job centres and social drop-in cafes; there is a high response rate from local service providers.

method. Area sampling implies knowing in advance the sites where people sleep, guessing the density of homeless people at each site and then optimally sampling the areas with a probability proportional to the homeless frequency. The sites include not only the streets, station areas, the ground floor of directional buildings and abandoned houses or establishments but also other closed-off sites that volunteers and police know are frequented by homeless people. Then the sampled areas are visited early in the night by squads of observers to count or interview homeless individuals.

Of course, this sampling technique may be dangerous for observers; therefore, any squad of observers should include at least one person who is involved in on-site homeless care. As a matter of fact, homeless individuals—some of whom include 'classical' vagabonds, including people with substance abuse problems, previously imprisoned people, individuals with long-term, multifaceted psychosocial vulnerabilities and irregular immigrants (Fabbris, 2005; Edgar, 2009; Istat, 2015; Benjaminsen, 2016)—either flee as soon as the data collection squad enters the site or refuse to speak with them. However, counting and even interviewing the homeless is feasible. In Italy, such a survey was conducted for the Veneto region (Fabbris, 2007) and it may be reproduced in other local contexts and at the national level.

A method similar to the oasis method was adopted by Istat (2015) for its second sample survey[19] of the homeless. The survey counted people frequenting Italian charitable structures to eat or sleep. Istat estimated a total of 50,724 homeless people in Italy in 2014 (https://www.istat.it/it/files//2015/12/Persone_senza_dimora.pdf). The proportion of surveyed people corresponds to approximately 0.2% of the resident population, a figure close to that of the homeless rate of other European countries.

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[19] The 2014 survey of people living in extreme poverty was carried out by a joint effort of Istat, the Welfare Ministry, the Italian Federation of organisations for the homeless (Fio.PSD) and Caritas for Italy. A previous survey held in 2011 estimated 47,684 homeless. The survey included the main Italian municipalities, provincial capitals with more than 30,000 inhabitants and all municipalities in the hinterlands of major towns and cities. A special weighting procedure based on information about the repeated use of services was used to control for double counting (Istat, 2015).

4. CORRESPONDENCE BETWEEN STATISTICAL PROPERTIES AND AIMS OF POVERTY MEASURES

We consider the following aims of poverty measures:

1. The possibility of individual interventions, for both on persons and families, targeted at subsidising a below-threshold household income.
2. The possibility of intervening in within-country areas or at-risk groups. This possibility refers to the definition of a normative policy at the regional or social group level.
3. The possibility of making comparisons between different EU countries.
4. Other aims.

The results of the merging of computational approaches and possible aims are described in Table 1. A cross in the cell of the table represents full correspondence between the approach and aim.

Table 1. Correspondence between poverty measurement approaches and intervention purposes

Measurement approach	Individual intervention	Areas or groups at risk	National, local intervention	Between-country comparison
Relative poverty	****	X		
Intensity of poverty	X	X		
Persistent poverty	X	X		X*
Absolute poverty	X	X	X	
Material deprivation	X***	X		X
Homelessness	X**		X**	
At risk of poverty	****	X		X*
At risk of poverty or social exclusion				X

(*) The comparability between EU countries depends on sensibility of the rate with respect to the country's poverty level. (**) The homelessness phenomenon is so socially relevant that each single case should be followed; statistics should be collected to focus the attention on the phenomenon. (***) For an individual intervention, deprivation has to be transformed into monetary values. (****) A correspondence is virtually possible but could be biased.

The synopsis shows that the relative and absolute poverty rates, as well as the poverty intensity rate, are adequate for community and group interventions. The absolute poverty rate can also be the informative basis for national or local policies intended to help persons and households overcome structural difficulties.

The at-risk-of-poverty rate and analogously targeted persistent poverty rate, as proposed by Eurostat, are adequate for highlighting those areas or population groups at risk of poverty and partially also those EU countries that rank low or high in the poverty rate. Regarding the relative poverty threshold, the European Commission (https://ec.europa.eu/social/main.jsp?catId=89&langId=it&newsId=982&furtherNews=yes) recognises the following:

> *While justified in many ways, presents some weaknesses and, especially does not properly reflect the real living conditions of EU citizen. Living under the poverty threshold in richer countries does not involve the same difficulties as living under the poverty threshold in the poorest ones. The at-risk-of-poverty threshold is also very low in some of the poorer countries. For example, in Romania, the threshold is €1.71 per day per person.*

The relative poverty indicator could also be a reference for individual interventions, but the thresholds require further insights.

The material deprivation rate can be reasonably broken down by areas and social groups and is adequate for making comparisons between countries in terms of deprivation. Instead, it does not offer enough information for an individual intervention unless a suitable monetary transformation of deprived items is defined.

Statistics on the homeless could be useful for both individual intervention and understanding the dimension of the phenomenon at the local or national levels.

5. CONCLUSION

In the current paper, we have discussed approaches for measuring poverty. Poverty was conceived as a social syndrome, varying in intensity and persistence, and associated with a lack of income and other personal and social problems, in particular housing and employment. We claim that the rationale for choosing a suitable approach is based on the pertinence of the

properties of statistical measures with respect to the policies and actions to overcome poverty.

We determined that two measures currently in use at Istat—the absolute poverty and intensity of poverty rates—are informative for local and national intervention purposes. The absolute poverty rate is particularly suitable for interventions at the individual, geographical and social group levels.

Instead, the statistical measures defined at the EU level, in particular the at-risk-of-poverty rate, which was introduced to identify poverty at the local and national levels, emulate the Istat relative poverty rate but without producing adequate information to intervene. If an indicator shows that all countries are similarly poor, it should be better defined.

Concerning EU measures, we have examined three rates: the at-risk-of-poverty, material deprivation and at-risk-of-poverty or social exclusion rates. Here, the material deprivation rationale is appropriate for individual interventions, though some permanent 'Rosetta stone' is necessary to translate item deprivation into an income need. Indeed, the dimensions of deprivation can be plural, item and dimension can be weighted, and currency parities for time and space comparisons require further research. Thus, the subjectivities of the at-risk-of-poverty rate and material deprivation rate, which together constitute two-thirds of the at-risk-of-poverty or social exclusion rate, makes the latter rate problematic. A shift in Eurostat's attitude about this would certainly be welcome.

Our analysis leaves the following issues open:

- If we were asked to state our preference between a measure of poverty that highlights local people in extreme difficulties, which could enable regional or national institutions to politically intervene, and a measure suitable for comparing countries with respect to poverty, we would answer that it depends on which territorial level the intervention is expected to target. If the local authorities, which stand shoulder to shoulder with the poor and are resilient to changes in social preferences, are prone to intervening for local poverty alleviation, an absolute measure of poverty or a monetary transformation of material deprivation seems adequate. The absolute poverty approach is applied in Italy, a country in which the largest part of social interventions is realised directly by municipalities and

charitable organisations. If the relevant intervention occurs at the national level, again, an absolute poverty measure can help. Indeed, economic and social policies on a large territorial scale could be combined with targeting the poor and active participation in local initiatives and civil society groups' engagement (Craig and Porter, 2003). Moreover, knowing which EU countries are poor may help only if the European Commission wishes to help the poorer countries. Therefore, more cogent indicators, in particular an extreme poverty measure, could pinpoint particularly poor countries or areas (see the next bullet point). Finally, the estimation of the distance between a poor individual and a national or international median level—which is the basis of all relative poverty or social exclusion measures—is nothing but an exercise in curiosity.

- The complete eradication of poverty in Europe is a far target. In any society, a quota of poor people is physiological in the sense that it is possible for a person or family to face social difficulties for some time because of health, welfare or social inequalities, the labour market, the political system, criminality diffusion or other social diseases. Think, for instance, of the diffusion of gambling among adults, which can suddenly deplete individuals' or families' resources. Therefore, if we conceive of a poverty rate as a gauge of the inequality of a society, something relevant for academic debate or to solicit social compassion, we can use any measure proposed by Eurostat, with the consequence that the larger the rates, the more the poverty problem seems overwhelmingly difficult to solve. If a rate or threshold is conceived of as an informative tool for intervention, a radical review of the current Eurostat measures is needed. The European Commission decided to measure poverty as a combination of a lack of income and deprivation to highlight areas where poverty is endemic in the EU. This may be a way to proceed, provided the baskets and thresholds are adequately defined and the parity between income and deprivation is made explicit.
- The homeless comprise a subgroup of poor individuals who are socially discomfiting and erased in official statistics. We roughly know this population's size, with rare exceptions. In Italy, Istat has attempted some surveys on the homeless, though a more attentive sample survey would be needed to highlight their necessities and

potential to switch to normality. They differ from other poor people in terms of both characteristics and needs. Therefore, at least every few years, a survey of the homeless population would be useful.

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