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The Constitutional Approach to poverty measurement. A multiple-deprivations framework for high-income countries.

Dottorando: Francesca Tosi

Relatore: Prof. Paolo Liberati

Correlatore: Dr. Francesco Burchi

Coordinatore: Prof. Luca Salvatici

Ai miei genitori, a mia sorella Valeria.

Abstract

Today there is widespread agreement on the urge of adopting conceptual frameworks and evaluation tools that allow to include a variety of aspects of human life in evaluating people's living standards, even at the highest levels of policy making. While there is no consensus on which specific life domains should be taken into account, the arguments in favour of a broadening of the informational basis for poverty analysis are cogent: low consumption surely is at the heart of the concept of 'poverty' but a number of other domains – like poor human health, limited access to education and powerlessness – are systematically concerned by inadequate living standards. This study hypothesises that the application of a theoretical framework for the reconceptualization of multidimensional poverty as a distributive justice question can be used to (i) address the need for multidimensionality in poverty assessment while minimizing the degree of arbitrariness with which normative choices are often made; and (ii) explain changes in living standards in high-income countries and inform policy makers in a more effective way compared to a unidimensional poverty framework. In Chapter I, we thoroughly review theories and metrics in support of multidimensional poverty analysis, with a particular focus on counting methods and axiomatically derived poverty indices. We highlight the advantages of applying a methodology that enables us to study the distribution of multiple deprivations that simultaneously affect the individuals and identify a new family of poverty measures that can serve our purpose. In Chapter II, we study the possibility of using conceptual instruments offered by contemporary theories of social justice to address a multidimensional poverty question for high-income countries. We then develop a theoretical framework inspired by John Rawls' theory of justice to reconceptualise multidimensional poverty analysis, which enables us to frame an ethically sound and publicly justified empirical assessments of people's living conditions in constitutional democracies through the application of a Constitutional Approach to dimensions selection. In Chapter III, we contextualize the research in the European framework, reviewing the history and the state of the art of multidimensional poverty analysis for Europe and Italy and identifying weaknesses and possible room for improvement in poverty measurement approaches currently in use. Chapter IV concludes with an investigation on the joint distribution of multiple deprivations in Italy based on EU-SILC cross-sectional data from 2004 to 2013. Two main factors tell the story of deprivation in Italy: age and geography. Deprivations follow a clear pattern through the different stages of life: the youth are threatened by unemployment and economic insecurity, while the elderly report more deprivations in health conditions and educational attainment at once. Geographically, multidimensional poverty estimates confirm the existence territorial disparities already accounted for by official monetary poverty measures; nonetheless, they also highlight remarkable exceptions, confirming that well-informed multidimensional estimates are able to generate non-trivial results. The study of the phenomenology of multiple deprivations in Italy shows that poverty breadth is higher in the South, as well as poverty

intensity; conversely, inequality among the poor is widespread in the North, especially in north-western regions. During the past ten years, multidimensional poverty has steadily decreased until 2010 and it started increasing without a clear pattern afterwards. Deterioration in both decent work and health conditions has mainly contributed to this change of pattern, while education and living environment conditions have improved across time. Comparing multidimensional figures to official statistics on poverty allows us formulating possible explanations about what are the factors to which different indicators are more likely to be sensitive. We conclude suggesting that a generalization of this study to assess multidimensional poverty at European level can make an interesting area for further research.

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List of Acronyms and Abbreviations

AF	Alkire-Foster
AN	Anonimity
AROPE	At-risk-of-poverty-and-social-exclusion rate
BES	Benessere Equo e Solidale (Equitable and Sustainable Well-being)
BNA	Basic Needs Approach
CA	Capability Approach
CN	Continuity
CNEL	Consiglio Nazionale dell'Economia e del Lavoro (National Council of Economy and Labour)
CSPI	Correlation-Sensitive Poverty Index
CVI	Conjoint Vulnerability Index
ECHP	European Community Household Panel Survey
EQLS	European Quality of Life Survey
ESRI	Economic and Social Research Institute
ESS	European Social Survey
EU	European Union
EU-SILC	European Union Statistics on Income and Living Conditions
FC	Focus
FD	Factor Decomposability
FGT	Foster-Greer-Thorbecke
GE	Generalized Entropy
G-SOEP	German Socio-Economic Panel
HBS	Household Budget Survey
HDR	Human Development Report
HR	Headcount Ratio
HRP	Household Reference Person
ISPL	International Standard Poverty Line
ISTAT	Istituto Nazionale di Statistica (National Statistics Institute)
IT	Information Theory
IS	Inequality Sensitivity
ISPI	Inequality-Sensitive Poverty Index
MN	Monotonicity
MPI	Multidimensional Poverty Index
MRS	Marginal Rate of Substitution
MW	Monotonic Welfare
NDCI	Non-decreasingness under Correlation Increasing Arrangement
NDS	Non-decreasingness in Subsistence Levels of Attributes
NICI	Non-increasingness under Correlation Increasing Arrangement
NIPA	Non-increasingness under Pareto-efficiency Association Increasing Switch
NLPCA	Non-Linear Principal Component Analysis

NPG	Non-Poverty Growth
NPV	Normalized Poverty Value
NR	Normalization
OECD	Organisation for Economic Co-operation and Development
ORW	Ordinal Rank Weights
OMC	Open Method for Coordination
OPCS	Office of Population, Censuses and Surveys
PCA	Principal Component Analysis
PD	Pigou-Dalton Transfer Principle
PG	Poverty Gap
PP	Principle of Population
PPF	Production Possibility Frontier
RE	Relative Equity
SD	Subgroup Decomposability
SHARE	Survey of Health, Ageing and Retirement in Europe
SI	Scale Invariance
SLL	Swedish Level of Living Survey
SPG	Squared Poverty Gap
SWF	Social Welfare Function
TFA	Totally Fuzzy Approach
TFR	Totally Fuzzy and Relative Approach
TR	Transfer
UDB	User Database
UM	Uniform Majorization
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WAI	Weak Association Increasing Switch

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Summary and conclusions

For a long time, in the economic literature poverty has been generally associated with lack of goods and services, often overlooking the fact that it is also a synthesis of political, economic factors and social rights and, above all, a human phenomenon. The income-centred approach has shown notwithstanding severe limitations, mainly due to the lack of evidence of perfect correlation between income poverty and unsatisfied basic needs, especially at household level (Lipton and Ravallion, 1995; Fukuda-Parr, 1999; Thorbecke, 2008), and to the recognition of the presence of imperfect or non-existing markets (Tsui, 2002; Bourguignon and Chakravarty, 2003) such as those of public goods. Low consumption surely is at the heart of the concept of 'poverty' but a number of other domains – like poor human health, limited access to education and powerlessness – are systematically concerned by inadequate living standards.

During the last decade, the acknowledgment that poverty involves much more than just low income has inspired a great scientific literature production on methodologies to measure or analyse deprivation in multiple dimensions: since the pioneering works of Tsui (2002) and Chakravarty and Bourguignon (2003), a number of approaches were developed to contribute to the debate, e.g., the axiomatic approach (Chakravarty et al., 1998; Alkire and Foster, 2011a), the information theory approach (Deutsch and Silber, 2005; Maasoumi and Lugo, 2008) and the fuzzy set approach (Cheli and Lemmi, 1995; Chiappero-Martinetti, 1994; 2000). At policy level, the opportunity to use multidimensional poverty evaluation systems has been highly debated as well. Many countries have already officially adopted multidimensional measures for the evaluation of poverty and social exclusion: among others, Colombia, Mexico, Bhutan, El Salvador, Malaysia, Peru and Philippines. Not surprisingly, developing countries have been the driving force of this change of perspective. Following the prominent examples of the World Bank and the United Nations Development Programme, that respectively publish the Millennium Development Goals and the Multidimensional Poverty Index on a yearly basis, the way of conceptualizing deprivation in poor countries has radically changed and is now more and more focused on the monitoring of achievements in multiple aspects of life (Alkire and Santos, 2010; 2014). At OECD and European Union level, some attempts of reconceptualising poverty and social exclusion through the use of composite indices have recently been made as well – see for instance the At-risk-of-poverty-and-social-exclusion rate released yearly since 2009 by Eurostat – and there is a general growing interest expressed by Governments and the civil society in understanding poverty as a multifaceted phenomenon (Stiglitz et al., 2009). Nonetheless, still a few studies contribute to the production of sub-national deprivation indicators or country-specific multidimensional poverty measures for wealthy countries, where multidimensionality in living standards – especially in the Anglo-Saxon tradition – is still mainly associated with material deprivation only (Whelan et al., 2001; Layte et al., 2001; Whelan et al., 2002; Guio and Maquet, 2006; Coromaldi and Zoli, 2012).

While the advantages of applying a multidimensional approach to poverty measurement are widely

acknowledged, aggregate poverty measures are far from being universally welcomed (Fleurbaey, 2009; Ravallion, 2011; Ferreira and Lugo, 2013). With this regard, the main disagreement in the literature lies in the way normative choices in support of the construction of poverty indices are made. The choice of dimensions, indicators, weights and cut-offs to be used to identify the poor requires in fact an evaluative process that we can expect to be diverse for each case, depending on the context, the scope of the analysis and the contingencies. Without an explicit reference to a sound theoretical ground, the risk the researcher encounters is to counterbalance the intrinsic strengths of a multidimensional framework – i.e., its inclusiveness and richness of information – with an excessive arbitrariness and a lack of theoretical justification.

Our research joins the scientific debate at this point and seeks to provide a clear answer to the following research questions: (i) how can we address the need for multidimensionality in poverty measurement while minimizing arbitrariness in normative choices and unambiguously informing empirical assessments? and (ii) can a multiple deprivation framework be used to explain changes in living standards in high-income countries and to inform policy makers more effectively than a unidimensional one?

This study is organized as follows. In Chapter I, we thoroughly review theories and metrics in support of multidimensional poverty analysis, with a particular focus on counting methods and axiomatically derived poverty indices. In Chapter II, we study the possibility of using conceptual instruments offered by contemporary theories of social justice to address a multidimensional poverty question for high-income countries. We then develop a theoretical framework, i.e., the Constitutional Approach to poverty measurement, to inform ethically sound and publicly justified empirical assessments in constitutional democracies. In Chapter III, we contextualize the research in the European framework, reviewing the history and the state of the art of multidimensional poverty analysis for Europe and Italy and identifying weaknesses and possible room for improvement in poverty measurement approaches currently in use. Chapter IV concludes with an investigation on the joint distribution of multiple deprivations in Italy based on EU-SILC cross-sectional data from 2004 to 2013.

Theories and metrics for multidimensional poverty analysis

The first Chapter of this study is aimed at reviewing – both theoretically and methodologically – the fundamental contributions to a reconceptualization of poverty from a multidimensional perspective that have been so profusely developed in the last twenty years. Strengths and weaknesses will be discussed for each of the approaches under review in order to identify the most suitable instruments to frame an investigation on multiple deprivations in high-income countries. Acknowledging that poverty is multidimensional has indeed motivated a large body of studies. We will focus our attention on counting methods – whose tradition was initiated in the UK by Townsend (1979) and Mack and Lansley (1985) – that were for a long time largely used from development practitioners and preferred by policy makers. Counting techniques are by now widely used in conjunction with methods deriving from the social welfare function approach, enthusiastically pioneered by scientists in the field of welfare economics (Atkinson, 1970; Deaton 1997). The development of the Alkire-Foster method (2009, 2011a) has been of key

importance in effectively linking these two approaches and making the computation of multidimensional poverty indices become widespread among policy makers. The real value-added of the Alkire-Foster methodology lies in the capability of taking into consideration the joint (or cumulative) distribution of deprivations experienced by individuals, which allows studying the degree of association between dimensional shortfalls and makes it possible to evaluate individuals' living conditions in terms of simultaneous multiple deprivations. The invaluable opportunity to quantify the extent to which a household or an individual is *simultaneously* deprived in different life domains removes all doubts raised by the vivid 'dashboard vs. single index' debate (see, among others, Lustig, 2011; Ravallion, 2011a; Alkire and Foster, 2011b). In fact, even if the use of a dashboard of social indicators could be less demanding in terms of data availability and provides more accurate information on specific dimensions of well-being, the development of aggregate measures of deprivation is a powerful way to account for multiple aspects of human life and to allow comparative analyses through the generation of complete orderings of countries, groups or individuals. Among the several approaches to multidimensional poverty measurement, we will show how the axiomatic approach proves to be the most convincing, as it allows explicitly specifying a list of 'rules' or desirable criteria that a poverty measure should satisfy in order to correctly reflect the phenomena it is intended to account for. A new family of axiomatically derived poverty indices recently proposed by Rippin (2010; 2012a; 2012b; 2015) offers interesting food for thought with this regard. Firstly, it combines the advantages of the counting approach and the fuzzy set approach (Cerioli and Zani, 1990; Cheli and Lemmi, 1995; Chiappero-Martinetti, 1994, 2000;), avoiding the dichotomization of the distribution into two crisp groups while allowing to classify the studied population according to the degree of poverty each person or household is affected by. Secondly, its decomposability by dimension, region and sub-group can guide the policy maker in better identifying where – either geographically or socioeconomically – poverty is nested. Thirdly, it allows accounting for the joint distribution of deprivations, just as Alkire-Foster measures do. Finally, and more importantly, it is able to account for the level of inequality among the poor, making it possible to design interventions whose target is represented by those who deserve to get more attention by the policy maker – i.e., the poorest of the poor. In light of these reasons, we will make use of Rippin's methodology to derive a multidimensional poverty index to monitor the joint distribution of deprivations across the Italian population.

A Constitutional Approach to poverty measurement

In Chapter II we will endeavour to address the need for multidimensionality in poverty measurement while minimizing the lacking of theoretical and ethical justification in informing normative choices. One of the main debates around multidimensional poverty assessment concerns the degree of arbitrariness used to inform poverty analysis. Which dimensions matter and who should be selecting them are questions that repeatedly raise issues of ethics and legitimacy. Whether it is true that the lack of agreement on what a good life is can be viewed as a symptom of the vitality of a pluralistic society, when it comes to evaluating life standards to support justice-enhancing institutions and policies, finding a certain degree of consensus is necessary. Such a consensus, in turn, requires a prior definition of what is 'just'.

Throughout the second Chapter, we will hold that, in order to justify normative decisions in support of poverty assessment, the latter has to be addressed as a distributive justice question. With this aim in mind, we will develop a theoretical framework to unambiguously guide the researcher in the selection of relevant dimensions, indicators and relative weights by means of the scrutiny of a society's political and institutional arrangements. The Constitutional Approach to poverty measurement thereby proposed is rooted in John Rawls' extensive work on social justice (1985; 1988; 1971; 1993; 1999a; 1999b; 2001), also known as 'Justice as Fairness'. The two principles on which Justice as Fairness is grounded state that free and equal persons, even if moved by conflicting conceptions of the good, will have reason to establish social rules that everyone abides by to guarantee equal basic liberties for all, equality of opportunities and a fair distribution of certain social primary goods that "every rational person is presumed to want" (Rawls, 1971, p.54). These goods include liberties, rights, opportunities, all-purpose means, like income and wealth, and the social bases of self-respect, whose distribution among the citizens, in Rawls' view, can only be unequal if that goes to the benefit of the least advantaged. Social primary goods thus represent the informative basis to make interpersonal comparisons and can serve as a metric for justice-enhancing evaluations. Rawls holds as well that stable and politically legitimate societal arrangements reflect values latent in the public political culture and embody an 'overlapping consensus' that free and equal citizens construct starting from a fund of public shared ideas. From the concept of overlapping consensus, and drawing on James' (2005) suggestion for a constructive interpretation of the constitutional law as well as on Burchi et al.'s (2014) work on the measurement of poverty on political grounds, we will hold that national constitutions, which are a form of social contract of primary importance, can be interpreted as a formal expression of such a consensus. They can thus serve as a consistent source of information for identifying societal systems of values that citizenry continues to agree upon in the course of time. We will therefore conclude that:

(i) constitutional norms, along with their judicial interpretations, represent a reliable informative basis to make ethically sound and publicly justified normative choices in support of multidimensional poverty analyses; making use of the Constitutional Approach to select relevant domains, indicators, relative weights and cut-offs will also allow to minimize the level of arbitrariness often used in assessing poverty and living conditions in multiple dimensions;

(ii) constitutional democracies are an ideal field of application for multidimensional studies on distributive justice, as their institutional and political settings undoubtedly convey values and principles shared by the citizenry; we will thus narrow the scope of our purpose of identifying a framework for multidimensional poverty analyses for high-income countries to liberal countries characterized by constitutional democratic regimes; and

(iii) interpersonal comparisons in a multidimensional space are conceivable and can be made on the basis of the means necessary to lead a decent life that are to be equally distributed unless an unequal distribution of any, or all, of them is to the advantage of the less fortunate – i.e., the social primary goods.

Concepts and measures of multidimensional poverty in Europe and Italy

In Chapter III we will review the empirical literature on multidimensional poverty measurement in Europe, both at national and European Union level, in order to identify conceptual and methodological approaches currently in use. Building on the theoretical framework proposed in Chapter II, we will carry out the review focusing on two core aspects: (i) how multidimensional poverty measurement has evolved in the European Union context and in its countries, paying special attention to the Italian case; and (ii) how normative and methodological choices in support of multidimensional analyses have been made, which form of social contract emerges from them (if any) and what are the most common methods used to justify normative choices in this branch of literature. To carry out such an evaluation, we will refer to Alkire's (2008) taxonomy on the methods through which multidimensional analyses on poverty typically ground their dimensions selection: (i) using existing data; (ii) making assumptions on the basis of a normative approach; (iii) drawing on existing lists generated by consensus; (iv) using a deliberative participatory process; and (v) proposing dimensions on the basis of empirical studies on people's values. The first two methods, i.e., relying on available data or conventions and making normative assumptions, are in fact the ones much in use. However, especially in the case of the development of countrywide multidimensional poverty measures, a non-transparent use of these methods entails the concrete risk of letting personal value judgments and beliefs interfere with the research objectives, undermining the legitimateness of final policy advices.

In the past half-century, European Union's institutions have played a main role in validating methods for multidimensional poverty assessments in the context of high-income countries and to create a diffused 'social indicators' culture. At EU level, the evolution of the definition of poverty started in the Seventies has been shaped by two major concepts: that of relative poverty (Council of the European Communities, 1975) and that of social exclusion, of which the EU has been one of the main advocates since the concept first appeared in the French social policy discourse (Lenoir, 1974). It is on these two pillars that today's European Union's strategy for tackling poverty is explicitly grounded and on which EU's leading tool for evaluating living conditions in Member States – i.e., the three-dimensional At-risk-of-poverty-and-social-exclusion rate (AROPE) – was conceptually built. The AROPE is composed by three sub-indicators respectively accounting for (i) relative monetary poverty (the at-risk-of-poverty-rate); (ii) severe material deprivation, or the capacity of the household to acquire a list of basic items deemed necessary to lead a decent life; and (iii) very low work intensity (European Council, 2010). The first indicator is a relative poverty measure while the other two account for absolute poverty conditions. In the first part of the Chapter, we will analyse the AROPE in detail showing that, despite the remarkable efforts made by the EU towards the inclusion of indicators not related to income in its anti-poverty strategy, it suffers from a number of theoretical weaknesses. First of all, it is not clear whether the absolute poverty indicators that have been paired to the at-risk-of-poverty rate, especially the severe material deprivation one, are actually able to reflect core aspects of living standards that do not vary with changes that might occur in the distribution. Secondly, and most importantly, the indicator accounting for households' capacity to afford buying certain items does not represent an innovative metric for poverty measurement, as it is an income-

related indicator just as the at-risk-of-poverty rate. As a conclusion, we will hold that such conceptual flaws might undermine the claimed purposes of broadening the informative base for poverty measurement at European Union level.

At country level, the multidimensional poverty tradition has started in the UK fuelled by two studies developed by Townsend (1979) and Mack and Lansley (1985), regarded as the landmarks in poverty measurement literature and from whose innovative approach – also known as 'Breadline Britain' – a rich literature on counting approaches to identifying the poor has spanned. The Breadline Britain approach has also influenced most of the countrywide surveys now developed by national offices for statistics as well as the harmonized surveys for assessing living conditions implemented by Eurostat, namely the ECHP and the EU-SILC. One major virtue of the Breadline Britain experience has been involving the public opinion in the definition of the list of households' essential goods. One possible drawback is linked to an excessive focus on material deprivation and to the neglect of a number of potentially more important aspects of human life domains, like political participation, subjective well-being and the quality of social relationships.

The second part of the third Chapter is dedicated to Italy, where official poverty measures computed by the National Statistics Institute (Istat) are represented by a dashboard of two indicators grounded on the 'income method' (Sen, 1981): a relative poverty and an absolute poverty indicator. One important step towards the inclusion of indicators able to monitor social functionings in multiple dimensions in Italy has been the development of the BES, or *Benessere Equo e Solidale* (Equitable and Sustainable Well-being). The construction of the list of indicators constituting the BES, which evaluate well-being achievements in twelve life domains, has been conceived as an inclusive experience: a noteworthy participatory research has been conducted to establish the list of relevant dimensions to be included in the final version of the BES and, to this aim, Italian citizens have been involved through the use of surveys and online consultations. Unfortunately, the same innovation potential is not traceable in the few attempts of deriving multidimensional poverty measures for Italy that have been made in the literature, as they hardly ever make use of other techniques than multivariate statistical methods to identify dimensions and deprivation indicators in support of multidimensional assessments. In fact, we will show that the empirical analyses scrutinized do not rely on any form of social contract to inform normative choices. This lack of ethical justification makes them theoretically weaker on the one hand, and, on the other, raises important questions of arbitrariness.

Evidence from Italy

In Chapter IV, we will carry out a detailed analysis of multidimensional poverty in Italy during the period 2004-2013 by making use of the cross-sectional component of the EU-SILC. As explained by Sen in a seminal paper of 1976, poverty measurement implies two fundamental steps: the first is the identification of the poor among the total population and the second is the aggregation of the available information into one measure through the use of a poverty index. We will accomplish the identification task through the lens of the Rawlsian approach to multidimensional poverty measurement identified in the second Chapter: an analysis of the Italian Constitution will allow us to select five relevant

dimensions, i.e., decent work, economic security, education, health and living environment. Then, following the concept of social primary goods, we will identify suitable indicators, weights and cut-offs to construct an Inequality-Sensitive Poverty Index (ISPI) for Italy.

Multidimensional estimates will allow us to study how both marginal and joint deprivations are distributed among individuals. We will conclude that two main factors tell the story of deprivation in Italy: age and geography. Deprivations follow a clear pattern through the different stages of life: the youth are threatened by unemployment and economic insecurity, while the elderly report more deprivations in health conditions and educational attainment. Geographically, multidimensional poverty estimates confirm the existence territorial disparities already accounted for by official monetary poverty measures, but with remarkable exceptions: Lombardy and Marche, for instance, get surprisingly high poverty scores compared to Istat's figures, while Umbria and Basilicata show lower levels of multidimensional hardship than suggested by expenditure-based indicators. Poverty is mainly nested in the South and in scarcely populated areas. We will also break down the ISPI by its three components – incidence, intensity and inequality, or the 'three I's of poverty' (Jenkins and Lambert, 1997) – which will allow us to study the 'phenomenology' of multiple deprivations in Italy. We will find out that poverty incidence is higher in the South, as well as poverty intensity; conversely, inequality among the poor is widespread in the North, especially in north-western regions. The availability of data from 2004 to 2013 will allow us to observe how multidimensional poverty levels have changed during the past ten years. Computations of ISPI for that period show that poverty has steadily decreased until 2010 and started increasing without a clear pattern afterwards. Dimensions that contributed to this change of direction are decent work and health, while education and living environment conditions have improved across time. Comparing ISPI figures to official statistics on poverty will allow us formulating possible explanations about what are the factors to which different indicators are more likely to be sensitive. A generalization of such a study to the assessment of multidimensional poverty in the European context will finally be proposed as an area for further research.

Chapter I.
Theories and metrics for multidimensional poverty analysis

Introduction

The fact that poverty is a complex and multifaceted phenomenon is by now widely accepted both in academia (Kolm, 1977; Atkinson and Bourguignon, 1982; Bourguignon and Chakravarty, 2003) and in the 'development community' (UNDP, 2010). While there is no consensus on which specific life domains should be taken into account when evaluating people's living standards from a multidimensional point of view, the arguments in favour of a broadening of the informational basis for poverty analysis are cogent. Moreover, today there is widespread agreement on the urge of adopting conceptual frameworks and evaluation tools allowing to account for a variety of aspects of human life, even at the highest levels of policy making (Stiglitz et al., 2009).

Acknowledging that poverty is multidimensional has motivated a large body of studies. According to Kanbur (2002), research on distributional issues has experienced two main phases: the first period – going from the Sixties to the mid-Eighties – has been marked by theoretical and conceptual ferment, while the second – from the late Eighties to the end of the last century – has been particularly vivid in terms of empirical applications and policy debate. Looking back to the early 2000s, we can now acknowledge that in the last 15 years big efforts have been made also in terms of methodological advances, a field where scientific contributions do not cease to appear. In fact, a great scientific literature production on methodologies to measure or analyse deprivation in multiple dimensions has spanned: since the pioneering works of Tsui (2002) and Bourguignon and Chakravarty (2003), a great deal of approaches were developed to contribute to this debate. However, as Thorbecke points out, "poverty has to be defined or at least grasped conceptually, before it can be measured." (2008, p. 4) Being poor is in fact above all a matter of definition: depending on how we classify social and economic phenomena, we can give rise to different if not contrasting quantification methods and analytical results.

This Chapter aims at reviewing existing approaches to multidimensional poverty analysis, from both a conceptual and a methodological point of view. As Sen highlighted in a seminal paper of 1976, poverty analysis is mainly concerned by a two-step exercise: (i) the identification of the poor and (ii) the aggregation of the characteristics of the poor into an overall indicator. We will discuss issues related to the former step in Section 1, where we will introduce theories and conceptual frameworks for analysing multidimensional poverty, like the Basic Needs Approach or the Capability Approach. Section 2 will address aggregation issues, by presenting methods and metrics in support of multidimensional poverty measurement.

1. Conceptualizing poverty: who is poor and why?

Poverty analysis is at the heart of the debate in both welfare and development economics. In the former, the social welfare function approach pioneered by Atkinson (1970) has been since the early Seventies the leading framework to analyse distributional issues and it is still widely used to interpret and address them. Measurement tools have been developed accordingly and then progressively refined and adapted to the most recent concerns about poverty and inequality issues and their intrinsic multidimensionality. In development economics, poverty reduction has become one of the core issues under discussion as well. In the last 25 years, both Governments and development organizations have increased their efforts in defining poverty reduction strategies to be implemented at both national and international level. The purpose of fighting poverty globally (see, for instance, the World Bank's Millennium Declaration, UN General Assembly, 2000) has required a renovation – in some cases a radical change – of concepts and methods for supporting poverty analysis, reason why extensive research has been dedicated towards this subject also in this field of study.

In these two branches of economics, theoretical and methodological efforts have followed for a long time two distinct paths. The first is represented by the Social Welfare Function (SWF) approach, firstly introduced by Atkinson (1970), which rapidly became the benchmark for welfare economists to study distributional issues (see, among others, Deaton, 1997). The second is the so-called 'counting approach', mostly used in empirical studies on multiple deprivations, especially in Europe and in Latin America (see, among others, Townsend, 1979, and Mack and Lansley, 1985). Recently, the reached consensus by both scholars and the 'development community' on the fact that poverty is intrinsically multidimensional has led to reconsider this rather pronounced dichotomy and big efforts have been made to reconcile these two ways of visualising poverty (Atkinson, 2003; Alkire and Foster, 2011a).

Precisely because of its deep roots in the European context and because of its influence on current approaches to multidimensional poverty promoted by the European Union, in our review we will mainly focus on counting approaches to multidimensional poverty analysis. In this Section we will first introduce the counting approach; then, we will discuss the most influential philosophical frameworks for conceptualizing multidimensional poverty in high-income countries.

1.1. Counting approaches to multidimensional poverty analysis

A counting approach is one way to identify the poor in multidimensional poverty measurement entailing the counting of the number of attributes or life domains in which people experience shortfalls in terms of well-being (Alkire et al., 2015a). Though not explicitly promoted by any specific development or welfare economics theory, the counting approach has become widespread in multidimensional poverty measurement, especially in the empirical literature. As observed by Atkinson in a seminal paper appeared in 2003 on the Journal of Economic Inequality, "Empirical studies of multiple deprivations to date have not typically adopted a social welfare function approach. Rather, they have tended to concentrate on counting the number of dimensions in which people suffer deprivation" (p. 60) and to assign "scores

corresponding to the number of dimensions on which they fall below the threshold." (2003, p. 51)

In practice, a counting approach to identifying the poor can be broken down into the following steps: (1) defining a set of relevant indicators; (2) defining a deprivation cut-off for each indicator; (3) creating binary deprivation scores for each household or individual in each indicator (1 indicating deprivation and 0 indicating non-deprivation); (4) assigning a weight to each indicator; (5) taking the weighted sum of deprivations to produce an overall poverty score; and (6) setting a poverty cut-off to identify the (multidimensionally) poor. Most of these steps require normative choices, which in turn are informed by a specific conceptual framework for analysing multidimensional poverty. Theoretically, many frameworks have motivated research on multidimensional poverty. Alkire et al. (2015a) provide a long, non-exhaustive list of them: Ubuntu (Metz and Gaie, 2010); human rights (CONEVAL, 2010); livelihoods (Bowley and Burnett-Hurst, 1915); social inclusion (Atkinson and Marlier, 2010); *Buen Vivir* (Hidalgo-Capitán et al., 2014); basic needs (Hicks and Streeten, 1979; Stewart, 1985); the Catholic social teaching (Curran, 2002); social protection (Barrientos, 2010; 2013); and capabilities (Sen, 1993; Wolff and De-Shalit, 2007). Among these, three frameworks in particular have fed the literature on the counting approach to multidimensional poverty assessment: (i) the basic needs approach; (ii) the capability approach; and (iii) the social exclusion approach.

1.2. Multidimensionality in theory

The Basic Needs Approach (BNA) was conceived during the 1970s and officially adopted by the UNEP/UNCTAD symposium of 1974 on 'Patterns of Resource Use, Environment and Development Strategies' through the Cocoyoc Declaration (UN General Assembly, 1974). Affirming that development concerns should be focused on securing human beings' basic needs – like food, shelter and clothing, but also health, education, freedoms and social and political rights – the Cocoyoc Declaration raised a big echo globally and heavily influenced the policy debate (see, for instance, Dag Hammarskjöld Foundation, 1976; Herrera et al., 1976; ILO, 1976). As recalled by Alkire et al. (2015a), the BNA was born with a strong political connotation in that it sought to elaborate some minimal requirements of human well-being and justice (Rawls, 1971; Hicks and Streeten, 1979; Stewart, 1985; Braybrook, 1987; Hamilton, 2003; Reader, 2005) as opposed to the then dominant economic growth-centred approach to development. Originally, it was intended to have a policy focus, though it quickly became a concrete alternative to the 'income method' (Sen, 1981) to poverty measurement, which uses a poverty line defined in the space of incomes to identify the proportion of population who cannot afford a minimum required standard of living. At first glance, the BNA seems to be consistent with (rather than dissimilar to) the income method. As a matter of fact, as also stressed by Stewart (1985), the focus of BNA is on the *actual* satisfaction of human basic needs and not just on people's expenditure capacity to afford a bundle of commodities, which are only a sub-set of basic human needs. The BNA thus calls for a 'direct method' of poverty measurement (Sen, 1981), with regard to which the count of deprivations emerges as a directly related method for identifying the poor.

Along with the BNA, during the Seventies another major conceptual framework made its appearance in

the international debate. Drawing upon line of reflection advanced by Aristotle, Adam Smith, Karl Marx, John Stuart Mill and John Hicks, the Capability Approach (CA) developed by Amartya Sen (1985; 1992; 1999) sees human progress, ultimately, as "the progress of human freedom and capability to lead the kind of lives that people have reason to value." (Drèze and Sen, 2013, p. 43) The CA gained increasing recognition as providing an appropriate space for evaluating poverty: the space of *functionings* – or 'beings' and 'doings' that people have reason to value – and that of *capabilities* – or "the various combinations of functionings […] that people can achieve." (Sen, 1992, p. 40) What the CA proposes is to evaluate human well-being (or lack of thereof) in terms of people's actual opportunities to be or to do what they really value in life. Particulary, Sen advocates that the focus in the evaluation of social progress should be shifted from the resources that people command – like income or commodities – to the ends one has reason to pursue. According to this view, the definition of poverty will be "concerned with a plurality of different features of our lives and concerns" (Sen, 2009, p. 233) and it will be consequently based on a multidimensional notion. Applications of counting approaches aiming at operationalizing the CA typically seek to look at failures in key capabilities such as the ability to meet nutritional requirements, being adequately clothed and sheltered, enjoying functional literacy and numeracy, or the ability to participate in the social life of the community (Alkire et al., 2015a). Unfortunately, the indicators considered in counting approaches drawing on the CA are severely data-constrained. Difficulties in finding or collecting capability-related information make it hard to build consistent poverty indicators, reason why resource-based or basic needs-based variables are often taken as proxies for functionings.

Even before the BNA and the CA emerged in the international scenario, in Europe social indicators that enabled empirical studies on non-monetary aspects of social welfare (Delors, 1971) had already started to being developed. Vogel (1997) recalls that in the late 1960s a renewed interest was shown towards the production of specific indices "covering a range of social concerns." (p. 105) A Level of Living Survey was implemented in Sweden in 1968, then repeated and spread in other Scandinavian countries, while Johansson (1973) had already emphasized in the early Seventies the need for the employment of dichotomous social indicators and ordinal scales. Atkinson and Marlier (2010) look at this European-rooted concern for non-monetary social indicators as to a 'social exclusion' approach, which focuses at people's ability to actively participate in economic, political, social and cultural life of their community of reference (Duffy, 1998). As observed by Atkinson et al. (2005), already in 1974 a resolution adopted by the Council of the European Union called for a social action programme to contrast poverty. The Council defined the poor as those "individuals of families whose resources are so small as to exclude them from the minimum acceptable way of life of the Member State in which they live." (Atkinson et al., 2005, p. 18) This definition set forth the 'relativity' of poverty associated with social exclusion as the way to intend poverty in the Union. Furthermore, it seemed to conceptualize social inclusion as a condition related not only to actual integration into the community life, but also to the ownership of adequate financial means to ensure one's subsistence (Room, 1995; Liberati, 2009).

More recently, on the occasion of the Lisbon Summit of 2000, the member states agreed on the design and the implementation of a common strategy to tackle poverty and social exclusion throughout the EU.

The resolution entailed the adoption of a common set of social indicators to monitor country performances in terms of social cohesion (Social Protection Committee, 2001; Atkinson et al., 2002). With such an agreement, member states engaged in an 'Open Method of Coordination' (OMC) for social measures and policies, involving the establishment of guidelines for collecting quantitative and qualitative data to build appropriate indicators. The whole process would make the counting approach linked to social exclusion becoming the official methodology to deprivations measurement at the European level.
Most measurement applications of the counting approach have used the proportion of people identified as poor (the so-called Headcount Ratio) as the favourite aggregation strategy. In Section 2 we will show that there exist other techniques that build upon counting approaches that can be fruitfully used to derive multidimensional poverty measures and that aggregate information about the poor in both an efficient and a just manner.

2. What is behind numbers. Aggregation strategies to complexity reduction

In the multidimensional framework, instead of visualising poverty using income or consumption as the sole indicator of well-being, the attention is focused on the evaluation of shortfalls from threshold levels of multiple 'attributes' (also called dimensions, or life domains). One immediate way of dealing with the multidimensionality of poverty is to assume that the various attributes of an individual may be aggregated into a single cardinal index of well-being and that poverty may be defined in terms of that index (Bourguignon and Chakravarty, 2003). In agreement with this idea, an individual may be considered poor if her index of aggregate poverty falls below some defined threshold, called poverty line, and not poor if the level of the index is above the same threshold. This method would require an a priori computation of shortfalls in specific attributes and then their (weighted) aggregation into one scalar index.
While the advantages of using a multidimensional approach to poverty measurement are widely acknowledged (see, for instance, Stiglitz et al., 2009), aggregate poverty indices are far from being universally welcomed (Ferreira and Lugo, 2013). With this regard, the main disagreement in the literature lies in the way normative choices in support of the construction of poverty indices are made. In fact, the choice of poverty attributes, indicators, weights and cut-offs to be used to build the poverty measure requires an evaluative process that we can expect to be diverse for each case, depending on the context, the scope of the analysis and the contingencies. It therefore raises a question of arbitrariness.

2.1. The issue of relative weights

One powerful critique to multidimensional poverty indices concerns the relative weights attached to attributes of different nature. Weights used to aggregate a variety of deprivation dimensions – like poor health, lifespan shortage or limited access to education – lack the intrinsic meaning associated with prices, which are commonly used in the income-centred framework to aggregate components of consumption expenditure (or the incomes used to finance such consumption). In the 'unidimensional' monetary

approach to poverty measurement, prices (either actual or imputed) are used to form a composite index for aggregate consumption to be compared to an aggregate poverty line defined in the same space. In the example given by Alkire and Foster (2011a), if y_i is individual i's vector of commodities with market price vector p, z is the target bundle and $\rho: \mathbb{R}_+^d \times \mathbb{R}_{++}^d \longrightarrow \{0,1\}$ is a poverty identification function, one might simply define $\rho_p(y_i; z) = 1$ whenever $py_i < pz$ and $\rho_p(y_i; z) = 0$ whenever $py_i \geq pz$. Hence, we would consider individual i as poor if the monetary value of her achievement bundle is below the cost of the target bundle z.

Ideally, such an aggregation includes not only market goods and services – for which either market prices or appropriate shadow prices can be used – but also imputed values for non-market commodities, like public goods (Ravallion, 2011).[1] As a matter of fact, there exist different reasons why, in practice, prices are not ideal welfare weights: among these, (i) the existence of externalities and missing or highly imperfect markets; (ii) the fact that price data are often geographically coarse, so actual price variation in space is missing from the information available to the researcher; and (iii) the regular need for imputing prices for market as well as for non-market goods (Bourguignon and Chakravarty, 2003; Ferreira and Lugo, 2013). Moreover, Sen (2000, p.78) highlights that even if prices may be adjusted to reflect externalities, "the 'metric of exchange value', although operational in its own context, was not devised to give us – and indeed cannot give us – *interpersonal comparisons* of welfare or advantage". Sen explains that, at the practical level, real-income comparisons cannot capture "the diversity of human beings, like difference in age, gender, special talents, disability, proneness to illness, etc., [which] can make different persons have quite divergent substantive opportunities even when they have the same commodity bundle." (Sen, 2000, p.78) On the other hand, it has to be acknowledged that relative prices have the advantage that they allow for a clear understanding of the effects of the weighting scheme (Maasoumi and Lugo, 2008), as they explicitly address the issue of trade-offs between different goods and services, or the rate at which consumers are willing to trade one unit of an expenditure component for another (i.e., the marginal rate of substitution – MRS – between two goods).[2] Moreover, MRSs play the important role of informing us on whether two commodities are completing, independent or competing to an individual – that is, whether, if we increase the quantity of one of the goods, the final utility of the other increases, remains constant or decreases (Schultz, 1935).[3]

[1] For non-market goods, missing 'prices' are typically assigned on an *a priori* ground or estimated (Ravallion, 2011).

[2] In this sense, advocates of the monetary approach to poverty measurement have argued that their criticisms to the multidimensional framework are not addressed to the notion of poverty as deprivation in multiple dimensions in itself (Ravallion, 2010). In fact, even the so-called 'unidimensional' consumption-based poverty measures are the expression of multidimensionality, as they are constructed starting from a multiplicity of items (e.g., clothing, food, housing, and so on). In truth, the monetary approach relies on the implicit, rather strong assumption of perfect substitutability between attributes, while some would argue that a person who does not achieve a minimum threshold in one dimension should be seen as poor, irrespectively of how much she has of the other attribute. According to this view, each attribute is thus to be considered 'essential' (Tsui, 2002; Bourguignon and Chakravarty, 2003).

[3] To discuss substitutability and complementarity issues, we consider here the so-called ALEP (*Auspitz-Lieben-Edgeworth-Pareto*) substitutability definition, also known as the 'decreasing increasingness' property (see, e.g., Chipman, 1977; Gravel et al., 2011): in a two-goods world, if the two goods are substitutes, the marginal utility of one good will decrease when the quantity of the other increases. Put other words, the marginal utility provided by each good is decreasing with respect to the quantity of that good. Analytically, the ALEP definition considers two goods as (i) substitutes, if their second cross partial derivatives are positive;

Similarly, in a multidimensional context relative weights play the central role of determining trade-offs between dimensions. They reflect value judgments and possibly the very structure of social preferences. For these reasons, the setting of a weighting system is unescapably subject to the formulation of strong normative assumptions and ethical considerations on what a 'good life' is and it should be made as explicitly as possible.

In their thorough investigation on weights in multidimensional indices of well-being, Decancq and Lugo (2013) explain that, in order to study how small changes in the achievements of different well-being dimensions can or cannot compensate each other, we have to look precisely at the weights structure. They then introduce the MRS between two dimensions j_1 and j_2 as the amount of dimension 2 an individual is willing to give up for an extra unit of dimension 1, while maintaining the same level of well-being. Formally, they define the MRS between dimensions j_1 and j_2 as:

$$MRS_{j_1,j_2} = \frac{\partial I(x)}{\partial x_{j_1}} \Big/ \frac{\partial I(x)}{\partial x_{j_2}},$$

where $I(x)$ is the well-being index and x the vector of achievements for all j dimensions.

Clearly, it is reasonable to argue that quantifying how many units of, say, education an individual would give up to compensate one extra year of life is a rather complicated task. In the first place, such an evaluation would require an amount of information that might be not easy – let alone possible, in some cases – to retrieve. Secondly, such a MRS could vary from an individual to another on the basis of the actual levels of the considered achievements like, for instance, age. With this regard, Fleurbaey says that "one can of course invoke the ethical preferences of the observer and ask her, for instance, how she trades the suicide rate off against the literacy rate, but there is little philosophical or economic theory that gives us clues about how to inform such preferences." (Fleurbaey, 2009, p. 1055) For this reason, and also because well-being dimensions are often deemed equally important from an ethical point of view, in multidimensional poverty assessments weights are often distributed equally among dimensions (as, for instance, in the case of the Human Development Index). In truth, there exists a wealth of approaches to set relative weights in a well-being analysis. Decancq and Lugo (2013) distinguish three classes: data-driven, normative, and hybrid. Data-driven approaches – like frequency-based weights, statistical weights (Krishnakumar and Nadar, 2008) and most-favorable weights (Melyn and Moesen, 1991) – are a function of the distribution of the achievements in the society and are not based on value judgements about trade-offs between different life domains. Frequency-based weights frequently assign an inverse relation between the frequency of deprivation in a dimension and the weight of that dimension (e.g., Deutsch and Silber, 2005). The motivation behind such a relation lies in the idea that less frequent deprivations have to get a higher weight because individuals would attach a higher importance to the shortfalls in dimensions where the majority in their society do not fall short (Decancq and Lugo, 2013), reason why some have

(ii) complements, when the respective cross partial derivatives are negative, and (iii) independent, in the case cross partial derivatives are zero.

also interpreted such weights as the "objective measures of the subjective feelings of deprivation." (Desai and Shah, 1988, p. 52) Statistical weights, on the other hand, are often classified into two broad sets: multivariate statistical methods, among which the most commonly used technique is based on the Principal Component Analysis (Klasen, 2000; Noorbakhsh, 1998), and explanatory models, mainly based on the idea of the latent variable, like Factor Analysis (Noble et al., 2006), the Rasch model (Fusco and Dickens, 2008), multiple indicator and multiple causes models (MIMIC) (Di Tommaso, 2006) and structural equation models (Kuklys, 2005; Krishnakumar, 2007; Krishnakumar and Ballon, 2008). Finally, the most-favorable weights technique, which has been widely used to set weights in well-being indices (see e.g., Despotis, 2005a, 2005b; Mahlberg and Obersteiner, 2001; Zaim et al., 2001) is a particular case of the data envelope analysis proposed by Melyn and Moesen (1991) and considers weights as individual-specific and endogenously determined, i.e., the highest relative weights are given to dimensions in which the person performs best (Decancq and Lugo, 2013).

Conversely, normative approaches depend on any value judgements about the MRSs. Weights can either be set in an equal or unequal way, but in any case they are assigned arbitrarily, that is, according to particular considerations about specific trade-offs among the dimensions. Arbitrariness could be overcome by following an 'expert opinion approach', that is, letting experts or well-informed persons decide which particular weighting scheme to attach to the different well-being or poverty attributes (see for instance Chiappero-Martinetti and von Jacobi, 2012). This latter method includes the Budget Allocation Technique (Moldan and Billharz, 1997; Chowdury and Squire, 2006; Mascherini and Hoskins, 2008), where experts are asked to distribute a budget of points to the different attributes, and the Analytic Hierarchy Process (Saaty, 1987), which compares dimensions pairwise and assigns for each round a score of importance.

Finally, hybrid approaches, like stated preference weights (Mack and Lansley, 1985; Halleröd, 1995, 1996; de Kruijk and Rutten, 2007; Guio et al., 2009; Bossert et al., 2009) and hedonic weights (Schokkaert, 2007; Ferrer-i Carbonell and Freijters, 2004; Nardo et al., 2005; Fleurbaey et al., 2009; Schokkaert et al., 2009) are a mix of the former two.

2.2. 'Dashboard vs. single index' debate

One other important methodological argument concerns the opportunity to use either a single aggregate index or a set of indicators to account for deprivations in different life domains – the so-called 'dashboard' approach. Voices in support of both sides (e.g., Alkire and Foster, 2011b; Lustig, 2011; Ravallion, 2011) have been hosted on the June 2011 issue of The Journal of Economic Inequality and led off a debate that is still lively and far from being concluded.

Some authors (Alkire and Foster, 2007, 2011a; Maasoumi and Lugo, 2008; Rippin, 2010) have proposed scalar indices that aggregate the information about the poor into one single measure, arguing that the advantages of using an aggregate measure to account for multidimensional poverty are manifold. Firstly, a scalar index, which summarises a complex and multifaceted phenomenon such as poverty into one number, avoids the problem of the 'fuzziness' of multiple indicators (Micklewright, 2001), especially in the

context of policy advising. As also pointed out by Hills (2001), multiple measures run the danger of turning out to be fuzzy and ultimately meaningless as it becomes possible almost to point to some of them as showing 'success' or 'failure' depending on the political aim. Secondly, a single measure is easier to be communicated and understood by the large public, and it is more effective for making comparisons over time and across regions. Thirdly, a scalar index generates a complete ordering of countries, regions or individuals, even when the rankings conflict across individual dimensions. Finally, aggregation over a number of dimensions is in some cases unavoidable and can therefore be better done explicitly rather than implicitly (Fleurbaey and Blanchet, 2013).

Others have instead stressed the advantages of using a dashboard approach to account for deprivations in multiple life domains. According to these authors, using a "credible set of 'multiple indices' rather than a single 'multidimensional index' " (Ravallion, 2011, p. 13) has the advantage of allowing to focus on the development of the best possible distinct measures on the various aspects of poverty, while avoiding the controversial task of assigning relative weights to well-being dimensions. Furthermore, the aggregation step inevitably causes a loss of information that could be preserved if the different components of the final index are kept and communicated disjointedly (Nussbaum, 2000; Micklewright, 2001). Finally, the sensitivity of aggregate indices to arbitrary choices, also for elements other than weights, raises questions of legitimacy and public scrutiny.

Ferreira and Lugo (2013) find it useful to look for a middle ground between these two sides. The authors argue that the 'dashboard vs. single index' debate is misleading: the real potential of multidimensional poverty measures lies in their capacity to move beyond the simple marginal distribution of well-being dimensions or indicators and to account for the joint distribution of achievements. Both the dashboard and the aggregate index approach, when the latter is based on marginal distributions, can overlook the information provided by the dependency structure of a joint distribution of attributes, that is, how closely correlated are the various achievements and how cumulative concentration of deprivations is distributed across the population.

2.3. The value-added of joint distributions of deprivations

When poverty is conceived as multiple *simultaneous* deprivations, the question of identifying the poor takes on a different meaning (Lustig, 2011). One method to account for simultaneous deprivations is to study their joint (or cumulative) distribution across the population.[4] The value-added of considering how attributes are jointly distributed is typically evaluated in opposition to marginal distributions, which are the distributions in one specific dimension without reference to any other attribute.[5] Contrary to joint distributions, marginal distributions do not provide information about multiple deprivations experienced by the same individual at once. Let us take the example of any two matrices of achievements X and X',

[4] In statistics, the joint distribution of two given random variables y_1 and y_2 can be expressed as the bivariate cumulative distribution function $F(b_1, b_2) = Prob(y_1 \leq b_1, y_2 \leq b_2)$, which, in words, gives the proportion of the population with values y_1 and y_2 lower than b_1 and b_2 correspondingly and simultaneously (Alkire et al., 2015).

[5] Given any random variable y_j, its marginal distribution can be described with the cumulative distribution function $F_j(b_j) = Prob(y_j \leq b_j)$.

where the row vectors show the achievements of individuals in each of the four dimensions considered (column vectors):

$$X = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 \end{bmatrix} \qquad X' = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

These two matrices generate the same marginal distributions but describe radically different situations in terms of simultaneous multiple deprivations. In X, all possible deprivations are experienced by the same individual, who is evidently severely multidimensionally poor. Conversely, in X' the deprivations are evenly distributed among the population; yet a multidimensional poverty measure that is not sensitive to the joint distribution of deprivations would give the same poverty level for the two populations. Pogge (2002) provides an ethical argument in support of the study of cumulative deprivations: "[c]onsider institutional schemes under which half of the population are poor and half have no access to higher education. We may plausibly judge such an order to be more unjust when the two groups coincide than when they are disjoint (so that no one bears both hardship)." (Pogge, 2002, p. 11) Another reason to account for multiple joint deprivations concerns the possible existence of interdependence among poverty attributes (Atkinson and Bourguignon, 1982; Ferreira and Lugo, 2013). As also stressed by Stiglitz et al. (2009), who claim for the implementation of surveys specifically designed to assess the links between various quality of life domains for each person, the opportunity of observing simultaneous dimensional shortfalls for the same individual could provide useful information to the policy maker and make anti-poverty interventions become more effective and more efficient.

Marginal methods for multidimensional poverty assessment have nonetheless some useful properties, like estimating poverty using dimensional data from different data sources, where the underlying vectors of dimensional achievements are not linked and may even refer to population of different sizes (Alkire and Foster, 2011b). One example of this kind is given by the Human Poverty Index (HPI), which aggregates indicators on adult illiteracy, the probability at birth of not surviving until the age of 40, the percentage of households lacking drinking water and the percentage of malnourished children according to weight for age built from different data sources (Anand and Sen, 1997). Based on unlinked and anonymous data, such poverty measures do provide rich information on multiple aspects of deprivation, but they are unable to effectively identify who is multidimensionally poor (Alkire and Foster, 2011b). Marginal methods can also be viewed as linked to the order of aggregation of data (Pattanaik et al., 2012). In fact, a poverty measure can be obtained in two ways, that is, either by first aggregating achievements or deprivations across people within each dimension and then aggregating across dimensions, or it can be obtained by first aggregating across dimensions and then across people (e.g., the Global MPI, Alkire and Santos, 2010; 2014).[6] The only order of aggregation that allows studying the joint distribution of deprivations is the second one, i.e., first across dimensions and then across people.

[6] Guio et al. (2009) suggest referring to the former approach as to 'composite' indicators and to the latter as to 'aggregate' indicators.

The example just provided brings us to discuss the importance of identifying the poor *before* aggregating the data. As already shown, the monetary method to poverty measurement aggregates market prices (or appropriate substitutes) for goods and services into a single cardinal variable of consumption and uses an aggregate cut-off to determine who is poor. The same procedure can be applied in the multidimensional space to aggregate several achievements into one poverty measure so as to create a single scalar index of, say, well-being. Using the notation introduced above, we could refer to such a multidimensional poverty measure as to a strictly increasing utility function u such that $\rho_u(y_i; z) = 1$ whenever $u(y_i) < u(z)$, and $\rho_u(y_i; z) = 0$ otherwise. However, precisely because it aggregates before identifying the poor, the procedure just exemplified leads us to evaluate poverty once again through a unidimensional lens. In fact, it entails the conversion of dimensional achievements into one another without regard to deprivation thresholds, having therefore the drawback of causing important loss of information on dimension-specific shortfalls (Alkire and Foster, 2011a). If we are assuming that each dimension has an intrinsic independent value for normative reasons – as, for instance, it is recommended by the Capability Approach – or we want to monitor how each single attribute contributes to overall poverty, we should then invert the order of the two operations – i.e., identifying the poor *before* aggregating the information at our disposal. As also recommended by Bourguignon and Chakravarty (2003), dimension-specific poverty lines can be applied with the purpose of determining who is deprived in each attribute and then, only as a second step, the magnitude of overall multidimensional poverty can be assessed through the use of a general poverty line.

2.4. Union vs. intersection identification methods

But how can we decide in how many attributes a person has to experience deprivation in order to be identified as multidimensionally poor? If we are considering joint distributions of attributes, there exist different approaches that could be followed. The two benchmark identification approaches, the union and the intersection methods, are again for the first time discussed by Atkinson (2003) in the context of multidimensional poverty measurement. The most commonly used identification criterion is the union method. Under union identification, a person who is deprived in any dimension is considered poor. It is clear that when the number of dimensions is large, such an approach will often identify most of the population as being poor, possibly including persons that we might not want to include in the sub-set of poor people. Considering people who are deprived in only one dimension as multidimensionally poor could be not optimal also for other reasons, e.g., we might want to look at people that actually suffer from a number of deprivation that is at least greater than 1. The union approach thus could lead to overestimate poverty. Conversely, under intersection identification, only those who are deprived in all dimensions are considered poor. This approach certainly helps in identifying the most vulnerable in a given society, though it misses to identify those who are extensively deprived, even if not in all life domains. Bourguigon and Chakravarty (2003) take the example of an old beggar, who, under intersection identification, would be regarded as non-poor because of her longevity, which, on the other hand, would probably not be sufficient to exclude her from the set of the poor. The intersection approach thus often leads to

underestimate poverty.

In the literature, there exist four main aggregation methods that look at individuals' poverty characteristics to derive composite indices: (i) the information theory approach; (ii) the fuzzy set approach; (iii) the distance function approach; and (iv) the axiomatic approach (for a thorough review of the various approaches see Deutsch and Silber, 2005; Silber, 2007; Kakwani and Silber, 2008). We will present these approaches, highlighting the main features, strengths and weaknesses for each of them.

2.5. The information theory approach

Originally developed in the field of the mathematical theory of communications, Information Theory (IT) aims at determining how much data can be transmitted through a channel without incurring significant losses or errors (Shannon, 1948). At the heart of IT lies the concept of entropy, which is the measure of data transmitted, or the amount of information required on average to describe the distribution of an underlying random variable. The entropy index[7] proposed by Shannon (1948) has been first used in economics to construct indices of economic inequality by Theil (1967)[8], whose work has been extended to create the Generalized Entropy (GE) measures by Cowell (1977) and Cowell and Kuga (1981a; 1981b)[9], and was later applied to multidimensional inequality measurement by Maasoumi (1986). The same literature has then inspired a branch of studies on multidimensional poverty measurement (see Miceli, 1997; Deutsch and Silber, 2005; Maasoumi and Lugo, 2008; Lugo and Maasoumi, 2009).

The IT approach to multidimensional poverty measurement starts from the reasoning that a poverty index (henceforth, p_i, with $i = 1, 2, \dots, n$) is the (moment) function of the distribution of individual-level aggregate welfare. All j attributes that compose the index have in turn a characteristic function $x_j = (x_{1j}, x_{2j}, \dots, x_{nj})$ that is equivalent to the full distribution of respective underlying variables. p_i, which is derived by the k distributions $x_j, j = 1, 2, \dots, k$, is supposed to summarize the information on the desired j attributes in an efficient manner, that is, the information carried by the poverty measure about the constituent attributes should be as complete as possible. However, all indices omit to some extent information relative to the distribution of attributes (Maasoumi and Lugo, 2008). Information Theory

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[7] Shannon's entropy index is a measure of the average uncertainty of the random variable and is expressed as $H(X) = -\sum_{i=1}^{n} p(x) log_i p(x) = \sum_{i=1}^{n} p(x) \log [1/p(x)]$, where X is the random variable with a probability function $p(x) = Pr\{X = x\}$. Values of $H(X)$ lie between 0 and $logN$, where minimum entropy is achieved when the probability of one event i is 1 and $p(x_j) = 0, \forall j \neq i$, and maximum entropy is reached when all events are equally likely (Lugo and Maasoumi, 2009, p. 4).

[8] In Theil's work, income is seen as a random variable, with each person having a probability of receiving a certain amount of income (or income share) within the income distribution. The latter is compared to a perfect equality scenario, that is, to an 'ideal' distribution where everyone receives the same income. Theoretically, both Theil's inequality indices borrow the concept of entropy from IT to measure the distance – or the 'relative entropy' – between the two probability distributions: the higher is the distance, the more unequal the income distribution. The first Theil Index is defined as $T_1 = 1/n \sum_{i=1}^{N} x_i/\bar{x} \ln(x_i/\bar{x})$, where $\bar{x} = 1/n \sum_{i=1}^{n} x_i$ is the mean income, and n is the number of people. If everyone has the same income $(\bar{x} = x_i)$, the case of perfect equality, then the index $T_1 = 0$ since $\ln \bar{x}/\bar{x} = \ln 1 = 0$. At the other extreme, if one person has all the income $(x_i = n\bar{x})$ while the rest have nothing $(x_j = 0, \forall j \neq i)$, the case of perfect inequality, the index achieves its maximum level $T_1 = \ln n$. The second Theil's index is $T_2 = 1/n \sum_{i=1}^{n} \ln(\bar{x}/x_i)$. It is always equal to zero in the perfect equality scenario and positive otherwise.

[9] Cowell (1977) and Cowell and Kuga (1981a; 1981b) extended the IT-based inequality indices to the Generalized Entropy measures. The GE family of indices introduces a parameter capturing the sensitivity of a particular GE index to different parts of the distribution (Lugo and Massoumi, 2009). The smaller is the parameter, the higher the sensitivity of the measure to the lower tail, that is, to the poorest share of the distribution.

employs information functions and related entropies to measure the distance (or divergence) between the characteristic functions of the distribution of attributes and the distribution function of the poverty index, which should be as 'close' as possible to the formers. By solving an IT inverse problem based on distributional divergences or distances, the researcher can select an optimal functional form for p_i so as to make its distribution the closest to the multivariate distributions of its constituent members x_j. The basic measure of divergence between two distributions is the difference between their entropies, or the so-called 'relative entropy' (Maasoumi and Lugo, 2008).

Formally, let S_i be the aggregate function for individual i that depends on her achievements in each of the k attributes $(x_{i1}, x_{i2}, \dots, x_{ik})$. Following Maasoumi's (1986) idea, by creating S_i we want to replace the k pieces of information on the values of the different attributes for the n individuals by a scalar representing the utility that individual i derives from the various attributes. S_i could also be considered as an estimate of the welfare (or well-being) of individual i (Deutsch and Silber, 2005). Let us now take a weighted average of the relative entropy divergences between $(S_1, S_2, \dots, S_n)$ and each $x_j = (x_{1j}, x_{2j}, \dots, x_{nj})$ as follows:

$$D_\gamma(S, X; w) = \sum_{j=1}^{k} w_j \frac{1}{\gamma(1-\gamma)} \sum_{i=1}^{n} S_i \left[1 - \left(\frac{S_i}{x_{ij}}\right)^\gamma\right]$$

where w_j is the positive weight attached to the GE divergence from each attribute and γ sets the level of substitutability between shortfalls.[10] Maasoumi and Lugo (2008) show that the minimization of the 'proximity' $D_\gamma(.)$ with respect to S_i such that $\sum S_i = 1$ leads to the following optimal IT aggregation functions:

$$(1)\ S_i \propto \left[\sum_{j=1}^{k} w_j \left(x_{ij}\right)^\gamma\right]^{1/\gamma} \quad \text{when } \gamma \neq 0$$

$$(2)\ S_i \propto \prod_{j=1}^{k} (x_{ij})^{w_j} \quad \text{when } \gamma = 0$$

The IT approach to multidimensional poverty measurement provides an 'optimal' functional form for the aggregator function S_i in the sense that it conveys information as close as possible to the multivariate distributions of its constituent attributes. It therefore summarizes the information on the attributes in an efficient manner. Lugo and Maasoumi (2009) argue that the IT approach to multidimensional poverty measurement has the advantage of emphasizing clarity in aggregation choices that are deemed inevitable in the multidimensional setting. However, a number of other decisions – i.e., the w_j weights to be attached

[10] The higher the γ, the lower the degree of substitutability. Maasoumi and Lugo (2008) discuss the properties of two special cases: if $\gamma \longrightarrow \infty$, relative deprivations are non-substitutes; if $\gamma = 1$, shortfalls are perfect substitutes. In Deutsch and Silber (2005) three cases are considered: (i) with $\gamma \neq 0, -1$; (ii) with $\gamma \longrightarrow 0$; and (iii) with $\gamma \longrightarrow -1$. In the latter two cases, the indicator is respectively expressed as $D_0(S, X; w) = \sum_{j=1}^{k} w_j \left[\sum_{i=1}^{n} S_i \log\left(S_i / x_{ij}\right)\right]$ and $D_{-1}(S, X; w) = \sum_{j=1}^{k} w_j \left[\sum_{i=1}^{n} x_{ij} \log\left(x_{ij} / S_i\right)\right]$.

to the different attributes, the parameter γ and a poverty line – still have to be made discretional by the researcher.

2.6. The fuzzy set approach

The theory of fuzzy set was first introduced by Zadeh (1965) as a response to the need of decision-making support models in the most diverse scientific fields. Based on the idea that certain classes of objects may not be defined by very precise criteria of membership, it was first applied to poverty analysis during the '90s from Cerioli and Zani (1990) to overcome measurement issues related to the intrinsically vague nature of poverty. This vagueness can be even more exacerbated when we analyse living standards in the multidimensional space, where poverty is not an 'all or nothing' condition but "[…] rather a vague predicate that manifests itself in different shades and degrees" (Cheli and Lemmi, 1995, p. 118) as well as in multiple aspects of life.

The fuzzy set theory aims at overcoming the rigid assignment criteria of the crisp set theory in those cases where one is unable to determine which elements belong to a given set and which ones do not (Deutsch and Silber, 2005). It does so by assigning to each element considered a value representing a degree of membership through a generalized characteristic function $\mu_A(i)$, called membership function. Formally, let there be a set X and let i be any element of X. A fuzzy set (or subset) A of X is characterized by a membership function $\mu_A(i)$ that assigns to i a value in the closed interval $[0, 1]$, which represents a membership degree of the element i to the subset A. The closer is the value of $\mu_A(i)$ to 1, the greater the degree of membership of i to A. When the element $i \in X$ does not belong to the subset A, the membership function $\mu_A(i)$ is equal to 0. If i fully belongs to the subset A, $\mu_A(i)$ is equal to 1. In those cases when i only partially belongs to the subset A, the membership function assumes a value that falls in the range between 0 and 1 ($0 < \mu_A(i) < 1$). If we apply the fuzzy set reasoning to poverty analysis, we are saying that $\mu_A(i)$ varies between 0 and 1 depending on the extent to which the individual i belongs to the set A of poor people. 0 and 1 respectively represent a condition of non-membership and full membership state. In the case of multidimensional poverty analysis, this means that individuals that score 0 are those that do not suffer from deprivation in any poverty dimension, while individuals that score 1 are those who experience the highest number of deprivations. Between the two extremes, there is a continuum of intermediate conditions corresponding to those individuals whose welfare is such that they certainly should not be classified as poor but who still are experiencing poverty to some extent (in a certain number of dimensions).

Chiappero-Martinetti and von Jacobi (2012) identify two main reasons why the fuzzy sets approach is particularly suited to analyse poverty and social phenomena in a multidimensional space. In the first place, the concept of gradualness conveyed by this methodology is perfectly consistent with the way attainments (or shortfalls) in specific well-being domains usually manifest themselves. Conditions like being healthy or having an adequate housing are not simply met or unmet: they rather are circumstances that can typically be fully achieved, only partly achieved or not achieved at all. In the second place, the fuzzy set logic

proves to be suitable to interpret information on living conditions expressed by both quantitative and qualitative ordinal variables. As a matter of fact, value judgments and psychological or bodily states – let alone degrees of welfare – are often summarized by ordinal or categorical variables, which are easily represented by appropriate membership functions that reflect intermediate positions between the two extreme conditions 0 and 1. With regard to this, it is also worth mentioning that another advantage offered by the fuzzy set approach is that it does not require the setting of a poverty cut-off. It thus avoids the undesirable, arbitrary dichotomization of the studied population into poor and not poor.

On the other hand, the functioning of the fuzzy set theory is subject to the functional form of $\mu_A(i)$, from whose specification depends the gradualness of the transition from one extreme condition to the other. As illustrated by Chiappero-Martinetti (1994), the definition of such a function requires three fundamental steps: first, the definition of an appropriate set of modalities associated to the different degrees of hardship they express, along with the assignment of a score to each of them to identify their respective positions along the established scale; second, the identification of the two extreme conditions such that individuals can be classified as belonging ($\mu_A(i) = 1$) or non-belonging ($\mu_A(i) = 0$) to the set A of poor people; and third, the specification of the membership functions for all the other intermediate positions.

Membership functions can be constructed adopting different methods. For instance, they can be chosen by the researcher according to theoretical considerations or underlying value judgments: (increasing or decreasing) linear membership functions depict the different intermediate positions as equally distributed along the ordinal scale, therefore assuming that shifts from a position to another are equal in value for increasing (or reducing) poverty. Trapezoidal-shaped membership functions (Cox, 1994) permit to maintain the linear logic while allowing for incorporating minimum and/or maximum thresholds in order to adapt ordinal scales to different realities and circumstances, as in the case of an educational attainment deprivation set where it could be useful to set different lowest education levels for a developed country and a less developed one (Chiappero-Martinetti, 2006). Non-linear membership functions – like sigmoid, logistic, Gaussian or exponential – could also be used to represent the appropriate form of gradual belonging to the poverty set. Another way to derive membership functions is according to empirical evidence, as in the case of the Totally Fuzzy and Relative Approach (TFR) proposed by Cheli and Lemmi (1995). The authors propose a modification of Cerioli and Zani's (1990) Totally Fuzzy Approach (TFA) to be able to minimize the level of arbitrariness, especially in the choice of the threshold levels. Cheli and Lemmi introduce a cumulative membership function that assigns intermediate values on the basis of each individual's relative position in the distribution of a specific deprivation indicator. In this sense, as also pointed out by Chiappero-Martinetti and von Jacobi (2012), cumulative functions work as 'relative adjustment' by deriving the individual membership degree from the sample distribution of the character in the examined context.[11] Other ways to set a membership function based on the empirical evidence are the

[11] For example, if an individual is heavily deprived in a specific domain whereas the rest of the population is not, the cumulative membership will assign a higher degree of poverty than a linear one. Conversely, if an individual is deprived to some extent, but

interpolation of given sample data or through the least squares method to fit data and estimate membership function parameters (for a review of these methods, see Klir and Yuan, 1995). Finally, subjective perceptions of the survey respondents or experts' opinions can be used to define poverty degrees and related membership functions (Chiappero-Martinetti, 2006).

What is the most appropriate functional form is thus again a matter of choice and value judgments and – just as for other aggregation strategies – raises a question of arbitrariness.

2.7. The distance function approach

The distance function approach to multidimensional poverty assessment makes use of analytical tools borrowed from production theory to employ them in the measurement of individual well-being. One key feature that production economics and well-being economics share is the need for summarizing a large amount of information into only one dimension. In efficiency analysis, for instance, the analyst might want to understand how a firm can employ a certain amount of inputs to produce a given set of outputs, whereas in the case of well-being measurement the problem often lies in bringing a large number of attributes into a scalar measure that approximates the level of an individual's overall well-being (Kakwani and Silber, 2008).

The first to apply efficiency analysis to well-being economics were Lovell et al. (1994), followed by Deutsch et al., (2003) and Ramos and Silber (2005). They first used the basic concepts of input and output functions to transform individual achievements pertaining to different poverty dimensions (inputs) in a set of 'functionings' (outputs); then, they aggregated them into a single index of well-being where the position of individual i was evaluated via a comparison to a chosen poverty cut-off. In order to exemplify their approach, let us introduce some basic tools and notation of efficiency analysis. The first concept to discuss is that of distance function. Distance functions may have either an output or an input orientation. Let us first discuss the case of an output function. Let $P(x)$ represent the various combinations of outputs y_1 and y_2 that could be produced using an input vector x, with $y \in \mathbb{R}^M_{++}$ and $x \in \mathbb{R}^N_{++}$. The production possibility frontier $PPF(x)$ depicts the maximum amongst these output combinations that can be produced given the input vector x. Intuitively, an output distance function measures the extent to which the output vector may be proportionally expanded or increased with the input vector held fixed (Ramos, 2008). Formally, the distance function for a specific output combination $D_{out}(x, y)$ is the measure of the distance between this combination and the production possibility frontier and is expressed as the inverse of the factor by which the production could be increased for the given input vector x:

$$D_{out}(x, y) = \min\{\theta : (y/\theta) \in P(x)\}$$

where θ is a scalar that measures the distance to $PPF(x)$. $D_{out}(x, y) \leq 1$ if y belongs to $P(x)$, while it

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the majority of the population is in the same – or in a worse – situation, the cumulative membership degree will be inferior to the linear one (Chiappero-Martinetti and von Jacobi, 2012).

equal to 1 if it lies on the frontier. Moreover, it is shown in Coelli et al. (1998) that $D_{out}(x, y)$ is non-decreasing, positively linearly homogeneous and concave in y and decreasing in x.

An input distance function is defined in a similar fashion: it considers by how much the input vector may be proportionally contracted given an output vector. Let us define an input set $L(y)$ as the set of all input vectors x such that $x \in \mathbb{R}^N_{++}$ that can produce the output vector y, with $y \in \mathbb{R}^M_{++}$. The distance input function for a specific input combination measures the distance between this combination and the isoquant $IQ(y)$ – that is, the minimum among the input combinations that can produce a certain output vector y. Formally, the distance input function $D_{in}(x, y)$ is the inverse of the factor by which the input quantities could be proportionally reduced for a given output vector without changing the output vector y or the production technology:

$$D_{in}(x, y) = \max\{\rho: (x/\rho) \in L(y)\}$$

where ρ is a scalar that measures the distance, $D_{in}(x, y) \geq 1$ if x belongs to $L(y)$ and is equal to 1 if x lies on the isoquant $IQ(y)$. As also highlighted for the case of distance output functions, Coelli et al. (1998) show that distance input functions have the following properties: they are non-decreasing, positively linearly homogeneous and concave in x and decreasing in y.

Ramos (2008) argues that the properties just presented are appealing for the researcher who wants to approach a well-being measurement question. Drawing on Dasgupta's (1990) intuition and following the work done by Deutsch et al. (2003) and by Ramos and Silber (2005), he uses input distance functions to build several measures of standard of achievements in various well-being dimensions and an output distance function to transform those achievements into a scalar measure of individual well-being. Conceptually, the distance function approach leads to perform the aggregation step before identifying the poor. According to the reasoning discussed at the beginning of this Section, it leads therefore to eventually evaluate the multifaceted phenomenon of poverty from a unidimensional point of view.

2.8. The axiomatic approach

Another way to measure multidimensional poverty is by axiomatically deriving poverty indices. The idea behind the axiomatic approach is to set a list of 'rules' or desirable criteria that a poverty measure should satisfy in order to correctly reflect the phenomena it is intended to account for. This means that instead of choosing individual poverty measures, we are choosing a set of criteria for poverty measures which in turn implicitly determines a class of measures (Bourguignon and Chakravarty, 2002). The fulfilment of these criteria would ideally avoid unintended reactions of the index, therefore preventing it to give casual or contradictory responses to possible events and contingencies (Liberati, 2009).

The first to contribute to this less explored body of research applied to the multidimensional space were Chakravarty, Mukherjee and Ranade (1998) and Tsui (2002). Most of the postulates these authors introduced were a generalization and extension of the ones elaborated for income poverty measurement

(see Sen, 1976; Foster, Greer and Thorbecke, 1984; Donaldson and Weymark, 1986; Cowell, 1988; Chakravarty, 1990; Foster and Shorrocks, 1991; Bourguignon and Fields, 1997; Zheng, 1997); or axioms originally formulated for inequality measures and adapted to the study of poverty (see Atkinson and Bourguignon, 1982; Dardanoni, 1995; Tsui, 1995; 1999). In order to illustrate how the axiomatic approach works, we will first introduce some basic notation. Let $\mathbb{R}^k$ denote the Euclidean k-space and $\mathbb{R}^k_+ \subset \mathbb{R}^k$ the non-negative k-space. Let $\mathbb{N}$ denote the set of positive integers. $\mathbf{N} = \{1, \dots, n\} \subset \mathbb{N}$ represents the set of n individuals and $\mathbf{D} = \{1, \dots, d\} \subset \mathbb{N}$ the set of d poverty dimensions captured by a set of poverty attributes $\mathbf{K} = \{1, \dots, k\} \subset \mathbb{N}$. Let a denote the weight vector for the different attributes with $a_j > 0$ for all $j = 1, \dots, k$ and $\sum_{j=1}^{k} a_j = 1$. Let us now define the quantity of attributes with which an individual is endowed as an achievement. The vector of the achievements of individual i is represented by $x_{i\cdot} = (x_{i1}, \dots, x_{ik})$, while the achievement matrix for the society with n individuals is represented by $\mathbf{X} \in \mathbb{R}^{\mathbf{NK}}_+$ where the ijth entry represents the achievement x_{ij} of individual i in attribute j. Let χ_n denote the set of the possible achievement matrices of population size n. Let z_j denote the threshold associated with attribute j. We consider individual i in attribute j deprived whenever her achievement x_{ij} falls short the threshold z_j: $x_{ij} < z_j$. Let $z \in \mathbb{R}^{\mathbf{K}}_{++}$ represent the vector of poverty thresholds and $\mathbf{Z}$ the matrix of possible threshold vectors. Let us now define a poverty index as a function $P: \chi \times \mathbf{Z} \longrightarrow \mathbb{R}$. For any poverty threshold vector $z \in \mathbf{Z}$, society $\mathcal{A}$ has a higher poverty level than society $\mathcal{B}$ if and only if, for any $\mathbf{X}^{\mathcal{A}}, \mathbf{X}^{\mathcal{B}} \in \chi_n, P(\mathbf{X}^{\mathcal{A}}; z) \geq P(\mathbf{X}^{\mathcal{B}}; z)$.

Following the notation introduced above, we here list the core axioms for deriving multidimensional poverty measures that were first proposed by Chakravarty et al. (1998):

FOCUS AXIOM (FC). The Focus axiom requires that if a person is given more of an attribute with regard to which she is not poor, then the intensity of poverty does not change, even if she is poor in other attributes. Put other words, the poverty measure that fulfils FC is insensitive to what happens above the poverty line. Formally: for any $z \in \mathbf{Z}$ and $\mathbf{X} \in \chi_n$, and for any individual i and attribute j such that $x_{ij} \geq z_{ij}$, an increase in x_{ij} given that all other attribute levels in $\mathbf{X}$ remain fixed, does not change the poverty value $P(\mathbf{X}; z)$.

NORMALIZATION AXIOM (NR). According to the Normalization axiom, the poverty index is equal to 0 if all persons in the society are not poor: for any $z \in \mathbf{Z}$ and $\mathbf{X} \in \chi_n$, if $x_{ij} \geq z_{ij}$ for all i and j, then $P(\mathbf{X}; z) = 0$.

MONOTONICITY AXIOM (MN). The Monotonicity axiom states that poverty does not increase if the condition of a poor person improves: for any $z \in \mathbf{Z}$ and $\mathbf{X} \in \chi_n$, any person i and attribute j such that $x_{ij} < z_{ij}$, an increase in x_{ij}, given that other attribute levels in X remain fixed, does not increase the poverty value $P(\mathbf{X}; z)$.

PRINCIPLE OF POPULATION (PP). According to the Principle of Population, the poverty measure is not sensitive to the population size. Since PP ensures that if an attribute matrix is replicated several times

poverty remains unchanged and that by replication two matrices of different sizes can be transformed into the same size, we are able to make inter-temporal and interregional comparison of poverty levels. For any $z \in \mathbf{Z}$ and $\mathbf{X} \in \chi_n$, $P(\mathbf{X}; z) = P(\mathbf{X}^{(k)}; z)$, where $\mathbf{X}^{(k)} = \left(\mathbf{X^1}, \mathbf{X}^2, \dots, \mathbf{X}^k\right)$ with each $\mathbf{X}^i = \mathbf{X}$, and $k \geq 2$ is arbitrary.

ANONIMITY AXIOM (AN). Anonimity, in some literature also called Symmetry axiom (SM), requires that the poverty measure only depends on the attributes j and that any other characteristic of the individual is irrelevant for the index: for any $z \in \mathbf{Z}$ and $\mathbf{X} \in \chi_n$, $P(\mathbf{X}; z) = P(\mathbf{\Pi X}; \mathrm{z})$, where $\mathbf{\Pi}$ is any permutation matrix of appropriate order.

CONTINUITY AXIOM (CN). Continuity is a technical axiom and states that the poverty measure should be a continuous function, so that minor changes in the level of attributes only have a marginal impact on the overall index. $P(\mathbf{X}; z)$ is continuous in $(\mathbf{X}; z)$.

SUBGROUP DECOMPOSABILITY (SD). If the population of size n is divided into several subgroups (say, k) according to some characteristics of interest (e.g., ethnicity, region, age), Subgroup Decomposability ensures that the overall poverty is the population share weighted average of subgroup poverty levels. SD is a useful property for policy purposes as it allows measuring (and monitoring) poverty levels of target groups. For any $\mathbf{X}^1, \mathbf{X}^2, \dots, \mathbf{X}^k \in \mathbf{X}$ and $z \in \mathbf{Z}$, $P(\mathbf{X}; z) = \sum_{i=1}^{k} \frac{n_i}{n} P\left(\mathbf{X}^i; z\right)$, where $\mathbf{X} = \left(\mathbf{X}^1, \dots, \mathbf{X}^k\right) \in \mathbf{X}$, n_i is the population size associated with $\mathbf{X}^i$ and $\sum_{i=1}^{k} n_i = n$.

TRANSFER AXIOM (TR). In its general form, TR holds that a poverty measure decrease after a progressive transfer and increase after a regressive one. For any $z \in \mathbf{Z}$ and $\mathbf{X}, \mathbf{Y}$ of the same dimension, if $\mathbf{X}^{\mathrm{P}} = \mathbf{B}\mathbf{Y}^{\mathrm{P}}$ and $\mathbf{B}$ is not a permutation of the rows of $\mathbf{Y}^{\mathrm{P}}$, where $\mathbf{X}^{\mathrm{P}}(\mathbf{Y}^{\mathrm{P}})$ is the attribute matrix of the poor corresponding to $\mathbf{X}(\mathbf{Y})$ and $\mathbf{B} = (b_{ij})$ is some bistochastic matrix of appropriate order[12], then $P(\mathbf{X}; z) \leq P(\mathbf{Y}; z)$.

NON-DECREASINGNESS IN SUBSISTENCE LEVELS OF ATTRIBUTES AXIOM (NDS). According to NDS, the poverty level does not decrease if, *cæteris paribus*, the threshold levels increase. For any $\mathbf{X} \in \chi_n$, $P(\mathbf{X}; z)$ is non-decreasing in z_j for all j.

NON-POVERTY GROWTH AXIOM (NPG). NPG holds that, if a rich person joins the society, the poverty level does not increase. Under FC and NPG, the poverty index is a non-increasing function of the population size (Chakravarty and Silber, 2008). Formally, for any $\mathbf{X} \in \chi_n$, $P(\mathbf{X}; z)$, if $\mathbf{Y}$ is obtained from $\mathbf{X}$ by adding a rich person to the society, then $P(\mathbf{Y}; z) \leq P(\mathbf{X}; z)$.

SCALE INVARIANCE AXIOM (SI). Scale Invariance implies that the poverty measure is 'relative': under scale transformations of attribute and threshold levels, the poverty index should remain the same. This means that the ranking of any two populations is preserved if the attributes are rescaled according to their respective ratio scales. For any $z^1 \in \mathbf{Z}$ and $\mathbf{X}^1 \in \chi_n$, $P(\mathbf{X}^1; z^1) = P(\mathbf{X}^2; z^2)$, where $\mathbf{X}^2 = \mathbf{X}^1\Omega$, $z^2 = z^1\Omega$ and $\Omega = diag\ (\lambda_1, \lambda_2, \dots, \lambda_m)$, $\lambda_i > 0$ for all i.

[12] $b_{ij} \geq 0, \sum_i b_{ij} = \sum_j b_{ij} = 1$.

FACTOR DECOMPOSABILITY (FD). Only in the case of additive indices, Factor Decomposability states that overall poverty is a weighted average of poverty levels for individual attributes. FD is an interesting property for policy purposes, as it allows the index to be broken down by attribute and therefore to highlight to what extent each attribute contributes to overall poverty. Formally, for any $z \in \mathbf{Z}$ and $\mathbf{X} \in \chi_n$, $P(\mathbf{X}; z) = \sum_{j=1}^{k} a_j \, P(x_{.j}; z_j)$.

NON-DECREASINGNESS UNDER CORRELATION-INCREASING ARRANGEMENT (NDCI). This axiom refers to switches of some attributes between individuals that increase the correlation of the attributes. Let us assume there are two individuals (a and b) endowed of two attributes (1 and 2) as follows: $x_{a1} > x_{b1}$ and $x_{a2} < x_{b2}$. Let us now suppose that a switch of attribute 2 between the two individuals occurs. Such an arrangement would make the correlation between the attributes increase, given that now individual a has more of attribute 1 as well as more of attribute 2. NDCI holds that, under such a switch, the poverty index does not decrease. It therefore treats attributes as independents: for any $z \in \mathbf{Z}$ and $\mathbf{X} \in \chi_n$, if $\mathbf{Y}$ is obtained from $\mathbf{X}$ by a correlation-increasing switch between two poor persons, then $P(\mathbf{X}; z) \leq P(\mathbf{Y}; z)$ if the two attributes are substitutes.

In the literature there exist many axiomatically derived poverty indices. In order to introduce and support the methodological choices we will make throughout this volume, in what follows we will present selected classes of measures in both the income and the multidimensional space.

2.8.1 Axiomatically derived unidimensional measures

Among the most renowned axiomatically derived indices of poverty defined in the income or consumption expenditure space there are the Sen Index (Sen, 1976) and the class of Foster-Greer-Thorbecke (FGT) measures (Foster et al., 1984).

i) The Sen Index

The Sen Index was proposed by Sen in a seminal paper of 1976 as a solution to the weaknesses of poverty measures currently in use at that time: the Headcount Ratio (HR) and the Poverty Gap (PG). The HR is an immediate though not very sophisticated index showing the share of the population below the poverty line over the total population. The PG is the aggregate shortfall of the income of all the poor taken together from the poverty line. These two measures have clear advantages if used in the policy context – they are of immediate usage and understanding, also for the broad public, and it is extremely easy to compute them. Nonetheless, they violate a number of desirable axioms, namely the monotonicity axiom and the transfer principle (Watts, 1969; Sen, 1976). Let us take the example of a sub-population of poor people who experience a fall in their income levels: PG would increase while – as long as the number of poor people does not change – HR would remain insensitive to such a general deterioration of living standards. Let us now consider the example of an income transfer from a poorer person to a less poor person (whose income is still below the poverty line): neither the PG nor the HR would respond to both the greater severity of poverty and the increase in the level of inequality among the poor.

In order to fix these limitations, Sen (1976) introduces four axioms to construct a new poverty index. Let us assume that $g_i = z - y_i$ is the income gap, defined as the shortfall of individual i's income from the poverty line z, and that $S(z)$ is the sub-population of poor people. Sen's axioms are as follows:

RELATIVE EQUITY (RE). For any pair of individuals i and l, if person i is worse-off than individual l in a given income configuration $\underline{y}$, then the weight v_i attached to her income shortfall g_i should be greater than the weight the weight v_j attached to the income shortfall g_l of individual l. Let us assume that $W_i\left(\underline{y}\right)$ and $W_j\left(\underline{y}\right)$ are the welfare levels of the two individuals. Formally, RE requires that for any pair i, l, if $W_i\left(\underline{y}\right) < W_j\left(\underline{y}\right)$, then $v_i\left(z, \underline{y}\right) > v_j\left(z, \underline{y}\right)$.

ORDINAL RANK WEIGHTS (ORW). If individual welfare is taken to be ordinally measurable and level comparable, the weight $v_i\left(z, \underline{y}\right)$ on the income gap of person i equals the rank order of i in the interpersonal welfare ordering of the poor.

MONOTONIC WELFARE (MW). Assuming that a richer person is also better-off and that the individual welfare relation is taken to be a strict complete ordering, MW requires that the relation > (greater than) defined on the set of individual welfare numbers $\left\{W_i\left(\underline{y}\right)\right\}$ for any income configuration $\underline{y}$ is a strict complete ordering, and the relation > defined on the corresponding set of individual incomes $\{y_i\}$ is a sub-relation of the former. For any pair i, l, if $y_i > y_j$, then $W_i\left(\underline{y}\right) > W_j\left(\underline{y}\right)$.

Sen then assumes that HR is the ratio of the number of poor people $q = q(y; z)$ to the total population size n:

$$H = \frac{q}{n} \tag{1.1}$$

and that PG can be normalized into a per-person percentage gap I (an 'income-gap ratio'):

$$I = \sum_{i \epsilon S(z)} \frac{g_i}{qz} \tag{1.2}$$

As shown above, HR and I do not give adequate information in terms of distribution among the poor nor they satisfy the transfer principle. However, in the special case of perfect equality among the poor (all poor people having the same income level $y^* < z$), if taken together, HR and I can be fruitfully exploited to produce a new poverty measure P, for which Sen needs to introduce one last axiom:

NORMALIZED POVERTY VALUE (NPV). If all the poor have the same income, then $P = HI$.

If individuals are numbered in a non-decreasing order of income ($y_1 \leq y_2 \leq \cdots \leq y_n$), Sen shows that the following poverty index is the only one that satisfies ORW, MW and NP:

$$P = H[I + (1 - I)G] \tag{1.3}$$

where G is the Gini coefficient of the income distribution of the poor (Sen, 1976).
The interpretation of the Sen Index is quite immediate. The overall poverty measure is composed of three elements: poverty incidence (given by the headcount ratio H), poverty intensity (represented by the mean income gap I) and the unequal distribution of the mean income (accounted for by G).
The introduction of the Sen Index has been of great importance for the debate on poverty measurement for a number of reasons. In the first place, it uses an ordinal approach to welfare comparison, going beyond the need to use interpersonally comparable cardinal utility functions. Secondly, by placing a greater weight on the income of the poorest persons in the distribution, it explicitly addresses the equity issue, therefore making it possible to link poverty to distributive justice considerations.

ii) The Foster-Greer-Thorbecke poverty measures

To the parametric family of FGT poverty measures belong the most common axiomatically derived indices used in the literature and in empirical applications (Alkire and Santos, 2009), namely the Headcount Ratio, the Poverty Gap and the Squared Poverty Gap (SPG). Let us assume that poverty is measured as income or consumption expenditure shortage, with $y = y_1, y_2, \dots, y_n$ being the income distribution in increasing order and $z > 0$ the predetermined poverty line. Let us then suppose that $g_i = z - y_i$ is the income shortfall of the ith individual, $q = q(y; z)$ is the number of poor individuals (the number of individuals whose income falls below the poverty line) and $n = n(y)$ is the total number of individuals. Foster et al. (1984) define the poverty measure P as:

$$P_\alpha(y; z) = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{g_i}{z}\right)^\alpha \qquad (2.1)$$

According to this formula, poverty is a normalized weighted sum of the income shortfalls of the poor.
Depending on how the parameter α is set, the FGT class of poverty measures produce a number of so-called 'partial indices' (Foster, 2006) that focus on specific aspects of poverty. The first partial index, the Headcount Ratio (P_0), is given when $\alpha = 0$. Each normalized gap raised to 0 gives either 1 if the person is poor and 0 if she is non-poor. This means that $P_0(y; z) = \mu(g^0)$, that is, the proportion of poor people on the total population, or the poverty incidence. As already highlighted above, HR is a quite crude though crucial indicator of the extent of poverty: the simplicity of its calculation and the immediateness of the information it conveys are at the heart of its success among policy makers. However, it does not give information about the depth of poverty nor on its distribution (Watts, 1969; Sen, 1976). In terms of policy implications, this means that a possible poverty reduction strategy designed on the basis of HR has no concrete incentives in relieving the living conditions of the poorest among the poor. Rather, it would respond to the urge of reducing the *proportion* of poor people over the total population, goal that would be maximized by transferring only the amount of resources necessary to help those who are closer to the poverty line. The second partial index, the Poverty Gap (P_1), is given in the case of $\alpha = 1$ and

corresponds to the average income shortfall of the poor. PG is the mean of the normalized gap vector $g^1(y)$ and, unlike HR, is sensitive to the depth of poverty, that is, to how far from the poverty line lie on average the incomes of the poor. It therefore satisfies the monotonicity axiom. In terms of policy, PG informs the analyst on the amount of resources that would be necessary to bring all the poor people above the poverty line. It is nevertheless insensitive to distributive issues, creating therefore the incentive to focus possible poverty reduction strategies on transferring resources to *any* poor person. Finally, for $\alpha = 2$ the FGT class of poverty measures produces a Squared Poverty Gap, which has the interesting property of being sensitive to the distribution of incomes below the poverty line. By squaring the normalized gaps $g^2(y)$, the biggest gaps receive a higher weight, making SPG become a measure of inequality among the poor.[13] Hence, SPG satisfies monotonicity as well as the transfer principle.[14] The parameter α could obviously assume any value greater than or equal to 0: generally speaking, the higher is the value of α – which Foster et al. (1984) consider as a parameter of 'aversion to poverty' – the higher the weight given to the lowest incomes of the distribution in the computation of the overall index.

2.8.2. Axiomatically derived multidimensional measures

iii) The Alkire-Foster class of poverty measures

One of the most prominent methodologies for producing national multidimensional poverty indices is the Alkire-Foster (AF) method (Alkire and Foster, 2007; 2011a). Since its first appearance in the international debate on multidimensional poverty measurement in 2007, the AF method has been gaining growing attention and recognition by both scientists and civil societies worldwide, and it is now one of the most suitable methodologies to measure multiple deprivations simultaneously affecting an individual. Specifically, Alkire and Foster (2011a) propose a counting based method to identify the poor and 'adjusted' FGT measures that reflect the breadth, depth and severity of multidimensional poverty.

Let us begin with the introduction of the AF identification method, the so-called 'dual cut-off identification system' (Alkire and Foster, 2011a, p. 477). According to this system, two cut-offs are typically set to measure multidimensional poverty: the first one is the deprivation threshold z, that is, a poverty line that helps identifying those who are deprived in a single dimension. The second one is an overall poverty cut-off k, with $k = 1, \dots, d$, and represents the threshold to which compare the (weighted) sum of person i's deprivations in order to determine if she is multidimensionally poor or not. The first cut-off is thus set to identify deprivations *within* well-being dimensions, while the second one is set to identify poverty *across* them. Let n represent the number of persons and let $d \geq 2$ be the number of well-

[13] The impact on measured poverty of a gain in income by a poor person increases in proportion to the distance of the person from the poverty line. Todaro and Smith (2011) consider the example of raising the income of a person from a household living at half the per capita poverty line by, say, one penny per day. According to the Squared Poverty Gap, it would have five times the impact on poverty reduction as would raising by the same amount the income of a person living at 90% of the poverty line.

[14] Foster (2006) highlights that there are several compelling reasons why a poverty measure should do so. The first is based on the traditional economic view that the marginal utility of income – and hence marginal deprivation from the lack of income – is higher at low incomes. A second reason follows a sociological perspective, according to which relative deprivation is more acute at lower incomes (Sen, 1976). Finally, from an ethical point of view, a poverty measure should be able to differentiate between two distributions that have different levels of concentration – which describe two radically different situations in terms of social justice – below the poverty line.

being dimensions. Let $y = [y_{ij}]$ denote $n \times d$ matrix of achievements, with $y \in \mathbb{R}_+^{ND}$, where the typical non-negative entry y_{ij} represents the achievement of individual $i = 1, 2, \dots, n$ in dimensions $j = 1, 2, \dots, d$. Each row vector $y_{i\cdot} = (y_{i1}, y_{i2}, \dots, y_{id})$ lists individuals' achievements, while column vectors $y_{\cdot j} = (y_{1j}, y_{2j}, \dots, y_{nj})$ give the distribution of achievements in dimension j across individuals. Let then $z_j > 0$ denote the cut-off below which a person is considered deprived in the jth dimension, with z as the row vector of deprivation cut-offs. The identification function $\rho: \mathbb{R}_+^D \times \mathbb{R}_{++}^D \longrightarrow \{0,1\}$ maps from individual i's achievement vector $y \in \mathbb{R}_+^{ND}$ and cut-off vector z in $\mathbb{R}_{++}^D$ to an indicator variable in such a way that $\rho(y_i; z) = 1$ if person i is poor and $\rho(y_i; z) = 0$ if she is not. The authors express the entries of the matrix in terms of deprivations rather than in terms of achievements: hence, for any given y, they denote with $g^0 = [g_{ij}^0]$ the 0-1 matrix of deprivations associated with y, whose typical entry is defined by $g_{ij}^0 = 1$ whenever $y_{ij} < z_j$, and $g_{ij}^0 = 0$ otherwise.[15] Starting from this matrix, they then construct a column vector c_i of 'deprivation counts' that represents the number of deprivations suffered by each individual.

The dual cut-off identification system proves to be particularly flexible in that it allows to overcome the limits that the union ($c_i \geq 1$) and the intersection ($c_i = d$) approaches entail: in fact, intermediate cut-off levels for c_i can be used depending on how we set the poverty cut-off k. The identification function will be thus defined as $\rho_k(y_i; z) = 1$ whenever $c_i \geq k$ and $\rho_k(y_i; z) = 0$ otherwise, that is, individual i will be considered multidimensionally poor if she experiences deprivations in at least k dimensions.

Let us now turn to Alkire and Foster's class of poverty measures based on the FGT class, also called the 'adjusted FGT class' of multidimensional poverty measures:

$$M_\alpha = \mu(g^\alpha(k)) \tag{3.1}$$

for $\alpha \geq 0$ and with $g^\alpha(k)$ being the matrix of the 'censored' data about non-poor persons.[16]

Depending on the value given to α, M_α assumes the forms of the different FGT partial indices. When $\alpha = 0$, an adjusted headcount ratio (M_0) is produced. M_0 can also be synthetically described as the product between an headcount ratio (H), or the number of poor people identified using the dual cut-off system, and another partial index that stands for the breadth of deprivations experienced by the poor (A), or the average deprivation share across the poor. M_0 offers a number of advantages: firstly, it is a quite immediate measure of multiple deprivations accounting for two core aspects of poverty, i.e., its prevalence over the total population and its intensity. Secondly, it can be used for handling ordinal data. Moreover, it satisfies the property that Alkire and Foster call 'dimensional monotonicity', as if an individual becomes

[15] This also means that the dual cut-off system can be meaningfully used with ordinal data, since an individual's status does not change when a monotonic transformation is applied to an achievement level and its associated cut-off (Alkire and Foster, 2011a).

[16] $g^\alpha(k)$ is obtained from g^α by replacing its ith row g_{ij}^α with a vector of zeros whenever $\rho_k(y_i; z) = 0$, so that $g_{ij}^\alpha(k) = g_{ij}^\alpha \rho_k(y_i; z)$.

deprived in an additional dimension, A rises and so does M_0. However, because of its insensitivity to changes in poor people's conditions within each dimension, M_0 violates the traditional monotonicity axiom: it does not provide any dimension-specific information on the depth of deprivation so, for example, if a poor individual becomes more deprived in one dimension in which she was already deprived, the measure will not be able to reflect the deterioration in that individual's living conditions (Alkire and Foster, 2011a). In the case cardinal data are available, the AF methodology allows producing two other measures, i.e., the adjusted poverty gap ($\alpha = 1$) and the adjusted squared poverty gap ($\alpha = 2$). With $\alpha = 1, M_1$ will equal the product between H, A and G, the latter being the average poverty gap across all instances in which poor people are deprived. When $\alpha = 2, M_2$ is given by the product between H, A and S, which is a partial index of average poverty severity. An overview of the class of AF poverty measures is given in Annex I.

iv) Rippin's inequality-sensitive class of poverty measures

The inequality-sensitive methodology presented by Rippin (2010; 2012a) and empirically tested on the German case (2012b; 2015) offers some interesting food for thought as it brings together poverty measurement issues and inequality considerations. In a multidimensional framework, two fundamental forms of inequality can be accounted for by a poverty index: inequality *within* dimensions (Kolm, 1977) and inequality *between* dimensions, also commonly treated in the literature as 'association (or correlation) sensitivity' (Bourguignon and Chakravarty, 2003). Focusing on the former characteristic – i.e., inequality within dimensions – Rippin proposes a new methodology that is able to make poverty indices accounting for both distributive justice and efficiency issues (Rippin, 2012a). According to the author, justice and efficiency are two distinct yet fundamental concepts that in the association sensitivity discourse are often erroneously equated. Distributive justice, as we will see in Chapter II, is a characteristic ascribable to both individuals and societies but its specific focus is on the removal of inequalities in the distribution of benefits and burdens – rights and duties, opportunities and privileges, and various forms of wealth – among the individuals of a community. Efficiency, on the other hand, aims at maximizing the total or average level of well-being in a society, often neglecting how the aggregate well-being is distributed among individuals. Rippin's methodology is explicitly intended to capture inequality within dimensions by making poverty not decreasing in case the spread of dimension-specific achievements across society increases.

The author derives a family of poverty indices that satisfies different levels of sensitivity to inequality within and between dimensions, differentiating between ordinal and cardinal poverty measures. Being most part of multidimensional poverty analysis built on the availability of ordinal data, we will focus here on ordinal poverty measures, letting cardinal measures methodology be explained by Annex I. Let us recall some notation already used above in this Section to clarify how Rippin's method works. Let $\mathbb{R}^k$ denote the Euclidean k-space and $\mathbb{R}^k_+ \subset \mathbb{R}^k$ the non-negative k-space. Let $\mathbb{N}$ denote the set of positive integers. $\mathbf{N} = \{1, \dots, n\} \subset \mathbb{N}$ represents the set of n individuals and $\mathbf{D} = \{1, \dots, d\} \subset \mathbb{N}$ the set of d poverty dimensions captured by a set of poverty attributes $\mathbf{K} = \{1, \dots, k\} \subset \mathbb{N}$. Let a denote the weight vector for

the different attributes with $a_j > 0$ for all $j = 1, \dots, k$ and $\sum_{j=1}^{k} a_j = 1$. Let us now define the quantity of attributes with which an individual is endowed as an achievement. The vector of individual's i achievements is represented by $x_{i\cdot} = (x_{i1}, \dots, x_{ik})$, while the achievement matrix for the society with n individuals is represented by $\mathbf{X} \in \mathbb{R}_{+}^{\mathbf{NK}}$ where the ijth entry represents the achievement x_{ij} of individual i in attribute j. Let χ_n denote the set of the possible achievement matrices of population size n. Let z_j denote the threshold associated with attribute j. We consider individual i in attribute j deprived whenever her achievement x_{ij} falls short the threshold z_j: $x_{ij} < z_j$. Let $z \in \mathbb{R}_{++}^{\mathbf{K}}$ represent the vector of poverty thresholds and $\mathbf{Z}$ the matrix of possible threshold vectors. Let us now define a poverty index as a function $P: \chi \times \mathbf{Z} \longrightarrow \mathbb{R}$. For any poverty threshold vector $z \in \mathbf{Z}$, society $\mathcal{A}$ has a higher poverty level than society $\mathcal{B}$ if and only if, for any $\mathbf{X}^{\mathcal{A}}, \mathbf{X}^{\mathcal{B}} \in \chi_n$, $P(\mathbf{X}^{\mathcal{A}}; z) \geq P(\mathbf{X}^{\mathcal{B}}; z)$. Let $\mathbf{c}_{i\cdot} = (\mathrm{c}_{i1}, \dots, \mathrm{c}_{ik})$ be the deprivation vector of individual i such that $c_{ij} = 1$ if $x_{ij} < z_j$ and $c_{ij} = 0$ if $x_{ij} \geq z_j$. Then, let denote the sum of weighted deprivations suffered by individual i by $\delta_i^{\alpha} \sum_{j \in \{1,\dots,k\}: c_{ij}=1} a_j$, while $S_j(\mathbf{X})$ is the set of individuals who are deprived with respect of attribute j. The identification of the poor is based on a function $\rho: \mathbb{R}_{+}^{\mathrm{K}} \times \mathbb{R}_{++}^{\mathrm{K}} \longrightarrow \{0,1\}$, meaning that individual i is poor if $\rho(c_{i\cdot}; z) = 1$ and not poor if $\rho(c_{i\cdot}; z) = 0$.

Rippin shows that it is possible to take into account both justice and efficiency starting from the setting of the identification function, which in this case (4.1) is a multi-step function which differentiates between the non-poor on the one hand, and those who are affected by different levels of deprivation on the other. One main advantage of such an identification function is that it is in a way a fuzzy sets approach, because it avoids the dichotomization of the population into two crisp groups (poor and non-poor), while allowing for the identification of a continuum of poverty severity degrees (Rippin, 2012b). In fact, every individual that gets a score between greater than 0 and 1 according to Rippin's poverty measures is considered poor to some extent. This feature entails the important advantage of not requiring the setting of an overall poverty cut-off, minimizing the level of arbitrariness used throughout the identification process. At the same time, Rippin claims, it accounts for possible association sensitivity among attributes through the specific shape of the function. For ordinal poverty indices, the identification function assumes the following specification:

$$\rho\,(\mathrm{c}_{i\cdot}; \mathrm{z}) = \begin{cases} f(c_{i\cdot}) & if \ \max\{\mathrm{c}_{i\cdot}\} = 1 \\ 0 & if \ \max\{\mathrm{c}_{i\cdot}\} = 0 \end{cases} \tag{4.1}$$

Rippin claims that another important feature of the newly developed methodology is that, in the case of ordinal variables, the identification function can be either concave or convex depending on whether it is assumed that the dimensions are complements or substitutes. If dimensions are complements, a shortfall in even only one dimension can be hardly compensated by higher achievements in any other one; graphically, complementarity would imply a concave poverty function. On the contrary, if it is assumed

that dimensions are substitutes, deprivation in one dimension can be overcome by higher achievements in other dimensions; substitutability among dimensions would imply a convex poverty function. Rippin shows how the degree of complementarity (or substitutability) among dimensions can be set by the researcher through a parameter α that can be used to 'adjust' the weighted sum of deprivations according to the assumptions made on the complementarity/substitutability of poverty attributes. This parameter of 'inequality aversion' is (i) always non-decreasing in the number of deprivations; however, (ii) the marginal increase in poverty severity is the less the higher the substitutability between attributes (Rippin, 2012b). A higher level of α thus implies a higher level of substitutability among well-being dimensions, and vice versa. In the case α is equal to 1, attributes are assumed to be independent, implying that inequality aversion linearly increases in the number of deprivations.

The poverty identification function can be therefore rewritten in the following way:

$$\rho_{CS}\left(\mathbf{c}_i.;\mathbf{z}\right) = \begin{cases} \delta_i^{\alpha} & if \quad \max\{\mathbf{c}_i.\} = 1 \\ 0 & if \quad \max\{\mathbf{c}_i.\} = 0 \end{cases} \tag{4.2}$$

A poverty measure that belongs to this family and that has been used by Rippin to measure multidimensional deprivation in Germany (Rippin, 2012), is the Correlation Sensitive Poverty Index (CSPI). It is defined as follows:[17]

$$P_{CS}(\mathbf{X};\mathbf{z}) = \frac{1}{n}\sum_{i\in S_j}\delta_i^{\alpha}\ \sum_{j\in\{1,\dots k\}:c_{ij}=1} a_j = \frac{1}{n}\sum_{i\in S_j}\delta_i^{\alpha+1} \tag{4.3}$$

The CSPI has indeed a number of appealing features: first of all, its additivity ensures decomposability by dimensions, regions and sub-groups, making it easier for policy makers to identify which aspects of multidimensional poverty deserve priority interventions and where (either geographically or socioeconomically) they are nested. In the second place, it is sensitive to the joint distribution of deprivations, meaning that it looks across dimensions for the achievements of the same individual. This allows to quantify the extent to which an individual is simultaneously deprived in different well-being dimensions, which, as also remarked by Stiglitz et al. (2009), is a key feature for improving developing measures and for understanding how having multiple disadvantages at the same time can affect people's quality of life. Finally, it is always possible to decompose it into three fundamental aspects of poverty, i.e., incidence, intensity and inequality (Jenkins and Lambert, 1997) as demonstrated in Rippin (2012a):

$$P_{CS}(X;z) = H\cdot\mu(\delta)^{\alpha+1}\cdot[1+2GE_{\alpha+1}(\delta)] \tag{4.4}$$

[17] The final formula is in fact the result of a two-step calculation:
$P_{CS} = \frac{1}{n}\sum_{i\in S_j}\delta_i^{\alpha}\sum_{j\in\{1,\dots,k\}:c_{ij}=1} a_j = \frac{1}{n}\sum_{i\in S_j}\delta_i^{\alpha+1}$, with $\sum_{i\in S_j}\delta_i^{\alpha}$ being the individual weight calculated in the identification step. This separation between the identification and the aggregation step enables the additivity of the index in the aggregation step, and thus the fulfilment of the Factor Decomposability axiom (Rippin, 2012b).

where $\alpha > 0$, and $GE(\delta) = [1/q\,(\theta^2 - \theta]\sum_{i \in S_j}[\delta/\mu\,(\delta)]^\theta - 1$ is a Generalized Entropy measure.

In (4.4), H is the headcount ratio and it accounts for the incidence of poverty; $\mu(\delta)^{\alpha+1}$ is the aggregate deprivation count ratio, accounting for the breadth of poverty; and the third term captures the inequality of the distribution among the poor. In case it proves to be useful for targeting purposes, it is also possible to transform Rippin's 'fuzzy' identification function into a dichotomized one, by applying a cut-off to the headcount. This feature is indeed highly informative for policy makers and can be used to target those groups who are in urgent need of a specific intervention.

Whether the usefulness of applying an inequality aversion parameter to the weighted sum of deprivation is unquestionable, we find Rippin's interpretation of the same parameter in terms of complementarity/substitutability of dimensions more controverted. As seen earlier in this Chapter, well-being attributes are typically assumed to be complements or substitutes depending on the structure of the relative weights. The use of an additional parameter for the accomplishment of the same task could make the identification step more complex and leave some of the normative passages implicit, let alone unclear. On the other hand, the useful and innovative properties of Rippin's methodology for the construction of ordinal poverty indices encourage us to put it into practice to serve our purpose of developing a framework for carrying out a multidimensional poverty analysis in high-income countries, reason why we will apply the methodology just presented to generate poverty estimates in Italy, basing on the EU-SILC data.

Concluding remarks

In this Chapter, we have reviewed theories and metrics in support of multidimensional poverty analysis, highlighting strengths and weaknesses for each of the mentioned approach. Counting methods, which have been for a long time largely used from development practitioners and preferred by policy makers, are by now widely used in conjunction with methods deriving from the social welfare function approach, which in turn has been enthusiastically pioneered by scientists. Though already in 2003 Atkinson had proposed to join the two methodologies, the development of the Alkire-Foster method (2009, 2011a) has been of key importance in effectively linking them and making the computation of multidimensional poverty indices become widespread among policy makers. The real value-added of the AF methodology lies in the capability of taking into consideration the joint distribution of deprivations, which allow studying the degree of association between dimensional shortfalls and makes it possible to evaluate individuals' living conditions in terms of simultaneous multiple deprivations. Following this line of reasoning, an aggregated index seems to be preferable to a dashboard approach, which is less demanding in terms of data availability compared to the 'single index' approach and certainly provides more accurate information on specific well-being dimensions. However, as also stressed by Stiglitz et al. (2009) the opportunity to quantify the extent to which an individual is simultaneously deprived in

different well-being dimensions is a key feature for improving developing measures and for understanding how having multiple disadvantages at the same time can affect people's quality of life.

Among the several approaches to multidimensional poverty measurement, the axiomatic approach proves to be the most convincing in our view, as it allows explicitly specifying a list of 'rules' or desirable criteria that a poverty measure should satisfy in order to correctly reflect the phenomena it is intended to account for. Recently, an axiomatically derived poverty index has been proposed by Rippin (2010; 2012a; 2012b; 2015). The new family of poverty indices proposed by the author has some interesting features that make it appealing for an empirical investigation on multidimensional poverty. Firstly, it combines the advantages of the counting approach and the fuzzy set approach, avoiding the dichotomization of the distribution into two crisp groups while classifying the studied population according to the degree of poverty each person or household is affected by. Secondly, its decomposability by dimensions, regions and sub-groups can guide the policy maker in better identifying where – either geographically or socioeconomically – poverty is nested. Thirdly, it allows accounting for the joint distribution of deprivations, just as AF measures do. Finally, and more importantly, it is able to account for the level of inequality among the poor, making it possible to design interventions whose target is represented by those who deserve to get more attention by the policy maker – i.e., the poorest of the poor. In case of use of ordinal variables, it is still possible to use Rippin's method to set the 'desired' level of social inequality aversion and to let the poverty index respond more or less dramatically to changes in the lower parts of the distribution.

Chapter II.

Accounting for distributive justice: a Rawlsian approach to multidimensional poverty analysis

Introduction

As illustrated in the first Chapter, one of the main debates around multidimensional poverty assessment concerns the degree of arbitrariness used to inform poverty analysis. Which dimensions matter and who should be selecting them are questions that repeatedly raise issues of ethics and legitimacy. Whether it is true that the lack of agreement on what a good life is can be viewed as a symptom of the vitality of a pluralistic society, when it comes to evaluating life standards to support justice-enhancing institutions and policies, finding a certain degree of consensus is necessary. Such a consensus, in turn, requires a prior definition of what is 'just'.

In this Chapter we hold that, in order to justify normative decisions in support to poverty assessment, the latter has to be addressed as a distributive justice question. Particularly, we will propose a theoretical framework for reconceptualising multidimensional poverty analysis starting from Rawls' theory of justice. Developed throughout the second half of the twentieth century, John Rawls' seminal and extensive work on the conception of justice (1985; 1988; 1971; 1993; 1999a; 1999b; 2001) has changed the face of moral and political philosophy. His theory of justice, most renowned as 'Justice as Fairness', has influenced scholars and thinkers not only in the field of political philosophy, but also in law, political sciences, sociology, welfare economics and in humanities in general.

The Chapter is structured as follows. We will first briefly review some of the most influential philosophical frameworks for analysing social justice. Then, we will introduce Rawls' main ideas on Justice as Fairness. The hints offered by Rawls' theory to the interpretation of multidimensional poverty analysis are manifold: in the first place, we maintain that Rawls' two principles of justice (Rawls, 1971; 1999a) are able to frame an investigation on multidimensional poverty and social inequalities in the case of constitutional democracies. Secondly, we analyse the idea of an overlapping consensus (Rawls, 1993) to demonstrate that, through the exploitation of national Constitutions and their judicial interpretations, it can serve the purpose of informing empirical analyses on multidimensional poverty in democratic societies as it undoubtedly conveys people's value judgments and public shared ideas.

1. The concept of distributive justice

Over the last decades, many theorists and philosophers have tried to establish how to evaluate whether the setting of a society is just or not. Which parameters count, what state of things has to be

investigated in order to dissipate this matter, are questions at the heart of the debate and discussions in favour or against different approaches continue to exist.

Justice is indeed a highly contested concept. There is no conventionally accepted definition of it and different theories provide a variety of elements of discernment and justification (Robeyns, 2009). As pointed out by Miller (1999), discussing about justice is essentially debating on how "the good and the bad things in life should be distributed among the members of a human society." (Miller, 1999, p. 1) For this reason, social (or distributive) justice theories[18] cover a broad spectrum of moral and political issues and seek to define the content of just principles for the distribution of benefits and (non-punitive) burdens.[19] Barry and Matravers (2005) identify four main schools of thought in contemporary academic literature on theories of justice. According to the first school of thought, conventionalism, what is due to each person is given by the laws, the customs and the shared understandings of the society of which the person is member. The earliest statements of conventionalism are traceable in Plato's *Republic*, where Socrates' interlocutors state that justice – intended as giving a person her due – is dictated by conventions that were prevailing in contemporary Athenian society. More recently, Walzer (1983) has offered a modern version of the conventionalist thought affirming that every social good, like health care or political rights, has an appropriate criterion of distribution that is related to how that good is understood by the society. As a matter of fact, it is not undisputed whether such a conception of the good would give rise to just distributions. Relying exclusively on conventions and shared understandings to evaluate social arrangements could theoretically perpetuate or even exacerbate unjust customs, like inequalities based on ascription at birth (Barry and Matravers, 2005). It is not unreasonable to think that accepting systems of law as unquestionable could lead to grossly unfair practices in certain communities, while others may be able to reject them on the basis of values and ideas that are available to that particular society.

The second school of thought, teleology, uses the most common justification of any set of laws, conventions or practices: it argues that these are conducive to the advancement of some form of ultimate good that people – and, by extension, their institutions – lean towards. According to this view, justice is the ordering principle through which a society pursues the good (Barry and Matravers, 2005). As recalled by Robeyns (2009), utilitarianism, natural law theory or Aquinas' Christian philosophy are examples of this way of approaching the concept of justice. Aquinas, in particular, gave a definitive Christian form to this principle already available amongst the Greek Stoics and in Cicero's thought (*De Republica*, c. 54-51 BC). It is therefore not essential to conceive the good as having a religious premise, though the teleological account of the good necessarily relies on an external source.

According to Barry and Matravers (2005), this very characteristic of depending on an external source represents the major problem of teleology. Social arrangements are hardly justifiable if they are only verifiable in terms of their compliance with a higher, 'unchanging' moral order, like God's authority. With this regard, utilitarianism (first pioneered in his classical formulation by Jeremy Bentham, 1789, and John

[18] In this literature, the terms 'social justice' and 'distributive justice' are generally used interchangeably (Robeyns, 2009).

[19] As Robeyns (2009) recalls, although justice is a property ascribed to both individuals and societies, theorists of justice tend primarily to discuss the justice of social arrangements, that is, of social institutions broadly defined. Conversely, justice as an individual virtue is sometimes regarded as a matter of ethics rather than of political philosophy.

Stuart Mill, 1861) proposes a secular teleological alternative in that it conceives human institutions as just only if they are apt to pursue the ultimate human good, i.e., human well-being, more often depicted as 'happiness' or 'utility'. In fact, as Sen and Foster (1997) recall, utilitarianism has been widely used in economics for social judgments, notably by Marshall (1890), Pigou (1920) and Robertson (1952). However, different people can reasonably have different notions of utility, which might also be conflicting with each other. The solution proposed by utilitarists is then to bring the plurality of human interests together in a social aggregate that has to be maximized (the total or average utility). Following this line of reasoning, justice corresponds to those social rules whose strict observance is essential for the furtherance of the utilitarian end (Mill, 1861) and any arbitrary departure from them is not for the general 'greater' good. However, it is hard to imagine how such a way to intend justice can effectively work in pluralistic societies. Irrespective of how faithfully social aggregate utility represents individual utilities, every person will always justify social arrangements according to her personal notion of justice. Furthermore, it might also be the case that single unjust arrangements ultimately are for the greater, general good. Hence, a teleological conception of justice cannot be easily defended, as it evokes a generally-accepted external source imposing on all a particular idea of the good with which individual, competing ideas of the good would find it difficult to peacefully coexist.

The third school of thought – justice as mutual advantage – goes back to the social contract tradition initiated by Rousseau in 1755 to affirm that the rules of justice can be derived from the rational agreement of each agent to cooperate with others to promote their own self-interest. If it is true that people are not motivated by the belief in a greater, shared idea of the good, then a resulting way of intending justice is representing it by a set of constraints, which is more advantageous to each individual than the unrestrained pursuit of one's ends (Barry and Matravers, 2005). The problem in this tradition arises because social rules that are explicitly intended to constrain the pursuit of self-interest can only hold if the bargaining power and relative strengths of the parties are well-balanced. Barry (1995), for instance, stresses that in justice as mutual advantage rules are no more than truces between moments of instability caused by either changes in the balance of power between the sides or non-compliant behaviours. In fact, the established set of rules would only go to everyone's advantage if each person complies with them, although there still can exist reasons for individuals to maximize personal interests by breaking them.

The fourth school of thought, i.e., egalitarian justice, shares with justice as mutual advantage the contractarian roots and adds to them the important insight of considering every person in the society – though moved by different beliefs and concepts of the good – as deserving to be treated with equal moral worth and respect. It is by cooperating under conditions of perfect equality among each other that citizens can ensure a greater good for the society as a whole. What kind of equality – whether of outcome, entitlements or resources – the citizens should be enjoying in concrete is the matter at the heart of the many disagreements among philosophers belonging to this school of thought (among others, Rawls, 1971; Nozick, 1974; Barry, 1995; Van Parjis, 1995; Scanlon, 1998; and Roemer, 1998). Robert Nozick (1974), for instance, develops an 'entitlement theory of justice', depicting a fully voluntary society where people cooperate on terms that do not violate anyone's rights. These rights are inviolable and 'acquired' in the

first place: they constitute the kind of entitlements citizens are born with and are essentially rights on holdings and property. From such a starting point, the just pattern of distribution is the one resulting from transfers among citizens (either voluntary ones or appropriations that do not leave anyone worse off). Van Parijs (1995) proposes an approach related to initial material entitlements as well, arguing that societies should approach as far as possible a condition in which each person has an equal opportunity to fulfil her life plans. This statement of liberal egalitarianism explicitly takes into consideration those persons whose life plans include non-paid activities, like voluntary work: this kind of people would be entitled to a basic income sufficient to live on.[20] Conversely, John Rawls (1971; 1999a) finds his solution in providing people with initial equal basic liberties and fair opportunities for all. A social setting would then be considered as just if it ensures an initial distributive scheme where social and economic inequalities are tolerated if and only if they are to the benefit of the least advantaged. Rawls' theory of justice, which we will further elaborate on in the next Section, requires that social rules are chosen from free citizens from a position of 'ignorance' about their own interests. This would be the only way, in Rawls' view, to guarantee that everyone abides by fair rules of cooperation and that self-interests do not prevail during the bargaining. Other liberal egalitarian authors, like Barry (1995) and Scanlon (1998), propose a different conception of the nature of people's participation to the agreement process. To them, it is not necessary to assume that citizens are unaware of their identities to ensure a fair outcome, provided that they are motivated to seek agreement on terms that nobody could reasonably reject. Another way to think about this matter is to propose that people are treated in such a way that they reach equality of outcome. Roemer (1998), for instance, thinks that members of a society can be divided into categories according to some criterion associated with advantage or disadvantage like, say, ethnicity or gender. Equality of opportunity would then be achieved if citizens belonging to each 'type' finished up with the same distribution of some valued goods (e.g., access to formal education).[21]

Social justice and equality are thus profoundly related in liberal egalitarian theories, even if not always at the level of material inequality. The fundamental requirement is that people should be treated as moral equals, often irrespective of the equality of outcome (Robeyns, 2009). John Rawls is considered the leading author of the school of liberal egalitarianism and his contribution in *A Theory of Justice* (1971) is regarded as the landmark of the Twentieth century for social justice.

2. John Rawls' theory of justice

2.1. Justice as Fairness

In *A Theory of Justice* (1971) Rawls first constructed his principles of justice as the ground for a

[20] In order to dissipate critiques on the risk of free-riding behaviours moved to his approach, Van Parijs has pointed out that the entitlement should be conditional upon 'participation', which could take a wide variety of forms (Van Parijs, 1995).

[21] Roemer (1998) takes the example of dividing Americans into two types, black and white, and shows that, even under such a simple categorization, the purpose of achieving equality of, say, earnings for each type would require to spend much more resources on blacks' education than on whites'. It is not made clear, though, how 'types' should be defined (Barry and Matravers, 2005).

liberal society. He was motivated by the belief that, despite its many strengths, the dominant utilitarian tradition provided deficient moral foundations for democracy, reason why it should be overcome. With this aim in mind, Rawls developed a liberal, egalitarian, moral conception that he called 'Justice as Fairness', designed to explicate and justify the institutions of a constitutional democracy (Freeman, 2005).[22]

Rawls' reasoning originates from the fundamental question on how to find such terms of societal cooperation that everyone could be mutually advantaged to abide by. He begins with a normative conception of persons, whom he describes as free, equal, rational and endowed with a moral capacity of sense of justice (Freeman, 2005). Then he describes the 'basic structure of society' as the totality of societal institutions and practices, "the way they fit together into one system and how they assign rights and duties and shape the division of advantages that arises through social cooperation." (Rawls, 1993, p. 258) The way the basic structure is organized is crucial to Rawls, because it is the expression of those social rules that will influence people's lives in the first place – that is, social justice.

To set these 'fair rules of the game', Rawls develops the idea of an impartial social contract, supposing that citizens are asked to decide upon them from an abstracted point of view that he calls the 'original position'. It is from this position of total unawareness of their own specificities – natural abilities and talents, social backgrounds and particular historical circumstances – that they will rationally set principles that meet the moral conditions for a just society: behind a 'veil of ignorance', Rawls affirms, no one will have the possibility to vote in favour of rules that benefit individuals or socio-economic categories that share their personal characteristics or their notion of the good (Rawls, 1971, p. 11). On the other hand, what these individuals know is that there exist certain all-purpose means that are essential to the achievement of their good. These are those social primary goods that "every rational man is presumed to want" (Rawls, 1971, p. 54): rights and liberties, powers and opportunities, income and wealth, and the basis of self-respect.[23] By choosing fair terms of agreement, the citizens would secure their equal status and independence and acquire an adequate share of the social primary goods needed to pursue freely their conceptions of the good (Freeman, 2005). Principles of justice reached in such way will be chosen under conditions of actual freedom and equality and will therefore endure and be respected by all.

That of the original position is a purely hypothetical "expository device" (Rawls, 1971, p. 19), built up to justify the bargaining process. Rawls uses it as an expedient to obtain a critical distance from the biases engendered by social institutions – that sometimes provoke envy, resentment, false consciousness and alienation in members of the community – and to build those moral conditions deemed necessary for the resulting choice to be fair (Richardson, 2006a). Specifically, through this thought-experiment Rawls shows that principles of justice that people would fairly agree upon substantially diverge from utilitarian ones. In his critique to utilitarianism, Rawls affirms to find it striking that the way the sum of satisfactions is

[22] In *Political Liberalism*, Rawls specifies that, unless otherwise stated, he would use expressions like " 'constitutional democracy' and 'democratic regime', and similar phrases" interchangeably (1993, p. 11).

[23] Rawls assumes that the parties in the original position are presented with a list of all known feasible conceptions of justice and consider them in pairwise comparisons. The parties are rational, in that all utilize effective means to secure their ends, and are motivated by their interests. The parties are also assumed to be rationally prudent (with zero time-preference), mutually disinterested (of limited altruism) and without envy (Freeman, 2005).

distributed among individuals does not matter in the utilitarian view of justice, according to which the only right way to distribute the means of satisfaction (whatever these are: rights and duties, opportunities and privileges, and various forms of wealth) is that which yields the maximum fulfilment. Society must allocate them so as to achieve this maximum if it can, but in itself no distribution of satisfaction is better than another (Rawls, 1971).[24] Rawls is harshly judgemental with regard to the utilitarian idea that society is to be arranged as to maximize aggregate utility or expected well-being; he complains that, from an utilitarian standpoint, legislator's decisions are not much different in nature from an entrepreneur's who decides to maximize her profit. Therefore "[…] the correct decision is essentially a question of efficient administration. This view of societal cooperation is the consequence of extending to society the principle of choice for one man. […] Utilitarianism does not take seriously the distinction between persons." (Rawls, 1999a, p. 24) Conversely, when the parties are in the original position, the veil of ignorance deprives them of any awareness about their preferences and personal commitments, reason why they would not choose to maximize their utility (nor the average level of utility in society), but rather to abide by fair terms of cooperation, possibly at the expense of their own interests, in order to pursue a just social system.

The principles of justice that guide this social system are two and state as follows:

1. "Each person has the same indefensible claim to a fully-adequate scheme of equal basic liberties, which scheme is compatible with the same scheme of liberties for all."
2. "Social and economic inequalities are to satisfy two conditions: (2a) first, they are to be attached to offices and positions open to all under conditions of fair equality of opportunity, and (2b) they are to be to the greatest benefit of the least-advantaged members of society." (Rawls, 1971, p. 266)

The first principle addresses the essentials of the constitutional structure (Rawls, 1993). Equal basic liberties mentioned in it include political liberties, freedom of speech and assembly, liberty of conscience and freedom of thought, freedom of the person (both psychological and physical), the right to hold personal property, and freedom from arbitrary arrest and seizure. These liberties are 'basic' in that they have priority over everything else: their equality cannot be infringed, even at the cost of possible limitations to opportunities or wealth of the least advantaged. In fact, the statement of Rawls' principles follows a priority rule (Rawls, 1999a, p. 220), holding that the principles of justice are to be ranked in lexical order: the first principle is prior to the second and, within the second principle, the first part has priority over the second one. This precisely means that equal basic liberties apply equally to all citizens and no violation of these liberties can ever be justified or compensated for by greater social and economic advantage (Rawls, 1971). The second principle is divided in two parts: the first one holds that the social

[24] In *The Methods of Ethics*, Henry Sidgwick (1874) elaborates on utilitarists' capacity to address the issue of how to distribute happiness among the people, acknowledging the fact that this question is often overlooked, let alone ignored, in expositions of utilitarianism. He states, "it is practically important to ask which way of distributing [the] quantum of happiness is the better. The utilitarian formula seems not to answer this question; it needs to be supplemented by some principle of just or right distribution of the happiness that is in question. Most utilitarians have tacitly or explicitly adopted the principle of pure equality, as given in Bentham's formula: 'Everybody to count for one, and nobody for more than one.' This seems to be the only principle that doesn't need a special justification, because – as we saw – it must be *reasonable* to treat any one man in the same way as any other if there's no apparent *reason* for treating him differently." (Sidgwick, 1874, p. 416)

structures that shape the distribution must do so by satisfying the requirements of fair equality of opportunity. The last part of the statement introduces the so-called 'difference principle', which requires the society to look out for the least well off.

As Rawls arranges the difference principle reasoning, he holds that the contracting parties in the original position will have reason to use the 'maximin' rule. The maximin rule can be seen as a general rule for making choices under conditions of uncertainty (Richardson, 2006a): during the bargaining, the parties will be directed to select the kind of distribution of social primary goods where the minimum place is higher than the minimum place in any other alternative. Individuals know that primary goods do not *coincide* with their conception of the good, so they are not what people ultimately care about. They rather are considered as versatile means that facilitate the pursuit of one's life plans, reason why, in deciding how to distribute them across the society, they will choose to take a cautious approach and lean towards a fair distribution of them. An uneven distribution of social primary goods will only be admissible if it is to the advantage of the less fortunate.

In his restatement of Justice as Fairness (2001, pp. 58-61), Rawls categorizes the social primary goods as follows:

(i) The basic rights and liberties;
(ii) Freedom of movement and free choice of occupation against a background of diverse opportunities;
(iii) Powers and prerogatives of offices of responsibility;
(iv) Income and wealth;
(v) The social basis of self-respect.

Robeyns and Brighouse (2010) explain that the basic rights and liberties are intended as the background institutions necessary for the development and exercise of the capacity to decide upon and revise, and rationally to pursue, a conception of the good. Similarly, these liberties allow for the development and exercise of the sense of right and justice under political and social conditions that are free. The freedom of movement and free choice of occupation are those liberties required for the pursuit of final ends as well as to decide to revise and change them, if one so desires. Powers and prerogatives of offices of responsibility are needed to give scope to various self-governing and social capacities of the self. Income and wealth, understood broadly as they must be, are all-purpose means (having an exchange value) for achieving directly or indirectly a wide range of ends, whatever they happen to be. Finally, the social basis of self-respect are those aspects of basic institutions that are normally essential if citizens are to have a lively sense of their own worth as moral persons and to be able to realise their highest order interests and advance their ends with self confidence (Robeyns and Brighouse, 2010).

2.2. Stability and political constructivism

Rawls' later work has been dedicated to clarify how pluralistic society can find a stable political legitimacy despite the coexistence of different conceptions of the good. Particularly, in *Political Liberalism* (1993) he showed how, through the political constructivist method, a democratic citizenry is able to build

a political conception of justice around a fund of implicitly shared ideas and principles (Rawls, 1993, p. 14) and to secure an orderly reproduction of society from one generation to another.

The issue of stability was first introduced in *A Theory of Justice* as an integral part of Justice as Fairness. According to Rawls, the stability of the institutions called for by a given set of principles of justice – that is, their ability to endure over time and to restore themselves after temporary departures from the just arrangement – is a key feature those principles must have (Richardson, 2006a). If institutions were inherently unstable, a revision of principles governing them would be needed, as those institutions would prove to not be able to secure the basic liberties, rights and opportunities that the parties care about. It is however in *Political Liberalism* that he definitively addresses the issue of political stability and legitimacy in a society where "opposing and irreconcilable religious, philosophical and moral doctrines" coexist (Rawls, 1993, p. 4). Rawls acknowledges that in a free society citizens can reasonably disagree about what the good life is or they may have disparate worldviews, which he calls 'comprehensive doctrines'. He takes it as a fact that pluralism – which has been endemic among liberal democracies since the Reformation of the Sixteenth century – is a permanent feature of liberal and non-oppressive societies. Democratic citizens can be thus profoundly committed to different conceptions of what is right and wrong, yet in a given society only one law can exist. How can they peacefully and durably cooperate under a legitimate use of coercive political power? This question raises two fundamental issues: the first one is that of legitimacy and the second one concerns stability.

The problem of legitimacy can be exemplified by asking how any particular set of basic laws can legitimately be imposed upon a pluralistic citizenry (Wenar, 2013). Rawls' solution is in his conception of citizens of a democratic society, whom he considers as reasonable and willing to live in a society where political power is legitimately used. In such a society, individuals cooperate with each other, propose and abide by acceptable rules and honour them even when this comes at the expense of their own interests. Still, reasonable pluralism *per se* is not sufficient to guarantee that people having different comprehensive moral doctrines will obey the same coercive political power. Rawls therefore identifies the one source of fundamental ideas that can play the role of focal point for all in the 'public political culture', defined as "the political institutions of a constitutional regime and the public traditions of their interpretation, including those of the judiciary, as well as historic texts and documents that are common knowledge" (Rawls, 1993, pp. 13-14). The political conception of justice of a pluralistic society is thus the expression of its public political culture and its values are embedded in the political institutions and their writings. Rawls' idea is that, whenever political power is exercised in accordance with a political conception of justice, its coercive use will be legitimated by all.

To address the stability issue, Rawls introduces the notion of 'overlapping consensus' (Rawls, 1993, p. 15), on the basis of which a stable liberal society rests and that consists of all the reasonable opposing views of the good likely to persist over generations. An overlapping consensus is not a mere consensus on accepting certain authorities or on complying with certain institutional arrangements "founded on a convergence of self- or group interests." (Rawls, 1993, p.147) Rather, it is a common ground, a shared political conception of justice that gains the support of all citizens no matter what conception of the good

or particular worldview they might have. Hence, in an overlapping consensus citizens support the same basic laws, even if they do so for different reasons that pertain to their own worldviews (Wenar, 2013). This is what in the end makes societal arrangements stable. As Rawls points out, "[a]ll those who affirm the political conception start from within their own comprehensive view and draw on the religious, philosophical, and moral grounds it provides. The fact that people affirm the same political conception on those grounds does not make their affirming it any less religious, philosophical, or moral, as the case may be, since the grounds sincerely held determine the nature of their affirmation." (Rawls, 1993, p. 148) The political conception is thus thought of by Rawls as a freestanding 'module' that can fit into any comprehensive doctrine and is supported by individuals from within their own perspectives. In his view, stability is ensured by the fact that those who affirm the various views supporting the political conception will not withdraw their support of it in case, for instance, the relative strength of their comprehensive doctrine in society increase and eventually becomes dominant.

2.3. Critiques to Justice as Fairness and limits of the approach

Along with the resonance raised by his seminal literary production, Rawls' liberal egalitarianism has been also harshly criticised. Drawbacks have been highlighted mainly by theorists and supporters of the capability approach (Sen, 1985; 1992; 1999; Nussbaum, 2000; 2006), which was firstly proposed in a well-known 1979 Tanner lecture by Nobel Prize Amartya Sen precisely as an alternative to Rawlsian social primary goods metric. As recalled in Chapter I Section 1.2, the CA contends that, in order to determine if certain social arrangements are just, looking at people's holding of external goods is misleading: what really matters to people is their ability to achieve what they value and have reason to value in life, so the focus should be rather placed to a person's valuable beings and doings – i.e., her functionings (Robeyns and Brighouse, 2010). Sen's proposal is to make interpersonal comparisons by paying specific attention at people's actual opportunities to function – i.e., their capabilities – instead of looking at their (relative) command over the social primary goods. If what really matters are the freedom that people enjoy to live the kind of life they value, the metric of justice should be then shifted accordingly, i.e., from the means to achieve one's life goals to the actual goals.

As recalled by Robeyns (2009), the first critique moved by capability theorists to Rawls' theory of justice starts from the accusation of being overly transcendental. Egalitarian theories in general are, according to some authors (see, for instance, Sen, 2006; and Pierik and Robeyns, 2007), too idealistic: while they are able to give an account of how the perfectly just society should look like, they fail in explaining how we could make the world less unjust or what policies are needed in concrete to enhance the situation of an unjust society. Likewise, Rawls' idea of social primary goods has led to criticisms by feminists and communitarians due to the distinction the philosopher makes between the ideal, abstract idea of the citizen – that is presumed to unescapably want the social primary goods and is able to sacrifice her own interests in the public arena – and the more realistic image of the same person as she is in her private sphere.

A second critique to Justice as Fairness concerns the presumed 'fetishism' about the primary goods. In a

well-known lecture of 1980, Sen argued that "the social primary goods approach seems to take little note of the diversity of human beings. […] If people were basically very similar, then an index of primary goods might be quite a good way of judging advantage. But, in fact, people seem to have very different needs varying with health, longevity, climatic conditions, location, work conditions, temperament, and even body size. […] So what is involved is not merely ignoring a few hard cases, but overlooking very widespread and real differences." (Sen, 1980, pp. 215-16) Following a similar argument, Arrow (1973) illustrated the case of variations in people's needs for medical care and in how expensive it is for them to satisfy preferences and tastes.

Rawls, on the other hand, has responded in defence of his theory by stressing that though citizens do not have equal capacities, they do have at least the moral, intellectual and physical capacities that enable them to be "fully cooperating members of society over a complete life." (Rawls, 1993, p. 183) This assumption, that he holds throughout his entire work on social justice, has in turn drawn criticisms because of an implied impossibility of taking into account the obligation of the society towards the severely disabled ascribed to his reasoning. However, in *Political Liberalism* he makes a point that raises questions about the argument on variations in people's needs Sen and Arrow alluded to by showing how, once the principles of justice are satisfied, none of the mentioned variations among citizens are unfair or give rise to injustice (Rawls, 1993).[25] Moreover, Rawls holds that the Capability Approach suffers from two major faults. The first one concerns the endorsement of a particular comprehensive moral view. By relying on a particular conception of the valuable ends in life, the CA would not respect the many comprehensive views of the good life that citizens of a plural society may endorse (Robeyns, 2009). Rather, in Rawls' view the only possibility that a society has to be just is by formulating principles of justice that citizens with conflicting comprehensive notions of the good can endorse as the result of an overlapping consensus (Rawls, 1985; 1988). The second major Rawlsian critique to the CA, then strengthened by Pogge (2002), is that it does not meet the publicity criterion, that is, it does not hold a conception of justice that is public, while the necessary information to make a claim of injustice must be verifiable by all and easily accessible. The use of the CA as an evaluative framework for interpersonal inequalities is in fact extremely demanding: it does not offer a public standard of interpersonal comparisons and it requires very large and difficult sorts of information (Rawls, 1993, p. 183).

In Section 3, we will show that notwithstanding its limitations and critical points, Rawls' Justice as Fairness can be successfully exploited to address a distributive justice question. Particularly, we will study the possibility to use it to theoretically frame and inform multidimensional poverty investigations on pluralistic societies.

[25] To demonstrate this point, Rawls considers four main kinds of variations and then asks whether a variation leaves people with more or less than the minimum essential capacities required to be a normal cooperating member of society. The four kinds are: (i) variations in moral and intellectual capacities and skills; (ii) variations in physical capacities and skills, including the effects of illness and accident on natural abilities; (iii) variations in citizens' conceptions of the good; and (iv) variations in tastes and preferences (Rawls, 1993, pp. 183-185).

3. A Rawlsian framework for multidimensional poverty analysis

As pointed out by Atkinson (1987), in Rawls' extensive work poverty as such seems to play no role. In fact, economists have usually presented the Rawlsian difference principle as maximizing the welfare of the least advantaged, but this is in no way related to a particular income or subsistence level. It would not be significant that people had more or less than a certain poverty line; all that would matter would be their rank order. Even though the concept of poverty does not appear in his wide literary production, Rawls' theory of justice offers a point of view that is attractive for the researcher who approaches a distributive justice question. We propose an interpretation of Justice as Fairness to show that:

(i) it can be fruitfully applied to frame and unambiguously inform an empirical analysis on multidimensional poverty for liberal constitutional democracies; and

(ii) it can be used to guide the researcher in making interpersonal comparisons on the basis of the distribution of diverse social primary goods among citizens.

3.1. Informing multidimensional poverty assessments in constitutional democracies

Our first claim is that, through the first principle, Justice as Fairness allows determining whether a social system is just and identifies liberal constitutional democracies as the ideal field of application for an ethically sound investigation on multidimensional poverty.

As abovementioned, according to Rawls a society is just when it secures basic liberties and rights for all citizens. Such a society is also regulated by a just Constitution (Rawls, 1999a), which is the expression of a stable consensus among the citizens that is reached through a constructivist process. Justice as Fairness is built upon the idea that principles of justice that go to everyone's advantage are to be worked out from a viewpoint of an initial situation of equality, where each person is fairly represented. Ideally, the equal representation of the original position is transferred to the constitutional process, and the Constitution can be regarded to as the social contract of primary importance in a given democratic regime. As already discussed in Section 2, in a pluralist society citizens can reasonably disagree about what the good life is or they may be profoundly committed to different religious, philosophical or moral doctrines. However, they still have reason to hold a constructivist position in order to find an overlapping consensus on one specific political conception that everyone abides by and that is the expression of values and ideas latent in the public political culture. Following this line of reasoning, we might affirm that the Constitution is conceivable as the highest-order system of rules where the overlapping consensus manifest itself.

Constitutional norms define societal functionings and protect basic liberties, limiting at the same time the clash of different political beliefs and the expression of self- or group interests, with the overarching goal of fostering advancements in human life. It is in these norms, as well as in "the public traditions of their interpretation" (Rawls, 1993, p. 13-14), that social values and principles are embedded and find a stable political legitimateness from one generation to the next. In light of this, we argue that holding a Rawlsian perspective leads us to correctly address a multidimensional poverty investigation in democratic regimes. In fact, by assuming that societies whose fundamental values and shared ideas are reflected in their very

institutional and political settings are those regulated by democratically conceived and longstanding Constitutions, we can study distributional issues from a multidimensional standpoint while limiting the possibility of incurring in arbitrary normative choices. As seen in Chapter I, multidimensional analyses unescapably require the researcher to take decisions on a plurality of aspects, from the number and the nature of dimensions or indicators to be included, to cut-off levels and functional forms. Constitutional democracies, we hold, offer an ideal field of application for multidimensional studies of distributive justice in that their political and institutional settings and traditions unambiguously convey the content of the social contract that, as free and equal persons, their citizens have agreed upon. This enables us to identify a proper informative basis – i.e., constitutional norms and their judicial interpretations – to look for the information needed for analyzing distributive justice from a multidimensional standpoint. Consistently with this finding, we will narrow the scope of our research to high-income countries with liberal democratic regimes.

3.2. A metric of justice: the social primary goods

Our second claim originates from the analysis of the last part of Rawls' second principle of justice, i.e., the difference principle, which allows determining whether a social system is fair, that is, whether it guarantees an equal distribution of social primary goods among the citizens. The difference principle introduces the possibility of making interpersonal comparisons in the Rawlsian framework: evaluating people's relative position in terms of distributive justice is thus conceivable, and it is made on the basis of people's command over diverse social primary goods – i.e., "[a]ll social values – liberty and opportunity, income and wealth, and the social bases of self-respect – (that) are to be distributed equally unless an unequal distribution of any, or all, of these values is to everyone's advantage." (Rawls, 1999a, p. 54)

Social primary goods are a plausible answer to the problem of finding a practical public basis for interpersonal comparisons, especially in pluralistic societies where citizens have conflicting comprehensive doctrines. We maintain so for two main reasons. The first one lies in their capacity of supporting advancements in human life no matter what idea people have of the good. Following Rawls' arguments (1993), whenever a problem of social justice arises, a well-ordered society will be able to fix it by resting on a public understanding about (i) the kind of claims that citizens can make to their political institutions and (ii) how such claims are to be supported. Though it is reasonable to expect that, against different conceptions of the good, individuals would tend to make different kinds of claims, whenever society is organized around a political conception that is independent of any particular comprehensive doctrine – and hence is the focus of an overlapping consensus – primary goods can offer an unanimous metric for justice evaluation. In fact, basic liberties, rights and opportunities, along with all-purpose means, like wealth and income, are goods that are meant to indiscriminately satisfy citizens' needs, and claims to these goods are appropriate claims for everybody's life plans.

The second reason is that Rawlsian social primary goods are a broad set of goods different in nature; hence, they satisfy the need for a broadening of the evaluation space in distributive analyses. Moreover, Rawls admits that the basic list of multiple 'goods' abovementioned could be extended, if proved

necessary, to include other goods, as for instance leisure time or mental states like freedom from physical pain (Ralws, 1993).[26] Indeed, Rawls' idea of necessary primary goods has been somehow distorted in public debates, where primary goods are often thought of as mere material requirements instead of a set of multiple-natured resources, understood as broadly as they must be. The misunderstanding has been even exacerbated by the existing conceptual link between Rawls' theory and the Basic Needs Approach (cf. Chapter I, Section 1.2) that, as also reported by Stewart (1985), has itself suffered from a general misinterpretation due to an overemphasis on commodities. As a matter of fact, Rawls' willingness to widen the metric of justice to include other kinds of goods, like mental states or spare time, weakens the accusation of fetishism ascribed to Justice as Fairness and makes it a good starting point to evaluate distributive justice through a multidimensional lens.

3.3. The Constitutional Approach to dimensions selection

Once that the field of application – i.e., constitutional democracies – and the metric of justice – i.e., social primary goods – have been defined, Rawls' constructivist method can be exploited also to determine how to make normative choices (dimensions, indicators, weights and cut-offs) in support of an ethically sound investigation on multidimensional poverty in democratic regimes. In order to do this, we have followed Burchi et al.'s (2014) suggestion for a Constitutional Approach to well-being dimensions selection to derive a methodology that can be easily applied to every liberal constitutional democracy.

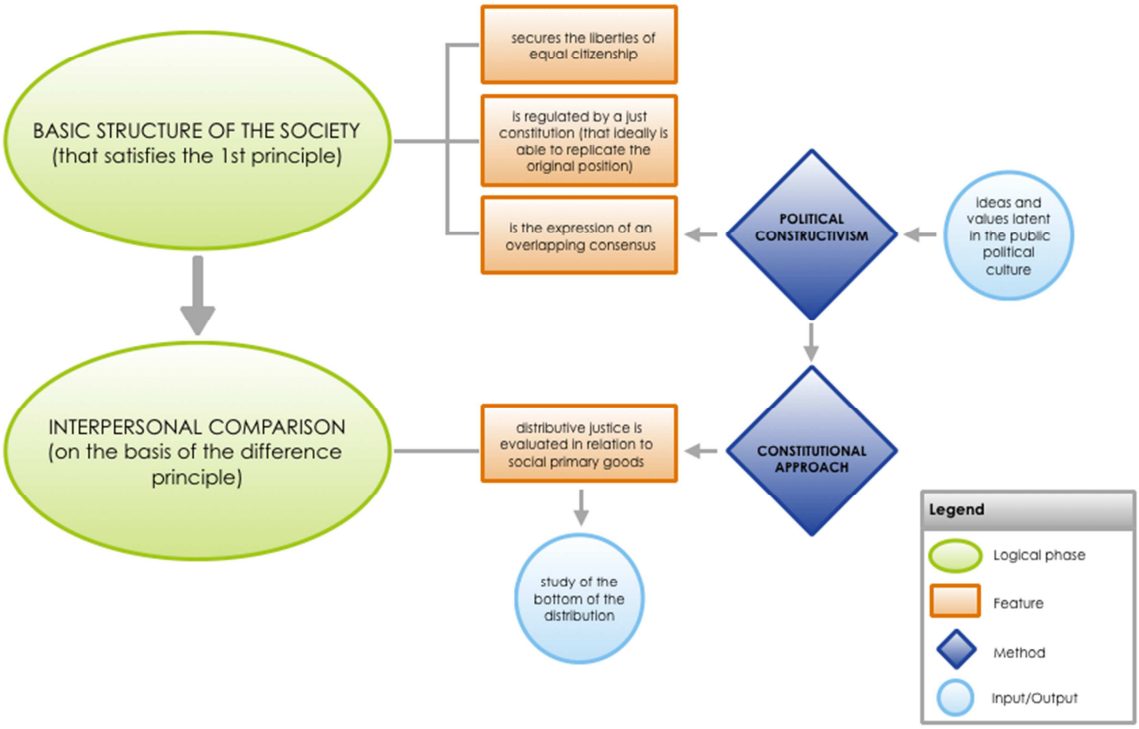
The method consists in deriving information on people's values through a 'constructive interpretation' (James, 2005) of one country's constitutional norms. In democratic regimes, the Constitution can be considered as the public document that, above all others, historically represents a common consent on a Nation's values. Elaborating on such document, it is possible to extrapolate information on those social primary goods that serve as a reliable metric for multidimensional analyses of distributional issues in pluralistic societies. Burchi et al. (2014) follow precisely this logical path, although they do so by combining Sen's (1985, 1999) Capability Approach and Rawls' constructivist method with the hope to derive a political justification for the selection of relevant capabilities. Though different in scope, their contribution to a constructive interpretation of the Constitution is of particular interest for us, as it aims at identifying ethically sound dimensions of human flourishing that are intrinsically valued and publicly justified (Burchi et al., 2014). We will discuss further Burchi et al.'s approach in Chapter IV, when we will apply our conceptual framework for analysing multidimensional poverty in Italy.

Our conceptual framework for analysing multidimensional poverty in constitutional democracies is depicted in Figure II.1: it shows the logical phases (green ovals) that guide the definition of the field of application for an ethically sound multidimensional poverty analysis, along with the features that characterize each phase (orange rectangles). Blue diamonds identify the methods used in support of the conceptualization, while pale blue circles identify inputs and outputs of the concept map. Assistance to the

[26] With regard to the expansion of the list of basic primary goods, Rawls recommends to use caution by conducting "a careful study of the circumstances" (Rawls, 1993, p. 182). The idea of including leisure time in an index of primary goods is taken from Musgrave (1974), while mental states are considered in Scanlon (1991).

reading of the concept map is given right below Figure II.1.

Figure II.1. A Rawlsian conceptual framework for multidimensional poverty analysis in constitutional democracies



Source: author. Adapted from Rawls (1971; 1993; 1999a); James (2005); and Burchi et al. (2014)

A RAWLSIAN CONCEPTUAL FRAMEWORK FOR MULTIDIMENSIONAL POVERTY ANALYSIS IN CONSTITUTIONAL DEMOCRACIES.

Whenever a society fulfills the first principle of justice (i.e., "*Each person has the same indefensible claim to a fully-adequate scheme of equal basic liberties, which scheme is compatible with the same scheme of liberties for all.*"), it is a society that: (i) secures the liberties of equal citizenship; (ii) is regulated by a just Constitution that embed a fund of implicitly shared ideas and principles; and (iii) whose political conception of justice is the expression of an overlapping consensus, which in turn is fed by ideas and values latent in the public political culture through a process of political constructivism. A basic structure of the society that satisfies such conditions allows moving to the second principle, which guides interpersonal comparisons on the basis of the maximin reasoning (i.e., "*Social and economic inequalities are to be to the greatest benefit of the least-advantaged members of society.*"), or the difference principle. The metric for interpersonal comparisons is that of social primary goods, whose distribution can be empirically investigated by applying a Constitutional Approach to dimensions and indicators selection. The Constitutional Approach draws again on the method of political constructivism, which legitimates constitutional norms and their judicial interpretations as unambiguous sources of information on people's living conditions. The study of distributional arrangements is theoretically possible for all society; if we want to focus on the conditions

of the least-advantaged, i.e., the poor, we will conduct our investigation on the bottom of the distribution.

Concluding remarks

In this Chapter, we have studied the possibility of using conceptual instruments offered by contemporary theories of social justice to address a multidimensional poverty question for high-income countries. Among others, John Rawls' liberal egalitarianism proves to be particularly suitable to serve this purpose. Drawing on the social contract tradition, his theory, also known as Justice as Fairness, assumes that free and equal persons can agree upon terms of cooperation that everyone could be mutually advantaged to abide by. In Rawls' view, even if moved by conflicting conceptions of the good, citizens will have reason to establish social rules that guarantee equal basic liberties for all, equality of opportunities and a fair distribution of certain social primary goods that every rational person is presumed to want. These goods include liberties, rights, opportunities, all-purpose means, like income and wealth, and the social bases of self-respect, and represent the informative basis to make interpersonal comparisons. Rawls holds as well that, despite the coexistence of a multiplicity of comprehensive doctrines, in pluralistic societies citizens can agree on societal arrangements that are stable and politically legitimate. Starting from ideas and values latent in the public political culture, they create, through a constructivist process, an overlapping consensus around a fund of public shared ideas, which manifest themselves in political institutions and their writings. Constitutions, which are social contracts of primary importance, can be interpreted as a formalization of such an overlapping consensus. They are also generally stable enough to represent a reliable informative source to be exploited for the identification of societal systems of values that citizenry continues to agree upon in the course of time. Constitutional democracies can thus be considered as an ideal field of application for studies on distributive justice from a multidimensional standpoint and primary goods can serve as a metric for justice-enhancing evaluations. It is on such theoretical grounds that we have identified a Constitutional Approach to inform empirical multidimensional poverty analyses. By looking at Constitutions and their judicial interpretations, a two-fold objective can be reached: (i) embedding public reasoning in normative choices that inform the assessment, making it ethically sound and publicly justified; and (ii) minimizing the level of arbitrariness in making those choices.

Chapter IV will illustrate how the Constitutional Approach can be exploited in practice to guide a set of normative choices such as the selection of relevant dimensions and deprivation indicators. In order to exemplify the validity of the approach, the analysis of the Italian Constitution will be proposed as a case study. With the information originated by the scrutiny of the Italian Constitution, we will finally endeavour to compute a multidimensional poverty measure for Italy.

Chapter III.
Poverty measurement in high-income countries

Introduction

Multidimensional poverty analyses have been profusely developed in high-income countries in the past half-century. Even though the tradition started in the UK, fuelled by Townsend's (1979) and Mack and Lansley's (1985) seminal works on Britain, European Union's institutions have played a main role in validating counting methods and creating a diffused 'social indicators' culture.

At country and regional level the attempts to assess poverty from a multiple deprivations perspective are nowadays copious, but it is still unclear whether life domains commonly included in multivariate analyses of living standards actually reflect any form of public consensus or social contract that could legitimate final policy advices. Alkire (2008) lists five methods through which multidimensional analyses on poverty typically ground their life domains selection on: (i) using existing data; (ii) making assumptions on the basis of a normative approach; (iii) drawing on existing lists generated by consensus; (iv) using a deliberative participatory process; and (v) proposing dimensions on the basis of empirical studies on people's values. The first two methods, i.e., relying on available data or conventions and making normative assumptions, are the ones much in use and, as stressed by Alkire, might be sufficient for a limited set of exercises, e.g., testing new techniques, developing descriptive historical research through which observing the data a particular institution chose to collect or encouraging reflection on particular assumptions (Alkire, 2008). However, especially in the case of the development of countrywide multidimensional poverty measures, a non-transparent use of these methods entails the concrete risk of letting personal value judgments and beliefs interfere with research objectives, undermining the very legitimateness of the results of these studies. In line with what argued in Chapter II, our claim is that, to be publicly legitimated, practical recommendations should rather be based on analyses built on some form of arguably genuine consensus-building processes.

In this Chapter, we will examine empirical studies on multidimensional poverty measurement in Europe, both at national and European Union level. Then, we will elaborate on Italy to highlight strengths and weaknesses of current methods for measuring poverty at country level. In reviewing such literature, we will try to shed light on normative choices underlying existing assessments and to evaluate to what extent they conform to the idea of the overlapping consensus as the expression of a social contract we have discussed about in Chapter II.

1. Multidimensional poverty measurement in high-income countries

1.1. The European Union and multidimensional poverty

In the EU, the first official definition of poverty was given in 1975 in a Decision of the Council of the European Communities aiming at establishing an anti-poverty programme for the Union. Persons beset by poverty were described as those "individuals or families whose resources are so small as to exclude them from the minimum acceptable way of life of the member state in which they live" (Council of the European Communities, 1975, p. 34), where resources are understood as "goods, cash income, plus services from public and private sources." Daly (2010) recalls that, at first, the decision mainly routed to the establishment of term-limited projects that would undertake research, information exchange and evaluation. The word 'programme' was also in some way misleading, as it basically consisted of a small number of local projects in Member States that were focused on experimental actions aiming at building an informational base about social and economic problems in Europe. Ever since, three further plans were launched by the European Commission to tackle poverty at the EU level, but none of them really succeeded in making the fight against poverty a concrete matter in Europe.[27] Moreover, since then, another concept has increasingly accompanied that of poverty, i.e., social exclusion, of which the EU has been one of the main advocates since it made its first appearance in the French social policy discourse (Lenoir, 1974) and of which the European Commission has recently given the following definition: "A process whereby certain individuals are pushed to the edge of society and are prevented from participating fully by virtue of their poverty, or lack of basic competencies and lifelong learning opportunities, or as a result of discrimination. This distances them from job, income and education opportunities as well as from social and community networks and activities. They have little access to power and decision-making bodies and thus often feeling powerless and unable to take control over the decisions that affect their day to day lives." (European Commission, 2004, p. 10) While to some authors the wide scope and fuzziness of this definition of social exclusion seem to undermine its analytical usefulness (Atkinson et al., 2002; Daly, 2010; Decancq et al., 2013), the same characteristics make it able to encompass concerns of different nature and to fit into a plurality of political agendas. European institutions' intention to go beyond the mere availability of economic resources that is intrinsic in the very notion of social exclusion introduces the concern for multidimensionality in poverty assessment at the EU level. Though the 1975 definition of the Council originally emphasized the role of material resources in combating poverty, it is explicitly stated in official communications – such as the 1992 European Commission's submission on *Intensifying the Fight Against Social Exclusion* – that the concept of social exclusion captures more adequately the "multi-dimensional nature of the mechanisms whereby individuals and groups are excluded from taking part in the social exchanges, from the component practices and rights of social integration." (European Commission, 1992, p. 8)

[27] Two programmes ran in the 1980s and early 1990s, while a fourth one, launched in the mid-1990s, was shipwrecked by some national Governments (mainly by Germany and the UK), which opposed a role for the EU in the area of anti-poverty actions other than research coordination (Daly, 2010).

The European joint strategy for poverty eradication was finally given a boost in 2000 at the Lisbon European Council. In that occasion, Member States established a Social Inclusion Process to set credible poverty reduction targets to be reached by 2010, along with a new method of governance: the Open Method of Coordination (cf. Chapter I, Section 1.1). In order to reach such objectives, the definition of suitable poverty indicators was essential. During the Leaken European Council of 2001, 18 indicators were then adopted to monitor progress in terms of social protection and social inclusion and to ensure comparability and cohesion among Member States. As stressed by Liberati (2009), the agreement on a set of social indicators confirmed the intention of the EU to pursue a multidimensional perspective in poverty tackling according to which the shortage of financial resources was only one of the possible forms of deprivation experienced by the poor. The set of the Leaken indicators was later extended to cover various aspects of human life, turning into a list of measures that account for different well-being domains, from economic poverty and employment conditions to literacy rates, life expectancy and other health-related measures (Decancq et al., 2013). More recently, the European Council has eventually defined a specific target for poverty reduction in the so-called Europe 2020 strategy: by 2020 "20 million less people should be at risk of poverty and exclusion according to three indicators (at-risk-of-poverty rate; material deprivation; jobless household), leaving Member States free to set their national targets on the basis of the most appropriate indicators, taking into account their national circumstances and priorities."[28] (European Council, 2010, p. 12) Taken together, the three indicators therein mentioned constitute the headline composite indicator for monitoring poverty and social exclusion in Europe, namely the At-risk-of-poverty-and-social-exclusion rate (AROPE) computed yearly by the Statistical Office of the European Union (Eurostat). The adoption of such a three-dimensional indicator has echoed the EU's ambition to tackle poverty through an integrated strategy, which complements the analysis of monetary poverty with other dimensions and that, as a policy tool, is thought as a measure able to reflect the diversity of situations and priorities across Member States of the enlarged EU (European Commission, 2012).

1.2. The at-risk-of poverty-and-social-exclusion rate (AROPE)

The AROPE is defined as the share of total population who is experiencing a deprivation in at least one of the abovementioned three sub-indicators (outlined in Table III.1). Specifically, people are considered as: (i) at risk of poverty[29], when their income is below the 60% of the median income of their country; (ii) severely materially deprived, if they suffer from an enforced inability to face unexpected expenses or to afford some items considered by most people as desirable or even necessary to lead a

[28] Maître et al. (2013) stress that the EU-2020 target allows for accommodating rather different perspectives and traditions in Europe, like the one more diffused in Scandinavian countries – for whom the concept of poverty has more limited resonance and who tend to privilege concerns for exclusion from the labor market – and the emphasis placed by countries like Italy and Ireland on vulnerability and material conditions. The authors affirm that "[the target] also allows considerable latitude for individual Member States in interpreting its requirements. They can opt to focus on any one of the three indicators, the union of any pair of indicators, the union of all three elements, one of the three intersections involving an overlap of two indicators or the intersection of all three indicators and indeed can propose alternative indicators by demonstrating the relationship between these indicators and the EU target. This provides considerable reassurance against the threat of downward imposition of national targets." (Maître et al., 2013, p. 5)

[29] The at-risk-of-poverty rate is commonly referred to as 'AROP', not to be confused with the composite index AROPE.

decent life; and (iii) with very low work intensity, if the total number of months that all working age members of their household have worked during the income reference year does not exceed 20% of the total number of months the same household members theoretically could have worked in the same period.

Table III.1. Composition of the At-risk-of-poverty-or-social-exclusion rate (AROPE)

Sub-indicator	Description	Type of sub-indicator
1. AT RISK OF POVERTY AFTER SOCIAL TRANSFERS (MONETARY POVERTY)	People with an equivalised disposable income below the risk-of-poverty threshold (60% of the national median income after monetary social transfers)[30]	Relative poverty indicator
2. SEVERE MATERIAL DEPRIVATION	People living in conditions greatly constrained by a lack of resources and who cannot afford at least 4 of the following items: ▪ a week-long holiday away from home; ▪ a meal involving meat, fish or other protein-rich nutrition every second day; ▪ keeping the home adequately warm; ▪ a washing machine ▪ a colour TV ▪ a telephone ▪ a car ▪ payments arrears (mortgage or rent, utility bills, hire purchase instalments or other loan payments) ▪ unexpected expenses	Absolute poverty indicator
3. VERY LOW WORK INTENSITY	People aged 0 to 59 living in households where the adults worked less than 20% of their work potential during the past year	Absolute poverty indicator

Source: adapted from Eurostat (2015)

Let us now analyse the AROPE and its main features. First of all, it is a headcount, as it measures the proportion of people suffering from poor living conditions across the EU. Secondly, the aggregation of its three sub-indicators is based on a union method of identification of the poor in that a person is considered as poor or socially excluded when she is so defined according to at least one of the three chosen criteria.[31] Moreover, according to the AROPE poverty is assessed both with direct reference to the general level of prosperity of the society where the person lives, as in the case of the at-risk-of-poverty rate, and in absolute terms, as in the case of the severe material deprivation and the very low work intensity indicators. Hence, the AROPE conveys both a relative and an absolute understanding of poverty at once. Since the Decision of the Council of the European Communities of 1975, in the European context the concept of poverty has always been interpreted in a relative fashion. The same perspective is used as well in one most influent poverty definition in European poverty research, i.e., Townsend's (1979),

[30] The net disposable income is equal to the sum of the income of all household members net of taxes. It includes: cash or near-cash employee income, company cars, cash profits or losses from self-employment (including royalties), social benefits, income from rental of a property or land, regular inter-household cash transfers received, interests, dividends, profit from capital investments in unincorporated business; minus regular taxes on wealth, regular inter-household cash transfer paid, and tax on income and social insurance contributions. The net disposable income is then equivalised using the modified OECD scale, which attaches a weight of 1 to the first adult, a weight of 0.5 to all household members aged 14 and over, and a weight of 0.5 to household members under the age of 14. The equivalised household income is obtained by dividing the total household income by the sum of the individual equivalence weights. Social transfers are benefits provided by national or local governments, including benefits related to education, housing, pensions or unemployment (Eurostat, 2015).

[31] In order to avoid double counting, for the computation of the AROPE people are counted only once even if they are present in more than one sub-indicator. This does not allow for accounting for the occurrence of joint multiple deprivations. Source: http://ec.europa.eu/eurostat/cache/Euro_2020/E2020_EN.html.

who defined the poor as those persons lacking resources to having the living conditions that are "customary, or at least widely encouraged, or approved, in the societies to which they belong." (Townsend, 1979, p. 31) Relative poverty occurs when someone's well-being is much lower than the average level of well-being in the country where the person lives. The position of the individual thus depends on the standard of living enjoyed by most of the country and is tightly linked to the concept of inequality (Eurostat, 2015). Also the concept of social exclusion expresses to some extent the relativity of people's conditions by conveying an 'horizontal' image of disadvantage (from the centre to the periphery of participation), as opposed to the more traditional 'vertical' view commonly used to study the distribution of wealth among the population. Indeed, the at-risk-of-poverty rate remains the agreed main headline indicator used to quantify poverty at the EU level (European Commission, 2012); nonetheless, it has been decided to couple it with two 'absolute' poverty indicators for two main reasons. Firstly, to ensure comparability across countries, as the relative monetary poverty line is set at the national level and may considerably vary from a society to another. With this regard, Goedemé and Rottiers (2011) stress that it might even be the case that many of the poor in the richest Member States have more purchasing power than the majority of population in the least wealthy countries. Similar arguments have been supported also by other authors (Guio, 2005a; 2005b; Beblavy and Mizsei, 2006; and Juhász, 2006), whose empirical evidences also show that poverty figures generated in such a way are not fully comparable cross-nationally and can lead to an underestimation of poverty in the less wealthy Member States. Additional explanations came from a related debate concerning the so-called 'Europeanisation' of reference groups (see, among others, Dickes et al., 2010; Förster et al., 2004; Delhey and Kohler, 2006; Fahey, 2007), according to which European-wide poverty measures should be established in order to meaningfully compare living standards across Europe.[32] Secondly, the introduction of the absolute poverty indicators was intended to make the AROPE more robust to shocks or big changes in living standards, to which relative poverty lines are typically more sensitive than absolute ones. In fact, a poverty line expressed as a percentage of the median varies when the income distribution changes; it is therefore floating by definition (Decancq et al., 2013).[33] Conversely, an absolute poverty line is anchored to some defined level of physiological minimum for human survival, which arguably does not vary with the income distribution.[34]

In the logic of the European Commission, the severe material deprivation and the very low work intensity indicators are understood as absolute poverty indicators in that they set EU-wide common thresholds. The list of material endowments as well as the standards of inclusiveness in the job market, from this

[32] Dickes et al. (2010), for instance, showed that the set of goods and services deemed necessary by European households to have an acceptable living standard was are largely similar across EU Member States. Goedemé and Rottiers (2011) also recall that a number of authors (e.g., Eurostat, 1990; de Vos and Zaidi, 1998; Berthoud, 2004; Boix, 2004; Kangas and Ritakallio, 2007) have endeavored to compute a European-wide relative poverty line.

[33] De Mesnard (2007) demonstrated that relative poverty lines anchored to median incomes (which Ravallion calls 'strongly relative' poverty lines, Ravallion, 2010) have perverse properties when the Lorenz curve shifts: reducing poverty may become paradoxically less costly in proportion to the total income as poverty increases, because a strongly relative poverty line would approximate to zero if the entire population becomes extremely poor. With this regard, Atkinson and Bourguignon (2001) proposed the use of a 'weakly poverty' line approach, holding that an absolute poverty line can be used until the subsistence level is reached and then a relative one can substitute the former. This hybrid approach has been later generalized in Ravallion and Chen (2011).

[34] As a matter of fact, absolute poverty lines might float too, for instance in the case where the subsistence level is approximated by a bundle of goods whose prices change substantially (Decancq et al., 2013).

standpoint, are fixed for all and stable over time, allowing to make comparisons among countries. However, according to some authors (see, for instance, Orshansky, 1965; Veit-Wilson, 1986; Dagum, 1989; Goedemé and Rottiers, 2011) the simple fact that a poverty definition refers to subsistence levels or to a fixed list of items does not imply that related thresholds are really 'absolute' or unique in time and space. Rather, the absolute conception of poverty relates to the fact that the poverty line does not change by the fact that others in society lack the same minimum requirement or not (Sen, 1983). Indeed, in providing background information on the current severe material deprivation indicator, Guio herself (2009) explains that to be chosen as a 'lifestyle deprivation' item, an item should ideally meet a number of criteria among which is the ability to reflect "the lack of an ordinary living pattern common to majority or large part of the population in the EU and most of its Member States" as well as the responsiveness to changes in the standard of living of people (Guio, 2009, pp. 3-4). This puts the AROPE absolute poverty components under a different light and makes us wonder whether the European Commission's aim to create a framework for evaluating poverty in an enlarged EU is correctly interpreted by the AROPE or not. Furthermore, information about the enforced lack of durables is collected in the European Statistics on Income and Living Conditions (abbreviated in EU-SILC) through a number of questions asking whether the respondent has the capacity to *afford* the basic items in question.[35] Hence, both the monetary poverty and the severe material deprivation indicators account basically for the same kind of endowment, i.e., income, undermining to some extent the purpose of broadening the informational base in support of poverty assessment in the European Union.

1.3. At country level

The tradition of country-level multidimensional poverty studies in Europe has started in the Anglo-Saxon world, largely inspired by Peter Townsend's seminal work Poverty in the UK of 1979. The author is considered a pioneer in the field of counting approaches to poverty measurement (cf. Chapter I, Section 1): he analysed a survey of 2000 households conducted in Britain in the late Sixties in order to assess the magnitude of relative deprivation in different life domains (diet, clothing, fuel and light, home amenities, housing conditions and facilities, the immediate environment of the home, conditions at work, family support, recreation, education, health and social relations), which he subsequently cut down to five – dietary, household, familial, recreational and social deprivation – and studied in correlation with income shortage. Interestingly enough, in order to identify the poor Townsend set the poverty threshold at an intermediate level (five indicators out of twelve) because he was convinced that a union method of identification of the poor would have been misleading in the attempt of ascertaining the situations of actual deprivation. Particularly, he linked individual preferences and differences in lifestyles to possible voluntary lack of certain items otherwise deemed necessary lo lead a decent life, reason why he decided to cautiously set a higher cut-off within the life domains set. Households who were eventually identified as poor were the ones whose low income was positively correlated with conditions of deprivation of

[35] The survey does ascertain whether the lack of the item is voluntary, though.

different nature. Hence, as also stressed by Alkire et al. (2015a), the counting method was in this case used to validate monetary poverty measurement.

Townsend's work inspired a great deal of literature on poverty, especially in North Europe. Gordon et al. (2000a) have listed the studies that make use of social indicators to assess relative deprivation grounded on Townsend's approach. They started from Mack and Lansley's (1985) *Poor Britain*, also regarded as a landmark in studies on multidimensional poverty in Europe because of an innovative method of construction of the list of items using a survey of the public's perceptions of minimum needs – the so-called 'Breadline Britain'. Mack and Lansley's approach is also often called 'consensual or perceived deprivation approach to measuring poverty' (Alkire et al., 2015a) precisely because it explicitly takes into consideration people's opinion in supporting normative choices. In the UK, Townsend and Gordon (1989), Gordon (1995) and Gordon and Pantazis (1997), as well as local authorities from UK cities like London, Manchester, Liverpool and Kent, replicated Mack and Lansley's 'consensual method' (Gordon et al., 2000a). Specific questions focused on disadvantaged categories were introduced in surveys conducted by the British Office of Population, Censuses and Surveys (OPCS) using the structure of the Breadline Britain too, serving as the base for a number of studies on disabled adults or families with disabled children (Martin and White, 1988; Smyth and Robus, 1989; Zarb and Maher, 1997; Gordon et al., 2000b).

The Breadline Britain approach influenced research on multidimensional poverty outside the UK as well, originating a body of empirical literature that relevantly contributed to the development of methods for setting poverty cut-offs and to the study of correlation between deprivations and income poverty. Such investigations have been primarily conducted in Denmark (Mack and Lansley, 1985), Sweden (Halleröd, 1994; 1995a; 1995b; 1998), Ireland (Callan et al., 1993; Nolan and Whelan, 1996), Belgium (Van de Bosch, 1998), Holland (Muffels et al., 1990; Muffels and Vriens, 1991; Muffels et al., 1992), Finland (Kangas and Ritakillio, 1998) and Germany (Andreß and Lipsmeir, 1995). The importance of the Breadline Britain experience appears even clearer if we consider that it has largely inspired initially the structure of the European Community Household Panel Survey (ECHP), used by Eurostat to measure standard of living in Europe (Ramprakash, 1994; Vogel, 1997; Eurostat, 1999), and later the SILC, which since its launch in 2004 has become the EU reference for micro-data in income and living conditions (Decancq et al., 2013) and that provides Eurostat with the information needed to compute the AROPE. Also national surveys, like the Swedish Level of Living Survey, the German Socio-Economic Panel (G-SOEP), the Dutch Socio-Economic Panel Survey and the household survey conducted in Ireland by the Economic and Social Research Institute ESRI in 1987 are rooted in Mack and Lansley's format (Alkire et al., 2015a). Precisely by making use of the SOEP, Rippin (2012b; 2015) has recently conducted an in-depth analysis on multidimensional poverty for Germany from a Capability Approach perspective, elaborating on regional disparities and poverty trends between 2002 and 2010. Rippin's normative choices have been made adapting Martha Nussbaum's list of central human capabilities (Nussbaum, 2003) to the available data.[36]

[36] Nussbaum's original list is as follows: 1) life; 2) bodily health; 3) bodily integrity; 4) senses, imagination and thought; 5) emotions; 6) practical reason; 7) affiliation; 8) other species; 9) play; 10) control over one's environment (Nussbaum, 2003, pp. 41-42).

Rippin thus identifies the following six dimensions: health, education, employment, housing, mobility and income, whose choice does not stem from an explicit investigation on people's values or ideas on social justice, but at least reflects a position grounded on a sound theoretical base.

The Breadline Britain approach has had the merit of integrating formal poverty analysis with people's values and has started a tradition in the field of research on social indicators that significantly underpins today's practices and conventions. However, in the light of the recent advancements in the field of the conceptualization of well-being (see, above all, Stiglitz, Sen and Fitoussi's Report on the measurement of economic performance and social progress, 2009; and OECD's Better Life Initiative, 2011) and the consensus they have generated among governments and civil societies, current national- or EU-wide surveys on living conditions have now the opportunity of substantially renovating their suites of indicators, so as to take into account a multiplicity of life spheres that go beyond the simple financial capacity to acquire basic items.

1.4. Other studies on poverty in Europe

Researchers outside the umbrella of EU institutions have proposed frameworks to assess EU-wide multidimensional poverty as well. Whelan et al. (2001), Layte et al. (2001) and Whelan et al., (2002) have analysed the relationship between 'persistent' income poverty and material deprivation for eleven countries using three waves of the ECHP. For their investigations, they have made use of twenty-four indicators then collapsed into five dimensions through confirmatory Factor Analyses to account for enforced lacks of items deemed necessary to maintain a minimum living standard.[37] The final list of dimensions is in these cases the result of both available data and authors' normative assumptions about what leading a decent life means: (i) basic life-style deprivation; (ii) secondary life-style deprivation; (iii) housing facilities; (iv) housing deterioration; (v) environmental problems. The authors justify their choice of items stating that they are interested in indicators "where one might reasonably expect a priori that absence will most often be attributable to limited resources rather than other constraints such as ill health, accidents of location, or differences in taste." (Whelan et al., 2001, p. 359) They also assume that deprivation conditions are generally understood as the inability to obtain goods, facilities and opportunities to participate in a way commonly identified as appropriate in the community of reference (Whelan et al., 2002). However, it is not clear if and to what extent such indicators are representative of what is considered appropriate for the European societies scrutinized. Even when frequency-based weights are used to account for possible differences in lifestyles in the studied countries[38], like in Layte et al. (2001) and Whelan et al. (2002), the selection of items – and consequently of dimensions – appears debatable from an ethical point of view, as no form of public scrutiny on authors' value judgments is used

[37] Whelan, Layte and Maître (2004) later refined their analysis on the mismatch between income poverty and deprivation in Europe from a dynamic comparative analysis standpoint by identifying 13 "widely desired items" (Whelan et al., 2004) out of the original 24, which were considered to cover a range of what the authors termed Current Life-Style Deprivations. In this case, indicators were not clustered in dimensions but simply added to each other so as to construct a final deprivation index.

[38] Whelan et al. (2002) use a weighted version of Whelan et al.'s (2001) measure in which every item is weighted by the proportion of households possessing that item in each country. For instance, deprivation in an item such a video recorder will be considered as a more substantial deprivation in Denmark as compared to Greece.

throughout the process. Similarly, Maître et al. (2013) propose a critical evaluation of the EU 2020 target along with a new approach to identifying the poor at EU-level, namely the 'consistent poverty' approach, showing that focusing on the overlap of the income poor and the materially deprived people allows distinguishing a sub-set within the European population that merits priority in anti-poverty interventions. However, the basic deprivation index they propose in substitution of the official severe material deprivation indicator is again essentially data-driven, as it is constructed starting from the special 2009 module on material deprivation provided by the EU-SILC, which is in turn largely based on Townsend's (1979) resource-based definition of relative poverty and Mack and Lansley's (1985) format.

Whelan et al. (2014), on the other hand, consider what can be gained by applying a well-defined multidimensional methodology to poverty indices construction, like the one proposed by Alkire and Foster (2007, 2011a), with the aim of assessing poverty in European countries using the 2009 round of the SILC. They rely on Whelan and Maître's (2012) study for selecting valuable life domains, in which the authors run an exploratory Factor Analysis to identify six dimensions, then cutting them down to four because of problems of interpretability. In this case too, the choice of dimensions is extrapolated by the data and does not reveal what kind of social justice according to societies from the twenty-eight countries studies should be pursued. Other studies on multidimensional poverty at European level are Decancq et al.'s (2013), who develop a relative deprivation indicator starting from the AROPE sub-indicators, and Alkire et al.'s (2014), who show the kinds of policy that could be implemented using the AF method with the EU-SILC data from 2006 to 2012. The authors choose a set of 12 indicators for illustrative purposes, and three distinct multidimensional poverty measures are derived to compare results across time and space.

2. Italy and poverty measurement

2.1. Official poverty measures

In Italy, statistics on poverty and living standards are released every year by the National Statistics Institute (Istat) based on a survey conducted on a sample of households, namely the Household Budget Survey (HBS). The two official poverty measures (whose summary is provided in Table III.2) are the relative poverty and the absolute poverty indices. With regard to the former, according to Istat a household composed of two members is poor when its average monthly expenditure for consumption is less or equal to a relative poverty threshold corresponding to the average per capita monthly expenditure for consumption.[39] Specifically, a household of two components is considered poor when its average monthly expenditure for consumption is less or equal to that of a household composed by only one person. To evaluate expenditure levels of households of different sizes, the poverty line is adjusted through the use of the Carbonaro equivalence scale[40], under the noteworthy assumptions that economic

[39] The methodology described here is known as the International Standard of Poverty Line (ISPL).

[40] Households' needs, like space, electricity and other shared goods, increase – typically less than proportionally – as the household size increases because of the presence of economies of scale. Moreover, economies of scale are likely to vary across the

resources are equally distributed within the family and that every household member has the same standard of living. From 2009 on, an absolute poverty index is also computed and reported every year by Istat.[41] It reflects households' inability to afford a basket of goods and services deemed necessary to meet a minimum required level of living and is adjusted according to several socio-economic factors: the geographic area (North, South or Centre), the household size and the age composition of its members, and the degree of urbanisation (densely populated area, intermediate area or thinly populated area).

Table III.2. Description of official poverty measures for Italy

	Relative poverty indicator	Absolute poverty indicator
UNIT OF ANALYSIS	Household with 2 members	Any household type
POVERTY LINE	Average monthly expenditure is less or equal to average monthly per capita expenditure	Overall monetary value at consumer prices of a basket of essential goods and services categorized in 3 domains: ▪ nutrition ▪ housing ▪ residual component (includes clothing, mobility, information, education, health-care)
CORRECTION FACTORS	Household size (Carbonaro scale)	▪ household size and age of members ▪ geographic area (North, Centre South) ▪ degree of urbanisation (densely populated, intermediate, thinly populated)

Source: adapted from Istat (2009)

Although both the relative and absolute poverty indicators are expressed in monetary terms (cf. Chapter I, Section 1.2), the absolute poverty indicator is theoretically grounded on the Basic Needs Approach (Liberati, 2009). Istat (2009) has classified the essential goods to be included in the basket of reference in three domains: (i) nutrition; (ii) housing; and (iii) a residual component, including clothing, mobility, education and health care-related needs. To establish which goods to include in the first domain, i.e., nutrition, minimum nutritional quantities have been fixed according to the energy intake standards computed by the Italian Society for Human Nutrition, differentiating the needs by gender and age. Concerning the second domain, basic housing needs have been defined assuming that non-poor households are those who live in a dwelling of appropriate size, which are adequately warm and properly equipped with basic durable goods. The third domain comprises all those needs that preserve households from falling into social exclusion conditions, like clothing, basic furniture, access to communication and information services, the capability to get a fair education and to maintain oneself in good health.[42] Though these goods are considered essential just like the ones belonging to the former two categories,

income distribution, time and place (Decancq et al., 2013). Equivalence scales assign each household type a value in proportion to its needs. The Carbonaro scale gives a weight of 0.60 to the one-person households, 1.00 to households with two members, then 1.33, 1.63, 1.90, 2.16 and 2.40 to households of respectively 3, 4, 5, 6 and 7+ members (Carbonaro, 1985). Source: http://www.oecd.org/eco/growth/OECD-Note-EquivalenceScales.pdf

[41] As a matter of fact, an absolute poverty indicator had been already established in 1996 but it got suppressed in 2003 because of methodological issues mainly linked to new legislation on the supply of goods and services and changes in consumers' lifestyles and habits (Istat, 2009).

[42] In the 1996 basket of essential goods, education and health care-related expenses were not included, as the State was supposed to be entirely in charge for them. The Steering Committee who developed the new methodology in 2009 decided to include them though, as part of them – like textbooks, school equipment or dental examinations – are in fact at households' charge (Istat, 2009).

their availability and the use that families make of them is tightly linked to lifestyles and preferences; as a consequence, it is difficult to fix a quantity that would be desirable for all. For this reason, in the residual component only types of good are listed, with the exception of expenditure for education and health care, which are computable and explicitly taken into account. Once that the basket of essential goods and services is constructed, its overall monetary value – that is, the absolute poverty line – is set by simply adding the different elements at their consumer prices. Households' conditions are then evaluated on the basis of the comparison between their disposable income and the poverty line.

While no official poverty indicators are produced in Italy beyond the space of expenditure capacity, multifaceted well-being indicators are currently enjoying a renewed attention at national level. The first attempt of broadening the informational base for official statistics on living conditions has been the development of the report *Noi Italia*, published on a yearly basis by Istat since 2008. *Noi Italia* describes how well the country is in roughly 100 indicators categorized in 19 dimensions, ranging from territorial statistics to public finance. Among these, the dimension 'household economic conditions' presents a dashboard of four indicators to assess Italian families living standards: (i) poverty incidence (relative and absolute); (ii) income distribution inequality; (iii) deprivation synthetic index; and (iv) level of satisfaction with the economic situation. Specifically, the deprivation synthetic index is the domestic version of the AROPE and is composed of all three sub-indicators recommended by the European Commission (2010), namely the at-risk-of-poverty rate, the severe material deprivation indicator and the very low work intensity indicator. Compared with figures published by Eurostat, the deprivation synthetic index sheds light on how many – and what kind of – households suffer from poverty or social exclusion conditions at national as well as regional level, with a focus on territorial disparities. Given its inclusion of information on work intensity, it is also the only one official indicator going beyond – although only partially – the income and expenditure space for defining poverty in Italy.

In the wake of the Better Life Index developed by OECD (2011), in 2011 Istat and the National Council of Economy and Labour (CNEL) have established a joint Steering Group on the Measurement of Progress in Italian Society, including representatives from firms, trade unions and civil societies, to develop and release an Italian list of well-being indicators called *Benessere Equo e Solidale*[43] (BES). The BES summarizes the state of the twelve most valued domains of well-being for the Italian population: health, education and training, work and life balance, economic well-being, social relationships, politics and institutions, security, subjective well-being, landscape and cultural heritage, environment, research and innovation and quality of services. The twelve domains globally include as many as 114 indicators unevenly distributed among dimensions, which combine outcome, output and input indicators and have been defined after an open participatory discussion with experts, civil society and citizens through the use of surveys and online consultations. For the first round of public consultation aimed at cross-examining the list of fifteen domains identified by the Steering Committee, a sample of 45,000 citizens aged 14 and above was asked to assign a score between 0 and 10 to each domain in order to create a ranking and to

[43] Equitable and Sustainable Well-being.

select the most valued. The survey brought to the identification of the twelve abovementioned domains, whose relevance and usefulness has been once more openly discussed with the citizenry through the Istat website. Given the ambitiousness of the initiative and the scope of the public scrutiny undertaken – the sample was stratified so as to be representative of the Italian population – that of BES can be regarded as a unique experience of its kind both at national and international level.

2.2. Studies on multidimensional poverty in Italy

Human well-being has indeed been thoroughly investigated in Italy. Burchi and Gnesi (2015) offer a review of this literature, which has spanned in the recent years and that includes different views and conceptions of quality of life, ranging from a Capability Approach to happiness perspective. Brandolini and D'Alessio (1998) and Chiappero-Martinetti (2000), for instance, investigate well-being of the Italian population from a Capability Approach perspective through the measurement of functionings, while Conte et al. (2007) and Costantini and Monni (2009) focus on Italian human development performances in terms of HDI levels over time. Monni (2002) elaborates on the same issue but at lower territorial scale, i.e., that of Italian provinces, while Passacantilli (2003) and De Muro et al. (2011) go even further taking into account human well-being dynamics at municipality level. Colombo et al. (2012) also investigate well-being at province level but apply a different perspective, i.e., that of the hedonic price method, to evaluate quality of life. Rampichini and D'Andrea (1997) and D'Andrea (1998) propose an even different conception to the study of quality of life, according to which happiness – also called life satisfaction – is a good proxy for interpreting human well-being. Finally, other authors have investigated on well-being in Italy, focusing their analysis on subsets of the population, e.g. the children (Addabbo et al., 2004; Addabbo and Di Tommaso, 2011; Addabbo et al., 2014) or women (Addabbo et al., 2010).

Fewer attempts of integrating multidimensionality in poverty measurement research have been made at national level, giving rise to a branch of literature that has interesting expansion possibilities. We will examine this empirical literature, underlying which normative choices underpin the dimensions and indicators selection and according to which criteria they were conducted. Of our particular interest is to understand whether any form of social contract emerges from conventional research on multidimensional poverty measurement in Italy. We will summarize our main findings with this regard in Table III.3 to facilitate a comparison among different approaches and methods of dimensions selection, bearing in mind Alkire's (2008) taxonomy presented in the introduction of this Chapter.

Dagum and Costa (2004) compared univariate and multivariate measures of poverty for Italy in order to identify possible divergences in terms of policy implications. They drew upon two major theoretical frameworks, i.e., the social exclusion approach and the Capability Approach to define deprivation and then applied a fuzzy set approach (cf. Chapter I, Section 2.6) to build a multivariate poverty measure for the years 1993-2000. The choice of the eleven indicators identified in their study has been weakly justified from a theoretical point of view, though. The indicators were supposed to refer to twenty-three "relevant socio-economic attributes" (Dagum and Costa, 2004, p. 249) observable in the available data from the Bank of Italy, but the final list the authors came up with leaves with serious doubts of theoretical

inconsistency. First of all, the choice of the socio-economic attributes is entirely data-driven, therefore it is not possible to trace any form of public consensus around the final list of indicators. Secondly, it is not clear how exactly the claimed combination of the two conceptual frameworks affects the selection of indicators – for instance, none of them seem to be attributable to the CA – which raises questions of arbitrariness. Thirdly, some of the indicators are not actual poverty indicators, but basic socio-economic attributes, like 'professional occupation of the household head' or combination of them, like 'gender, age and job status of the household head', making their interpretability even more difficult. Finally, it is not always clear if and to what extent the indicators selected are informative for the purposes of the study. For instance, indicator no. 11, i.e., 'ratio between the number of the number of the household members with income and the household size' completely ignores the total amount of income the household has at its disposal, making it complicated to formulate value judgments on underlying situations. Moreover, the information conveyed by that particular indicator is partially covered by indicator no. 1, i.e., household equivalent disposable income, where the total disposable income is already adjusted by the household size through the use of an appropriate equivalence scale. The authors, on the other hand, do not provide justifications in support of these normative choices, leaving all possible questions to this regard unanswered.

Betti and Verma (2008) proposed an 'integrated' fuzzy and relative approach to multidimensional poverty measurement in Italy by making use of the Italian component of the rich ECHP data. Although their contribution was intended to be mainly methodological, the authors tested their composite operator on Italian data referring to year 2001 and compared its results to a traditional fuzzy monetary measure based on a monetary variable, namely the equivalized disposable income. For bulding the fuzzy multidimensional measures, Betti and Verma chose as a first step a set of twenty-four indicators, affirming that "the result has been to include a majority of the so-called 'objective' indicators on non-monetary deprivations, such as the possession of material goods and facilities and physical conditions of life, at the expense of what may be called 'subjective' indicators such as self-assessment of the general health condition, economic hardship and social isolation, or the expressed degree of satisfaction with various aspects of work and life" (Betti and Verma, 2008, p. 242). As a second step, the indicators were grouped into five underlying dimensions. Though not explicitly stated by the authors, it seems that the transition from indicators to dimensions was performed through the use of a Factor Analysis, as they stressed the importance of "taking into account the manner in which different indicators cluster together" (p. 242). In any way, both the indicators and the dimensions sets used to compute their final poverty measure are identical to those identified by Whelan et al. (2001) and widely exploited in the branch of empirical literature started from their seminal study, so we might also consider Betti and Verma's choice of relevant deprivations as relying on available data or conventions.

Devicienti and Poggi (2009) applied a counting method to identify multiple joint deprivations among the Italian adult population (16-60) starting from the EU-SILC 2004-2005 longitudinal data. They drew on Amartya Sen's CA to identify socio-economic deprivations that they interpreted as proxy for social exclusion and were then studied in connection with income poverty from a dynamic standpoint. As a first

step, the authors identified five life domains of key importance for the purpose of achieving the kind of existence people value, namely satisfaction of basic needs fulfilment, access to essential durable goods and services, adequate housing, social relations, health and safety. To identify these dimensions, the authors referred to a well-nourished literature on both theoretical and empirical issues about multidimensionality and living conditions, including Nussbaum (2000), Chiappero-Martinetti (2000), Alkire (2002) and Robeyns (2006). Hence, we can easily classify Devicienti and Poggi's attempt as relying on assumptions based on normative approaches. Interestingly enough, the dimensions the authors ultimately put in the list – basic needs fulfilment, access to essential durable goods and services, adequate housing and health – seem not to comply with CA's theoretical requirements, but rather recall the Basic Needs Approach analytical framework. The four dimensions and the fifteen indicators the authors included in their analysis evidently represent a compromise between ideas motivating their investigation and the available data. In another study of 2011, Devicienti and Poggi run a slightly different analysis on social exclusion in Italy, this time drawing on the 1-8 waves of ECHP data and running a dynamic bivariate probit model. They also refined the choice of dimensions – though always relying on existing literature to justify their final list – and included a political dimension of social exclusion, i.e., the ability to have social relationships (Devicienti and Poggi, 2011, p. 3552). The list is as follows: (i) basic needs fulfilment; (ii) reaching a certain quality of life; (iii) having an adequate house; (iv) being healthy and able to do work; (v) living in a safe and clean environment; and (vi) the ability to have social relationships. The authors state that each of these dimensions represents "a functioning considered as important in its own right" (p. 3552) even if it is still unclear how such consideration should be validated and by whom.

More recently, a most-cited work by Coromaldi and Zoli (2012) has shown the advantages of applying a Non-Linear Principal Component Analysis (NLPCA) to derive poverty indicators in support of multidimensional poverty assessments. The authors proceeded in two logical steps. In this first phase, they run a NLPCA on raw data to derive deprivation indicators in five life domains, comforted by the fact that the chosen methodology is able to handle categorical and binary variables as well as quantitative ones. Then, they applied a high order Principal Component Analysis (PCA) to summarize the five life domains in one composite indicator. As a second step, they used the extrapolated indicators to analyse the mismatches between multidimensional poverty and income poverty in Italy through the 2004 EU-SILC data. The authors affirmed that the raw data used to derive indicators was referring to a "comprehensive definition of poverty, by considering not only basic necessities but a wider set of goods identifying the common society's living pattern" (Coromaldi and Zoli, 2012, p. 39). Such a standpoint concretely entails the representation of poverty through the idea of the enforced lack of items, which is fully consistent with the Anglo-Saxon tradition started by Townsend (1979) and Mack and Lansley (1985). Hence, suggestions inspired by a mix of conventions and a normative approach have been put to work through a purely data-driven approach, where the authors exclusively relied on multivariate statistical methods to make normative choices and allowed the data to determine which life domains will represent people's ideas of good life and social justice.

Table III.3. Dimensions and indicators choices in empirical literature on multidimensional poverty in Italy

	Dimensions	Indicators	Method of selection
DAGUM & COSTA (2004)	n/a	1. Household equivalent disposable income 2. Gender, age and job status of the household head 3. Educational achievement of the household head and his father 4. Educational achievement of the household spouse and his father 5. Professional occupation of the household head 6. Household size, number of senior members and job status of the household head and other members 7. Typology and heating services of the household residence 8. Occupancy title and location of the household residence 9. Household size and dimension (in squared meters) of the household residence 10. Household size and number of bathrooms in the household residence 11. Ratio between the number of the household members with income and the household size	Relying on data or conventions
BETTI & VERMA (2008)	1. Basic non-monetary deprivations	1. Keeping the home adequately warm 2. Paying for a week's annual holiday away from home 3. Replacing any worn-out furniture 4. Buying new, rather than second hand clothes 5. Eating meat, chicken or fish every second day, if the household wanted to 6. Having friends or family for a drink or meal at least once a month 7. Ability to meet payment of scheduled mortgage payments, utility bills or hire purchase	Relying on data or conventions
	2. Secondary non-monetary deprivations	8. A car 9. A color TV 10. A video recorder 11. A micro wave 12. A dishwasher 13. A telephone	
	3. Housing facilities	14. A bath or shower 15. An indoor flushing toilet 16. Hot running water	
	4. Housing deteriorations	17. Leaky roof 18. Damp walls, floor, foundations 19. Rot in window frames or floors	
	5. Environmental problems	20. Shortage of space 21. Noise from neighbors or outside 22. Dwelling too dark/not enough light 23. Pollution, grime or other environmental problems caused by traffic or industry 24. Vandalism or crime in the area	
DEVICIENTI & POGGI (2009)	1. Basic needs fulfillment	1. Eating meat, chicken or fish every second day, if the household wanted to 2. Ability to meet payment of scheduled mortgage payments, utility bills or hire purchase	Making assumptions on the basis of a normative approach
	2. Access to essential	3. A telephone	

	durable goods and services	4. A colour TV 5. A computer 6. A washing machine 7. A car 8. Paying for a week's annual holiday away from home	
	3. Adequate housing	9. Overcrowding 10. Indoor flushing toilet 11. Bath or shower 12. Keeping the home adequately warm 13. Leaking roof, damp walls, floor, foundations, rot in window frames or floors	
	4. Health	14. Chronic illness 15. Limited activity because of bad health conditions	
DEVICIENTI & POGGI (2011)	1. Basic needs fulfillment	1. Eating meat, chicken or fish every second day, if the household wanted to 2. Buying new, rather than second hand clothes 3. Ability to meet payment of scheduled mortgage payments, utility bills or hire purchase	Making assumptions on the basis of a normative approach
	2. To reach a certain quality of life	4. A car 5. A colour TV 6. A video recorder 7. A telephone 8. Paying for a week's annual holiday away from home 9. Having friends or family for a drink or meal at least once a month	
	3. Having an adequate house	10. Indoor flushing toilet 11. Hot running water 12. Enough space 13. Enough light 14. Adequate heating facility 15. Leaking roof, damp walls, floor, foundations, rot in window frames or floors	
	4. Ability to have social relationships	16. Frequency to talk to the neighbors 17. Frequency to meeting people 18. Member of any club (sports club, neighborhood association, etc.)	
	5. Being healthy and able to work	19. Being hampered in daily activities by any mental or physical health problem 20. Not looking for job because of illness, injury or incapacitation	
	6. Living in a safe and clean environment	21. Noise from neighbors or outside 22. Pollution, grime or other environmental problems caused by traffic or industry 23. Vandalism or crime in the area	
COROMALDI & ZOLI (2012)	1. Maintenance capacity	1. Arrears on utility bills 2. Paying for a week's annual holiday away from home 3. Eating meat, chicken or fish every second day, if the household wanted to 4. Capacity to face unexpected expenses 5. Ability to make ends meet	Relying on data or conventions Making assumptions on the basis of a normative approach

	6. Ability to keep the home adequately warm
	7. Financial burden of the total housing cost
	8. Ability to purchase food
	9. Ability to purchase clothes
	10. Capacity to spend money for health
	11. Capacity to spend money for education
	12. Capacity to spend money for transport
	13. Capacity to spend money for paying taxes
	14. Capacity to spend money for medical treatment
	15. Capacity to spend money for dental examination
2. Consumption deprivation	16. Owns a mobile phone
	17. Owns a telephone
	18. Owns a computer
	19. Owns a car
	20. Owns a dishwasher
	21. Owns a VHS
	22. Owns a camera
	23. Owns an aerial
	24. Access to internet
3. Health status	25. General health
	26. Suffers from chronic illness
	27. Limitation in activities because of health problems
	28. Incapacity to look for a job because of personal illness
4. Housing facilities	29. Owns a TV
	30. Owns a washing machine
	31. Owns a fridge
	32. Dwelling too dark
	33. Bath or shower in dwelling
	34. Indoor flushing toilet
	35. Hot running water
5. Other housing related problems	36. Noise
	37. Pollution
	38. Crime
	39. Leaking roof, damp walls, floor, foundations, rot in window frames or floors
	40. Overcrowding
	41. Financial burden of mortgage
	42. Arrears on mortgage
	43. Financial burden of rent

Source: author

Concluding remarks

In this Chapter, we have reviewed existing empirical literature on multidimensional poverty measurement in Europe, in order to identify conceptual and methodological approaches currently in use. In our analysis, we have focused on two core aspects: (i) how multidimensional poverty measurement has evolved in the European Union and its countries, paying special attention to the Italian case; and (ii) how choices in support of multidimensional analyses have been made, which form of social contract emerges from them (if any) and what are the most common methods used to justify normative choices in this branch of literature, following Alkire's taxonomy as a benchmark.

In Europe, the evolution of the definition of poverty has been accompanied since the Seventies by two major concepts: that of relative poverty and that of social exclusion. It is on these two pillars that today's European Union's strategy for tackling poverty is explicitly grounded and that served as a conceptual base to build EU's leading evaluative tool, i.e., the three-dimensional At-risk-of-poverty-and-social-exclusion rate. The AROPE, however, suffers in our opinion from a number of theoretical weaknesses: first of all, it is not clear whether the absolute poverty indicators that have been paired to the at-risk-of-poverty rate, especially the severe material deprivation one, are actually able to reflect core aspects of living standards that do not vary with changes that might occur in the distribution as they are supposed to do. Secondly, the indicator accounting for households' capacity to afford buying certain items does not represent an innovative metric for poverty measurement, as it is an income-related indicator just as the at-risk-of-poverty rate. In our opinion, such conceptual flaws might undermine the claimed purposes of broadening the informative base for poverty measurement at European Union level.

At country level, the multidimensional poverty tradition has started in the UK, fuelled by two studies regarded as landmarks in poverty measurement literature developed by Townsend (1979) and Mack and Lansley (1985), from whose innovative approach known as Breadline Britain a rich literature on counting approaches to identifying the poor has spanned. The Breadline Britain approach has also influenced most of the countrywide surveys now developed by national offices for statistics as well as the harmonized surveys for assessing living conditions implemented by Eurostat, namely the ECHP and the EU-SILC. One major virtue of the Breadline Britain experience has been of involving the public opinion in the definition of the list of households' essential goods. One possible drawback is linked to an excessive focus on material deprivation, while neglecting a number of potentially more important aspects of human life domains, like political participation, subjective well-being and the quality of social relationships.

In Italy, official poverty measures are represented by a dashboard of indicators grounded on the 'income method' (Sen, 1981): a relative poverty and an absolute poverty indicator. Recently, a synthetic deprivation index has been added to the ones aforementioned as a domestic version of the AROPE, representing the only one official multidimensional indicator for measuring poverty computed by Istat. Indeed, in the past few years human well-being has obtained significant consideration in Italy both in the policy and academic worlds. In the wake of the pioneering French experience represented by the Stiglitz-Sen-Fitoussi Report

of 2009, Istat and CNEL have conducted a noteworthy participatory research to establish a list of relevant life domains to going beyond the GDP and building a genuine multidimensional list of well-being indicators called BES. Behind the construction of the whole BES evaluation system significant public scrutiny processes have taken place, making it a unique experience both at national and international level. Unfortunately, the same innovation potential is not traceable in the few attempts of deriving multidimensional poverty measures for Italy that have been made in the literature, as they hardly ever make use of other techniques than multivariate statistical methods to identify dimensions and deprivation indicators in support of multidimensional assessments. In fact, empirical analyses hereby scrutinized do not rely on any form of social contract to inform normative choices. This lack of ethical justification makes them theoretically weaker on the one hand, and, on the other, raises important questions of arbitrariness.

In the next Chapter, we will show how to overcome this theoretical inconsistency by applying the conceptual framework identified in Chapter II to a study case on Italy.

Chapter IV.
Evidence from Italy

Introduction

As discussed in Chapter I, poverty measurement implies two fundamental steps: (i) identifying the poor among the total population and (ii) aggregating the available information about the poor into one measure through the use of a poverty index (Sen, 1976). To accomplish the identification task, there are several choices that a multidimensional analysis typically requires. These include the order of aggregation, a number of dimensions and deprivation indicators along with a poverty line (or threshold) for each of them, a system of weights. In this Chapter, we will first present our identification strategy following the Constitutional Approach to dimensions selection as inspired by the Rawlsian conceptual framework for multidimensional poverty analysis identified in Chapter II, Section 3. Then, we will show how appropriate deprivation indicators can be selected by following the Rawlsian concept of social primary goods and by making use of the rich and heterogeneous EU-SILC database. Finally, we will present poverty estimates for Italy from 2004 to 2013 according to the new Italian Inequality-Sensitive Poverty Index (henceforth, ISPI). Though such a methodology can be successfully applied to all democratic regimes, we will first test it on Italy as a study case and then propose its generalization as a proper method to assess multidimensional poverty in the European context.

1. The European Union Statistics on Income and Living Conditions (EU-SILC)

The selected source of information about living conditions in Italy is the Italian component of the European Union Statistics on Income and Living Conditions, abbreviated in EU-SILC. The SILC was launched in 2003 on the basis of a gentlemen's agreement between Eurostat and a number of Member States[44], with the aim of providing timely and comparable annual data on variables such as income, social exclusion, material deprivation, health, education and labour at both household and individual level. It was adopted as the common European source for data on income and social inclusion after the termination of the ECHP in 2001 due to the persistence of quality problems, like low response rates, steady attrition rates and incomplete geographical coverage (Decancq et al., 2013). To overcome these issues, the SILC project has been conceived to pay special attention to the sample design, the establishment of internationally-harmonized income definitions and the scope of the survey, so as to cover as many European countries as

[44] Currently, thirty-one countries are included in the EU-SILC data set, namely all EU Member States plus the four non-EU members Iceland, Norway, Switzerland and Turkey. Not all countries are represented for all years in the User Database (UDB) though.

possible (Clemenceau and Museux, 2007).[45] Since 2010, it is also used for monitoring poverty and social exclusion in the EU in accordance with the Europe 2020 Strategy. EU-SILC is composed by two types of data: the first one is the cross-sectional component, which provides data in a given time or a certain time period; the second one is the longitudinal component and follows up micro-level changes over time over a period of four years. The survey provides quite accurate information on labour conditions, education and health at the individual level; data at the household level is provided for income, social exclusion as measured by material deprivation conditions, and housing.

Using the EU-SILC to construct an aggregate poverty measure for Italy presents a two-fold advantage. In the first place, though there exist various cross-national comparative surveys providing data for the study of poverty and social exclusion in the EU – such as the Survey of Health, Ageing and Retirement in Europe (SHARE), the European Quality of Life Survey (EQLS) and the European Social Survey (ESS) – these data sets are constrained by a number of limitation to be considered eligible for the scope of our analysis. For instance, the SHARE only provides information on a part of the population – i.e., the elderly – while the EQLS has a small sample size and the ESS has limited data on income and living conditions. These are among the reasons that made the EU-SILC become the official reference source for monitoring poverty at the EU level; it therefore represents an interesting benchmark for comparing our multidimensional poverty figures with the official ones. In the second place, using the EU-SILC makes it possible to upscale our case study to the supranational level and to develop a multidimensional framework for measuring poverty in the European Union.

For our analysis, we have made use of the cross-sectional Italian component of the survey. First of all, following the 1975 definition of poverty proposed by the Council of the European Communities (cf. Chapter III, Section 1.1), we chose the person as the unit of analysis, namely the individual adult. Any individual aged 16 and above is considered multidimensionally poor based on her achievements in the chosen deprivation indicators. Whenever possible, we have relied on personal level data; otherwise, we have used the household level data and applied the Household Reference Person's (HRP) achievements to the members of the same household.[46] Throughout the analysis, we have held a severe absolute poverty perspective in order to identify acute deprivation conditions, and the choice of thresholds and indicators has been done accordingly. Secondly, we had selected an appropriate order of aggregation. As shown in Chapter I Section 2.3, in multidimensional poverty measurement the information about the poor can be aggregated either first across people and then across dimensions (see for instance the HPI, Anand and Sen, 1997), or first across dimensions and then across people (see for instance the Global MPI, Alkire and Santos, 2010; 2014). Each type of aggregation order has important empirical advantages along with a

[45] National statistical offices have a certain degree of discretion to implement the common guidelines for EU-SILC according to national conditions. Decancq et al. (2013) remark that differences remain between countries in terms of sample design, data collection and post-collection processing, with varying impact on the comparability of the survey results.

[46] The HRP is defined as the person responsible for the accommodation. Where more than one person is responsible, the oldest person is chosen (Maître et al., 2013). It is worth underlying that applying HRP's achievements to all members of the family imposes strong assumptions of equal sharing of the resources within the household. Though this is the only way to proceed to carry out the analysis at individual level, this approximation remains problematic in that it could lead to underestimate poverty among certain vulnerable groups, like children or the elderly (see for instance, Burton et al., 2007; Dunbar et al., 2012).

number of disadvantages. On the one hand, aggregating first across people and then across dimensions would allow us to use different data sources, making it less difficult to find suitable data to inform the poverty analysis. However, it also makes it impossible to measure the actual breadth of poverty each person or household suffers (Alkire and Santos, 2009) and to study the cumulative distribution of deprivations. On the other hand, aggregating first across dimensions and then across people imposes a restricted choice of the usable data, which has to come from the same survey for the studied population. While it is certainly more difficult to find data sets that provide information on multiple life domains, poverty measures based on this kind of aggregation are very appealing as they are able to account for people's simultaneous deprivations. Even if the wide information provided by EU-SILC does not cover all life domains that could theoretically be of interest for a multidimensional poverty analysis, making a compromise between research objectives and the available data is unavoidable and the existence of a such an harmonised database allows observing multiple aspects of life for the same individual, in order to assess the extent to which people are deprived and to study associations among deprivations (Ferreira and Lugo, 2013). Hence we have chosen to follow the latter approach and to aggregate the information on the poor before across dimensions and then across people.

2. Identifying the poor

2.1 The Constitutional Approach to dimensions selection

We have first proceeded by identifying relevant dimensions starting from the analysis of the Italian constitutional law. The Italian Constitution is a reliable and exhaustive normative benchmark for conducting an empirical analysis on distributive justice in Italy. It is indeed a long standing Constitution, resulting from a broad and rich public debate that took place between 1946 and 1947 among the diverse political cultures represented in the Constituent Assembly: among others, Christian, socialist, communist, liberal, conservative and republican (Onida, 2007; Carlassare, 2012). Since it has not been significantly modified since it was promulgated in 1947[47], it represents a sound informational base on current values shared by the Italian population. To illustrate how it is composed and to analyse its contents, we will extensively refer to the work done by Burchi et al. (2014), although our final list of dimensions will turn out to be slightly different. Three sections compose the Italian Constitution:

1) Fundamental Principles,
2) Part I. Rights and Duties of Citizens, and
3) Part II. Organisation of the Republic.

The sections that are of main interest for us are the first two, as they are more relevant for the purpose of identifying Italian citizens' shared ideas and values.

[47] The only part that has been considerably reformed is the 'Part II. Organisation of the Republic', that refers to the organs and the technical principles that rule the Republic.

The most valued dimension in the Italian Constitution is decent work. In both sections 1 and 2, several articles[48] put work and workers' rights at the centre of the functioning of the Republic.[49] These articles cover many aspects of work, like social security and protection, free trade unions, work of women and minors, the right to strike, work remuneration and hours. Given the wide-spreading protection offered to workers, it is undisputed to refer to this dimension as to 'decent work', following the framework coined by ILO (1999).[50]

The second most valued dimension in the Italian Constitution is political and civil liberties, with eight articles[51] regulating citizens' political rights and duties and sanctioning fundamental civil liberties of thought and expression. The right and duty to vote, the freedom of association in parties and to organize citizens' petitions, the right to assemble and to form associations as well as the right of citizens to freely express their ideas reflect a number of important equal basic liberties guaranteed by Rawls's first principle of justice. Art. 51 is instead more attached to Rawls's principle 2a, as it states that "[a]ll citizens of either sex are eligible for public office and for elected positions on equal terms, according to the conditions established by law. To this end, the Republic shall adopt specific measures to promote equal opportunities between women and men. The law may grant Italians who are not resident in the Republic the same rights as citizens for the purposes of access to public offices and elected positions. Whoever is elected to a public function is entitled to the time needed to perform that function and to retain previously held employment." (Camera dei Deputati, 2007) When it comes to analysing the articles just presented, Burchi et al. get to quite different conclusions compared to ours. They split the political sphere from the civil one and stress the aspect of participation rather than that of liberty. The reason for doing so is clearly linked to the theoretical framework they start from, i.e. the Capability Approach, according to which participation is tightly related to justice and well-being (Alkire, 2002; Drèze and Sen, 2002; Robeyns, 2005). Participation is indeed a highly valued principle in Italian public culture[52]; however, the Constituent Assembly gave a more extensive formal guarantee to fundamental liberties than to participation. Furthermore, the basic liberties of the individual are at the heart of Justice as Fairness, reason why we decide to diverge from Burchi et al.'s interpretation and to regroup the fundamental political and civil liberties into one single dimension.

According to Burchi et al., a third aspect of citizens' participation to public life is represented in the Italian Constitution by economic participation. The authors identify three articles[53] that regulate rights such as the protection of citizens' private economic initiatives, co-operative work and co-ownership of enterprises. Another fundamental article about the functioning of the economy that they don't include in their analysis is Art. 47, that offers a broader protection to citizens' savings and credit operations: "The Republic

[48] Articles n. 1, 4, 35, 36, 37, 38, 39 and 40.
[49] It's no coincidence that throughout the Constitution citizens are often called 'workers'.
[50] ILO's primary goal is to "[…] promote opportunities for women and men to obtain decent and productive work, in conditions of freedom, equity, security and human dignity (ILO, 1999).
[51] Articles n. 17, 18, 21, 25, 48, 49, 50 and 51.
[52] It is stated in the second subsection of Art. 3: "It is the duty of the Republic to remove those obstacles of any economic and social nature which constrain the freedom and equality of citizens, thereby impeding the full development of the human person and the effective participation of all workers in the political economic and social organization of the country."
[53] Articles n. 41, 45 and 46.

encourages and safeguards savings in all forms. It regulates, co-ordinates and oversees the operation of credit. The Republic promotes the access through citizens' mutual savings to the ownership of housing and of directly cultivated land, as well as to direct and indirect investment in the equity of the large production complexes of the country." (Camera dei Deputati, 2007) Also articles 42 and 44 protect and regulate private properties and economic initiatives. We rely on these articles to introduce another new dimension, economic security, which conveys a broader concept than that of economic participation and is more consistent with the Rawlsian concept of social primary goods.

Two other dimensions valued within the Italian constitutional law are education and health.[54] The Republic safeguards health as a fundamental right of the individual and guarantees the access to both medical care and primary education to all, including those without adequate finances. Furthermore, the State has the duty of establishing schools for all branches and grades and lays down general rules for education. A number of other principles are then codified by the Italian Constitution, like full equality in terms of social dignity of all citizens before the State, the recognition of international law and the rejection of war as an instrument of aggression against the freedom of other peoples or settlement of international disputes.

The dimensions identified so far are five: (1) decent work; (2) political and civil liberties; (3) economic security; (4) education; and (5) health. These dimensions are indeed widely used in the empirical literature on multidimensional poverty measurement both in advanced and developing countries (Chiappero-Martinetti and Roche, 2008; Alkire et al, 2014).

The Italian Constitution is certainly an invaluable normative ground to support an analysis on values and shared ideas of the Italian population. Nonetheless, along with the development of societies and their priorities in terms of public action from the post-World War II era onwards, some new values appeared and claimed to be legitimated worldwide. As also suggested by Burchi et al. (2014), among these we find some rights – namely the right to decent housing and the right to a healthy environment – that are actually missing from those explicitly promoted by the Italian Constitution. From a juridical point of view, these new values have been legitimated in Italy during the Eighties, through a number of judgments issued by the Italian Constitutional Court, a high court that has the specific and unique mandate of guaranteeing that Constitutional principles and values are applied and respected throughout the juridical functions of the Republic. In a judgment of 1987[55], the Constitutional Court affirms that the right to housing is a "fundamental social right guaranteed by the Constitution" and that the State has the "unabdicable responsibility of making people life reflecting the image of human dignity." At that time, the need for stressing the primary importance of the right to housing had been driven by a renewed attention of the State towards the social housing issue. It thereby motivated the Constitutional Court to extend the rather limited tutelage of the "access through citizens' mutual savings to the ownership of housing" mentioned in the Constitution (Art. 47) to a broader concept that involves the protection of human dignity through

[54] The former is regulated by articles 33 and 34 while to the latter is dedicated Art. 32, under the subsection *Ethical and social rights and duties*.

[55] Judgment n. 217 of 1987 of the Constitutional Court.

better housing conditions. In two other judgments of 1987[56], the Constitutional Court refers to the principles of "the safeguard of the landscape as well as the historical and artistic heritage" (Art. 9) and "the protection of human health as a fundamental right of the individual and as an interest for the community" (Art. 32) to link them and extend them in the broader concept of healthy environment. Of particular interest for us is the passage of the judgment n. 641 stating that "[…] the natural environment is a determining element of quality of life and its tutelage does not seek aesthetic or naturalistic goals, while it conveys the need for a natural habitat where people can live and interact". This paragraph suggests that the chance to live in a healthy environment can be thus considered as one of those means that the State has to provide the citizens with in order to lead a decent life. The primary role carried out by the Constitutional Court represents, to some extent, a natural extension of the one fulfilled by the Constituent Assembly in 1946 and 1947. Furthermore, Rawls's definition of public political culture includes, as already said, the political institutions of a constitutional regime and the public tradition of their interpretation, including those of the judiciary. In light of this, we can easily add one other dimension to the previous five, namely (6) living environment.

2.2. Deprivation indicators and the social primary goods

This section presents the deprivation indicators selected as proxy for Rawlsian social primary goods, also outlined in Table IV.1. Social primary goods have been categorized as suggested by Rawls (1999) into the following five groups: (1) the basic rights and liberties; (2) the freedom of movement and choice of occupation; (3) powers and prerogatives of offices and positions of authority and responsibility; (4) income and wealth; and (5) the social bases of self-respect.

1) DECENT WORK (Rawlsian category: the basic rights and liberties, the freedom of movement and choice of occupation, powers and prerogatives of offices and positions of authority and responsibility; the social bases for self-respect).

We have explored throughout the EU-SILC the possibility to make use of a number of indicators accounting for this dimension. The first one is unemployment. Three variables give information about the individual's status in employment: 'self-defined current economic status' (PL031[57]), 'basic activity status' (RB2010) and 'activity status' (PX050). The former two have been excluded for two reasons: first of all, they rely on the person's own perception of her main activity as present. This means that information is subjectively reported and may not meet the criteria established by ILO for the categorization of work statuses.[58] The 'activity status' variable, on the contrary, is an objective one, as it is computed by Eurostat on the basis of the declared number of months spent in a list of activity statuses.[59] Secondly, in PL031 the concept of 'current' status implies that any definitive changes occurred in the person's employment

[56] Judgments n. 210 and n. 641 of 1987 of the Constitutional Court.
[57] Variable PL030, used until 2008, has been recoded into PL031 starting 2009 operations onwards.
[58] For instance, as illustrated by the SILC guidelines, a person who would regard herself as full-time student or homemaker could be classified as ILO-employed if she has a part-time job, or some people that consider themselves unemployed may not meet the criterion of taking active steps to find work and being immediately available.
[59] For 2011 operations, the modalities are: employed persons except employees, employees, other employed, unemployed, retired, inactive, other inactive.

situation are taken into account so to explicitly override any averaging over any reference period. On the other hand, a situation corresponding to the average situation over the previous twelve months might better represent a disadvantaged situation as opposed to a mere status quo which is only temporarily occurring. Also with this regard, the use of the variable 'activity status' (PX050) seems therefore preferable. A second possible decent work indicator is the work intensity status of the family, that is computed as the ratio between the number of months that household members of working age worked during the reference year and the total number of months that theoretically could have been worked by the same household members. As shown in Chapter III Section 1.2, within the Europe 2020 strategy people living in households with very low work intensity are defined as people of all ages living in households where working age members worked less than 20% of their total potential during the previous 12 months. Work intensity is therefore an important aspect of people's lives to be monitored for both normative and policy reasons: on the one hand, it looks at employment not only as a fundamental right of the person that guarantees decent living standards and protects human dignity, but also as a determinant of people's and families' psychological well-being (Warr, 1999; McKee-Ryan et al., 2005). On the other hand, it could be useful to include in our measure indicators that follow Europe 2020 standards, in order to ensure comparability of poverty figures. However, it also has two important limitations: firstly, it seems to be not optimal to rely on a household indicator when in the same survey data on labour is available at individual level. With this regard, the loss of accurateness would not be fully compensated by the advantage of results comparability. Furthermore, the low work intensity indicator has been computed only from the 2009 operations onwards while it is not available for years 2004 to 2008. We thus decided to exclude it from our final list of indicators. Finally, we have considered the possibility of using the 'number of hours usually worked per week in main job' variable (PL060) to build two indicators respectively accounting for underemployment and overemployment, conditions that are both strongly discouraged by ILO and associated with low quality of life standards.[60] However, we eventually decided not to include them in the final index, as they do not reflect severe poverty conditions and do not meet the criteria we have used to select the other deprivation indicators. As shown in the previous section, in the Italian Constitution several articles put work and worker rights at the centre of the constitutional law – i.e. work remuneration and hours, work of women and minors, social security and protection, free trade unions, the right to strike – offering different starting point to empirically investigate decent work conditions. Unfortunately, the EU-SILC does not allow for observing all these aspects of people's working lives. To sum up, the decent work dimension will be exemplified in our analysis by only one indicator accounting for unemployment.

2) POLITICAL AND CIVIL LIBERTIES (Rawlsian category: the basic rights and liberties).

[60] There is no international definition for overemployment. Time-related overemployment usually refers to a situation where workers are willing but unable at their current jobs to reduce the amount of time they devote to earning an income (Golden, 2003). As Romano and Spizzichino point out, "[in narrow economic terms] above a certain threshold, an increase in hours actually decreases the long-run level of output because worker fatigue decreases productivity over the entire working day. Even when economically efficient, long hours may have other negative individual or social effects and may entail high social costs not only for workers but also for their families, severely impacting the entire household's perceived well-being." (Romano and Spizzichino, 2012, p. 154)

In terms of political and civil liberties, EU-SILC does not allow for any empirical validation, as no proxy is available in the data at our disposal. Moreover, as already explained in Chapter II, we interpret the guarantee of basic equal liberties as a pre-condition to conduct an analysis on the distribution of social primary goods among the population. That is why we interpret this overarching dimension as framing our analysis rather than being part of the investigation objectives. We thus leave it aside and move on with our examination.

3) ECONOMIC SECURITY (Rawlsian category: income and wealth).

The first indicator we have selected for this dimension is income poverty. In accordance with the chosen identification strategy – i.e., to hold a severe absolute poverty perspective throughout the analysis – we have tried to replicate the structure of poverty lines used by Istat to measure *absolute* poverty by establishing if a household's total disposable income (variable HY020) falls below the absolute poverty threshold. However, the complexity of Istat's absolute poverty measurement requirements has made it impossible to go further in our purpose, particularly because of the lack of some of the information necessary to adjust disposable incomes, i.e., the age composition of households' members. We have thus been obliged to use relative poverty lines: an individual is considered income poor if her total disposable (equivalent)[61] income is equal or below the relative poverty lines established by Istat. We have then examined two other indicators as proxy for economic security. The first one is related to the individual's tenure status and has been investigated keeping in mind the special tutelage offered by the Italian Constitution to mutual savings also in the form of the ownership of housing. In the EU-SILC, the 'tenure status' variable (HH021[62]) provides information about the titles held on the dwelling, specifying if the person is owner (whether outright owner or paying mortgage), tenant or subtenant paying rent at prevailing or market price, reduced-rate renter or recipient of an accommodation provided free. Particularly the latter category can be of interest for our analysis, as it might be representative of households eligible for social housing programmes. In Italy, social housing is assigned taking into account a number of factors that are generally linked to living in conditions of hardship, e.g., family income, size and composition of households, age and degree of invalidity.[63] Nonetheless, the tenure status indicator does not unambiguously identify only households in need, as in some cases provided-free accommodation can come with the job or from private sources. Furthermore, also in the cases where the dwelling is provided free by the State based on a vulnerable economic situation, retaining the tenure status indicator could still be the cause of double counting when coupled with the income poverty one, reason why we eventually decided to drop it. The second indicator we have examined is related to financial strain and could be accounted for starting from the variables 'financial burden of debts from hire purchases or loans' (HS150). Including an indicator of financial strain in our analysis could complement our view of the economic security dimension: it would be of help to go beyond the mere availability of economic

[61] Eurostat uses the so-called 'modified OECD scale', which assigns a value of 1 to the household head, 0.5 to each additional adult member and 0.3 to each child.

[62] Variable HH020, used until 2010, has been recoded into HH021 from 2011 operations onwards.

[63] In Italy, Law 179/1992 prescribes the requisites for eligibility to public housing dwellings. Furthermore, some special categories may be identified by the Regions, which autonomously administrate part of the funds dedicated to public housing, as priority: e.g., the elderly, young couples, emigrants that return back to Italy, students, refugees and immigrants.

resources while capturing economic stressful conditions – e.g., feeling indebtedness and other unavoidable expenses being a heavy burden for the household. As also shown by other authors (Morrone, 2014), this is a relevant issue for an advanced country context, especially when observed in conjunction with periods of economic crisis. However, also in this case we cannot be sure that this one specific indicator would unambiguously identify severe hardship, as the pressure of indebtedness could not be associated with deprived lifestyles, as also suggested by the very low correlation coefficient generated by Cramer's V[64] between the Ar-risk-of-poverty indicator computed by Eurostat (HX080) and variable HS150. We thus decided not to retain the financial strain indicator and to only keep the income poverty one as proxy for lack of economic security.

4) EDUCATION (Rawlsian category: the social bases of self-respect).

In Italy, schooling is compulsory for everyone for at least ten years and the school leaving age has been established at 16 years old.[65] To measure deprivation in education in Italy, we have built an educational attainment indicator starting from the 'higher ISCED level attained'[66] variable (PE040). The threshold is set at lower secondary level for two reasons: the first one is that higher secondary education is only partially covered by the compulsory schooling prescription; the second one is because it is more consistent with the purpose of identifying severe absolute poverty conditions than the higher secondary one.

5) HEALTH (Rawlsian category: the social bases of self-respect).

The EU-SILC gives the opportunity to observe conditions related to human health thanks to a number of variables: 'self-reported general health' (PH010), 'suffer from any chronic illness or condition' (PH020), 'limitation in activities because of health problems' (PH030) and 'unmet medical need for medical examination or treatment' (PH040). As a first step, we have studied all the four indicators as proxies for the health dimension. Cramer's V shows that they are strongly positively correlated among each other, but they can still be retained for normative reasons – i.e., they stand for distinct aspects of the health domain. We decided to only drop the 'limitation in activities because of health problems' indicator as it has the highest correlation with the self-reported general health and also because it has the larger number of missing values. For the 'self-reported general health', variable PH010 reports respondents' statuses in five modalities ranging from very bad to very good. The threshold has been set at bad or very bad. For the

[64] Drawing on all elements of the contingency table (or cross-tabulation), Cramer's V generates correlation coefficients between binary variables pairwise (Alkire et al., 2015b; Santos et al., 2015). Let us consider a contingency table between two dichotomous variables, where $\mathbb{p}_{00}^{jj'}$ is the percentage of people simultaneously not deprived in any two indicators j and j'; $\mathbb{p}_{11}^{jj'}$ is the percentage of people simultaneously deprived in any two indicators j and j'; $\mathbb{p}_{10}^{jj'}$ is the percentage of people deprived in indicator j but not in indicator j'; and $\mathbb{p}_{01}^{jj'}$ is the percentage of people deprived in indicator j' but not in indicator j. The correlation is given by the product of the matches minus the product of the mismatches, divided by the square root of the product of the marginals:

$$V = \frac{\left(\mathbb{p}_{00}^{jj'} \times \mathbb{p}_{11}^{jj'}\right) - \left(\mathbb{p}_{10}^{jj'} \times \mathbb{p}_{01}^{jj'}\right)}{\left[\mathbb{p}_{+1}^{j'} \times \mathbb{p}_{1+}^{j} \times \mathbb{p}_{+0}^{j'} \times \mathbb{p}_{0+}^{j}\right]^{1/2}}$$

The notation used here borrows from the cited sources. See Annex II for correlation coefficients between indicators and between dimensions computed with Stata for years 2004 to 2013.

[65] The Italian Constitution demanded originally that every citizen would at least complete 8 years of compulsory primary school.

[66] International Standard Classification of Education is a statistical framework for organizing information on education maintained by the United Nations Educational, Scientific and Cultural Organization (UNESCO) since 1976.

'chronic illness' indicator possible modalities were simply yes or no, as well as for the unmet medical needs one. For this latter indicator people were asked if there was at least one occasion during the last 12 months when the person really needed an examination or treatment and did not go to get it. To correctly identify people deprived with this regard, particular attention has been paid in adjusting the cut-off according to the reasons why those who answered yes did it (PH050). Among the eight possible causes, the one related to the unaffordability of the examination or treatment was excluded in order to avoid redundancy with the income poverty indicator. 'Waiting list', 'could not take time because of work, care for children or for others' and 'too far to travel/no means of transportation' have been retained as valid reasons to indicate lack of access to health care and services, while other reasons like 'fear of doctor' or 'did not know any good specialist' have been excluded, as they have been judged too subject to preferences and personal attitudes to be taken into account.

6) LIVING ENVIRONMENT (Rawlsian category: the freedom of movement and choice of occupation; the social bases of self-respect).

The last dimension, living environment, groups five indicators that refer both to housing and environmental conditions. As already done for other dimensions, also with regard to housing conditions indicators that account for households' expenditure capacity on either material goods or bills and utilities – which are in fact the most numerous in the EU-SILC – have been excluded from the list of eligible indicators to avoid redundancy of information on income poverty. This leaves us with a smaller number of variables on housing that reflect the Constitutional Court's provision of defending human dignity through the decency of the dwelling. The first one is the variable 'problems with the dwelling: too dark, not enough light' (HS160), which has been dropped due to the high degree of subjectivity ascribable to the responses. On the contrary, 'leaking roof, damp walls/floors/foundation, or rot in window frames or floor' (HH040), 'bath or shower in dwelling' (HH081[67]) and 'indoor flushing toilet for sole use of household' (HH091[68]) have been retained. Variable HH040, whose question aimed at getting an objective measure of the condition of the dwelling, has been used to build the 'poor quality of dwelling' indicator (we have considered deprived in this indicator individuals declaring to have experienced any of the problems mentioned in the question). The two variables referring to the presence of adequate indoor sanitation facilities and a bath or shower have been used to build a single indicator, 'lack of adequate sanitation facilities', as Cramér's V reports very high levels of association between the two. The quality and safety of external environmental conditions are accounted for by variables 'noise from neighbours or from the street' (HS170), 'pollution, grime or other environmental problems' (HS180) and 'crime, violence or vandalism in the area' (HS190). Deprived individuals according to these indicators are the people who declared to have experienced any of these problems.

[67] Variable HH080, used until 2008, has been recoded into HH081 from 2009 operations onwards.
[68] Variable HH090, used until 2008, has been recoded into HH091 from 2009 operations onwards.

Table IV.1. Overview of selected indicators, variables, modalities and cut-offs

DIMENSION	INDICATOR	VARIABLE	MODALITIES AND CUT-OFFS
Decent work	Unemployment	Activity status (PX050)	2=Employee
			3=Employed persons except employees
			4=Other employed
			5=Unemployed
			6=Retired
			7=Inactive
			8=Other inactive
Economic security	Income poverty	Total disposable income (HX090)	Densely populated area + north **≤ 806.78 €/month**
			Densely populated area + centre **≤ 785.84 €/month**
			Densely populated area + south **≤ 593.09 €/month**
			Intermediate area + north **≤ 768.36 €/month**
			Intermediate area + centre **≤ 744.56 €/month**
			Intermediate area + south **≤ 572.72 €/month**
			Thinly populated area + north **≤ 723.99 €/month**
			Thinly populated area + centre **≤ 696.88 €/month**
			Thinly populated area + south **≤ 537.29 €/month**
Education	Low educational attainment	Highest ISCED level attained (PE040)	**0=Pre-primary education**
			1=Primary education
			2=Lower secondary education
			3=Upper secondary education
			4=Post-secondary education
			5=First stage of tertiary education (not leading directly to an advanced research qualification)
			6=Second stage of tertiary education (leading to an advanced research qualification)
Health	Bad health status	General health status (PH010)	1=Very good
			2=Good
			3=Fair
			4=Bad
			5=Very bad
	Chronic illness	Suffers from any chronic illness or condition (PH020)	**1=Yes**

			2=No
	Unmet medical needs	Unmet medical need for medical examination or treatment (PH040)	**1=Yes, there was at least one occasion when the person really needed examination or treatment but did not** 2=No, there was no occasion when the person really needed examination or treatment but did not
		+	
		Main reason for unmet medical need for medical examination or treatment (PH050)	1=Could not afford to (too expensive) **2=Waiting list** **3=Could not take time because of work, care for children or for others** **4=Too far to travel/no means of transportation** 5=Fear of doctor/hospital examination/treatment 6=Wanted to wait and see if problem got better on its own 7=Did not know any good doctor or specialist 8=Other reasons
Living environment	Poor quality of dwelling	Leaking roof, damp walls/floor/foundation or rot in window frames or floor	**1=Yes** 2=No
	Lack of adequate basic sanitation facilities in dwelling (composite indicator)	Bath or shower in dwelling (HH081)	1=Yes, for sole use of the household **2=Yes, shared** **3=No**
		+	
		Indoor flushing toilet for sole use of household (HH091)	1=Yes, for sole use of the household **2=Yes, shared** **3=No**
	Noise	Noise from the neighbours or from the street (HS170)	**1=Yes** 2=No
	Crime	Pollution, grime or other environmental problems (HS180)	**1=Yes** 2=No
	Pollution	Crime violence or vandalism in the area (HS190)	**1=Yes** 2=No

Modalities indicating deprivation are highlighted in bold. Cut-offs for the Income poverty indicator shown here refer to year 2011.

Source: author

The study of the joint distribution of deprivations has been made through the computation of Cramér's V coefficients, which show both the strength and the direction of associations between dimensions. Table IV.2 reports the simple average across all observations for years 2004 to 2013 that were statistically significant. First of all, it is worth observing that average associations are all very low and close to 0. This means that while dimensions are surely not independent from each other, they have been constructed in such a way as to avoid redundancy between deprivation indicators. In Italy, association is higher between education and health (0.33) and between economic security and decent work (0.19). Interestingly enough, deprivations in decent work (i.e., unemployment) is negatively correlated with deprivations in educational attainment, potentially suggesting that higher academic degrees are associated with greater difficulties in finding a stable job in Italy. As we will see through the study of marginal distributions of deprivations, joblessness is in fact a concern for the youngest cohorts of the Italian population, who are at the same time the most threatened by unemployment and the most well educated ones. Deprivation in economic security (i.e., income poverty) is positively yet slightly associated with deprivations in all other dimensions, with average associations never exceeding 0.06. This confirms that income shortfall represents only one of all possible manifestations of poverty and cannot be used as proxy for exhaustively explaining deprivation in other life domains. The lowest average associations (0.04 and 0.03) are between deprivations in economic security and education and between economic security and health, suggesting that in Italy lacks in educational attainment and health do not depend on lacks of monetary means to finance participation in education or access to the health care system. Finally, and reasonably, poor living environment conditions are associated with critical health conditions (0.07).

Table IV.2. Average associations between dimensions (Cramér's $\boldsymbol{V}$), 2004-2013

	DECENT WORK	ECONOMIC SECURITY	EDUCATION	HEALTH	LIVING ENVIRONMENT
DECENT WORK	1.00	0.19	-0.08	0.06	0.05
ECONOMIC SECURITY		1.00	0.04	0.03	0.06
EDUCATION			1.00	0.33	0.03
HEALTH				1.00	0.07
LIVING ENVIRONMENT					1.00

Average values of associations between dimensions for the period 2004-2013 were computed considering all observations in which $\boldsymbol{V}$ coefficients were statistically significant (see Annex II).

Source: own elaborations based on EU-SILC 2004-2013

2.3 Weighting system

The last crucial normative choice required by an empirical multidimensional poverty analysis is the setting of a weight system. As underlined by Decancq and Lugo (2013), weights are central in determining the trade-offs between the dimensions of well-being. From a normative point of view, attaching different weights to dimensions (or simply deciding to assign them equal weights) means attaching value judgments

on how a good life should look like and this has of course implications on poverty figures, reason why choices about weights should be as explicit as possible.

As discussed in Chapter I Section 2.1, several procedures can be followed to set a system of weights. One of the most used consists in giving the same weight to each dimension (or indicator). According to Brandolini (2008), equal weighting may result from a wish to reduce the researcher's influence to a minimum, or from the lack of information about some kind of consensus view (i.e., embracing an agnostic point of view). Equal weighting can be on the other hand justified by the normative assumption that the selected dimensions and indicators are considered equally important, as it has been said for the HDI (Decancq and Lugo, 2013).[69] Weights can be set also through an unequal weighting procedure, that can be guided by normative assumptions or can be data driven (most frequently used techniques include frequency-based weights, statistical weights, most favourable weights. For a thorough review on weights in multidimensional indices of well-being, see Decancq and Lugo, 2013) or result from a mix of the two (a hybrid approach). A normative unequal weighting procedure suggests that weights represent a sort of consensus or a scheme of preferences about what a decent life is (see Mack and Lansley, 1985; Halleröd, 1995). However, as pointed out by Fleurbaey, "[…] there is little philosophical or economic theory that gives us clues about how to form such preferences." (2009, p. 1055) In this sense, Rawls admits that the construction of an index of primary social goods is no easy task and presents a number of difficulties. Nonetheless, he reminds us that if we accept that the principles of justice are serially ordered this problem is greatly simplified. In fact, it is not necessary to balance the liberties or the opportunities against other values, as they are always equal by construction (Rawls, 1971, p. 80). In light of this suggestion, we set an equal weighting scheme for dimensions and nested weights for indicators to investigate multidimensional poverty in Italy. An outline of the chosen dimensions, indicators, cut-offs and weights is provided in Table IV.3.

Table IV.3. Overview of selected dimensions, category of social primary goods, indicators and weights

Dimension	Rawlsian category of social primary goods	Indicators	Weights	
			Indicator	Dimension
Decent work	(1) Basic rights and liberties (2) The freedom of movement and choice of occupation (3) Powers and prerogatives of offices and positions of authority and responsibility (5) The social bases for self-respect	Unemployment	1/5	1/5
Economic security	(4) Income and wealth	Income poverty	1/5	1/5
Health	(5) The social bases of self-respect	Bad health status	1/15	1/5

[69] On the other hand, Ravallion (1997) looked at the implied marginal rates of substitution among the dimensions of the HDI and showed that value judgments underlying the trade-offs built into the HDI are not made explicit and therefore questionable. He found that "The HDI's implicit monetary valuation of an extra year of life rises from a remarkably low level in poor countries to a very high level in rich ones. In terms of both absolute dollar values and the rate of GDP growth needed to make up for lower longevity, the construction of the HDI assumes that life is far less valuable in poor countries than in rich ones; indeed, it would be nearly impossible for a rich country to make up for even one year less of life on average through economic growth, but relatively easy for a poor country." (Ravallion, 1997, p. 633)

		Chronic illness	1/15	
		Unmet medical needs	1/15	
Education	(5) The social bases of self-respect	Low educational attainment	1/5	1/5
Living environment	(2) The freedom of movement and choice of occupation	Poor quality of dwelling	1/25	1/5
		Lack of adequate basic sanitation facilities in dwelling	1/25	
		Noise	1/25	
	(5) The social bases of self-respect	Crime	1/25	
		Pollution	1/25	

Source: author

3. Aggregation strategy

To compute the ISPI for Italy we have made use of Rippin's (2010; 2012a) multidimensional ordinal poverty measures as her inequality-sensitive methodology empirically tested on the German case (2012b; 2015) has some appealing identification properties. As discussed in Chapter I, Rippin's innovative family of poverty indices is constructed on a multi-step identification function (4.1) that differentiates between the non-poor on the one hand, and those who are affected by different levels of deprivation on the other. One main advantage of such method for identifying the poor is that it is in a way a fuzzy set approach, because it avoids the dichotomization of the population into two crisp groups (poor and non-poor), while allowing for the identification of different degrees of poverty severity (Rippin, 2012b). In fact, individuals that score between greater than 0 and 1 according to Rippin's poverty measures are all considered to some extent poor. This also means that this methodology does not require the setting of an overall poverty cut-off, hence the level of arbitrariness used throughout the identification process is minimized. The proposed identification function is as follows:

$$\rho\,(c_{i\cdot}; z) = \begin{cases} f(c_{i\cdot}) & if \ \max\{c_{i\cdot}\} = 1 \\ 0 & if \ \max\{c_{i\cdot}\} = 0 \end{cases} \tag{4.1}$$

where $c_{i\cdot} = (c_{i1}, \ldots, \ c_{ik})$ is the deprivation vector of individual i and z represents the vector of the chosen poverty thresholds. In the case of ordinal variables, ρ allows for taking into account the level of social inequality aversion through the setting of a parameter α, which determines the social weight assigned to individuals placed in the lower part of the distribution, i.e., the poorest of the poor. The higher is the level of α, the higher is the weight given to the worse-off: this is turn implies that the final poverty measure will be more sensitive to the level of inequality among the poor. From a theoretical standpoint, the use of an inequality aversion parameter to fine-tune the identification function perfectly interprets Rawls' concern for the least advantaged and can be viewed as an adaptation of the Rawlsian maximin principle. As seen in Chapter II, from a Justice as Fairness perspective priority should be given to the worst-off individuals in a society. A natural way to introduce such a concern for inequality is exactly to penalize the overall level of poverty by adjusting it with a parameter α interpretable as a 'degree of bottom

sensitivity' (Decancq and Schokkaert, 2013), allowing to capture differences in opinion on what justice requires. Rippin's identification function for ordinal variables assumes the following form:

$$\rho_{CS}\,(c_i.;z) = \begin{cases} \delta_i^{\alpha} & if \;\; \max\{c_i.\} = 1 \\ 0 & if \;\; \max\{c_i.\} = 0 \end{cases} \tag{4.2}$$

where $\delta_i^{\alpha} = \sum_{j\in\{1,\dots,k\}:c_{ij}=1} a_j$ denotes the sum of the weighted deprivations suffered by individual i. The poverty measure belonging to this family that has been used by Rippin to measure multidimensional deprivation in Germany (Rippin, 2012b; 2015), is the Correlation Sensitive Poverty Index (CSPI) defined as:

$$P_{CS}(X;z) = \frac{1}{n}\sum_{i\in S_j}\delta_i^{\alpha+1} \tag{4.3}$$

where n is the total population and S_j is the set of individuals who are deprived with respect to dimension j.[70] A number of key features make the CSPI appealing for our analysis. These are (i) its decomposability by dimensions, regions and sub-groups, which makes it easier for us to identify what are the aspects of multidimensional poverty that deserve priority interventions and where (either geographically or socioeconomically) they are nested; (ii) its sensitivity to the joint distribution of deprivations, that is, its capability to look across dimensions for the achievements of the same individual. This allows to quantify the extent to which an individual is simultaneously deprived in different well-being dimensions, which, as also remarked by Stiglitz et al. (2009), is a key feature for improving developing measures and understanding how suffering from multiple disadvantages at once can affect people's quality of life; and finally (iii) the possibility to decompose it into three fundamental aspects of poverty, i.e., incidence, intensity and inequality (Sen, 1976; Jenkins and Lambert, 1997; Rippin, 2012a):

$$P_{CS}(X;z) = H\cdot\mu(\delta)^{\alpha+1}\cdot[1+2GE_{\alpha+1}(\delta)] \tag{4.4}$$

where $\alpha > 0$; H is the headcount ratio accounting for the incidence of poverty; $\mu(\delta)^{\alpha+1}$ is the aggregate deprivation count ratio, accounting for the breadth of poverty; and the third term, $GE(\delta) = [1/q\,(\theta^2-\theta]\sum_{i\in S_j}[\delta/\mu\,(\delta)]^{\theta} - 1$ is a Generalized Entropy measure capturing the inequality of the distribution among the poor (Rippin, 2012b). In light of these reasons, we have decided to adopt the CSPI as a methodological base to compute our multidimensional poverty measure for Italy. In what follows, we will provide the results of our empirical analysis at both national and regional level, along with

[70] The final formula is in fact the result of a two-step calculation: $P_{CS} = \frac{1}{n}\sum_{i\in S_j}\delta_i^{\alpha}\sum_{j\in\{1,\dots,k\}:c_{ij}=1}a_j = \frac{1}{n}\sum_{i\in S_j}\delta_i^{\alpha+1}$, with $\sum_{i\in S_j}\delta_i^{\alpha}$ being the individual weight calculated in the identification step. This separation between the identification and the aggregation step enables the additivity of the index in the aggregation step, and thus the fulfilment of the Factor Decomposability axiom (Rippin, 2012b).

dimensional decompositions. For now, we set the inequality aversion parameter equal to 1. This rather conservative way to choose α suits particularly well as long as a deeper analysis of the relationship between poverty dimensions is lacking. We will scrutinize the possibility of choosing more appropriate levels of α in further research steps.

4. Multidimensional poverty in Italy

In this section we first present the results of our analysis on multidimensional poverty in Italy in 2011 using the Italian cross-sectional component of the EU-SILC. We had at our disposal a sample of roughly 40,500 individuals. As the existence of missing values in one or more of the chosen indicators resulted in the removal of the whole observation, the sample reduced to about 38.800 individuals, that is, to 95% of its original size. We then investigate on how each dimension has contributed to overall poverty and then conclude the analysis by showing the trend of multidimensional poverty for years 2004 to 2013.

4.1. Multiple deprivations and the Italian population

4.1.1. Geographical patterns

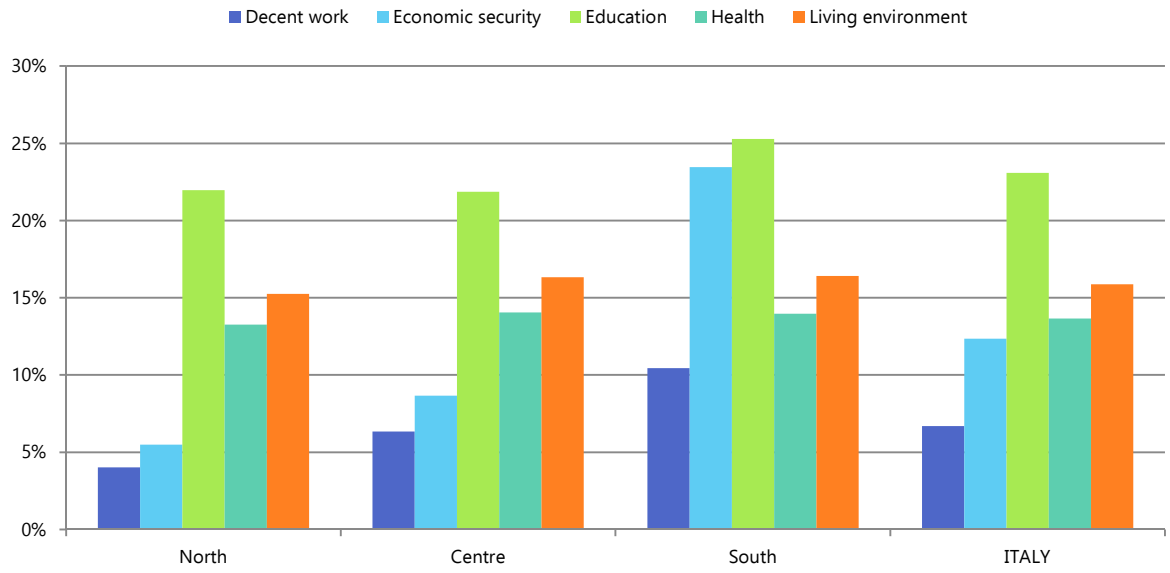
Before aggregating the data into a multidimensional poverty index, we have studied the marginal distribution of socio-economic deprivations across the Italian population. Marginal distributions broken down by geographical area and urban degree (Figures IV.1 and IV.2) show that people living in the South of Italy experience the highest number of shortfalls in all dimensions but health, whose deprivations are quite evenly distributed nationally but more widespread in the Centre. Economic insecurity is worryingly high in southern regions, as also confirmed by Istat official poverty figures commented further on in this Section. Deprivations in decent work are also a major concern for people living in the South, where the unemployment rate attained 13.6% in 2011 and is constantly increasing (17.2% in 2012 and 19.7% in 2013) (Istat, 2013). Unemployment, on the other hand, is apparently a concern for people living in all degrees of urbanisation, as well as health-related problems. Shortfalls in educational attainment are strikingly high throughout the country, with a peak in the South where in 2011 one every four individuals had not completed the lower secondary school. Not surprisingly, deprivations in living environment are lower in thinly populated areas, where on the other hand low educational attainment levels are much more concentrated compared to urbanised areas. At aggregate level, the North is less deprived, both in terms of social and economic functionings, compared to the poorer South.

Marginal distributions broken down by the 19 Italian regions plus the 2 autonomous provinces of Trento and Bolzano[71] are shown in Figure IV.3. In northern regions the distribution of deprivations across dimensions is quite homogeneous. Two cases belonging to this group that stand out are those of the provinces of Bolzano and Trento, where a very small percentage of the population reports unemployment

[71] Trento and Bolzano are the only two autonomous provinces in Italy (D.P.R. del 31 Agosto 1972, n. 670). Together they form the region Trentino Alto-Adige, which is one of the five Italian special status regions along with Aosta Valley, Friuli Venezia Giulia, Sicily and Sardinia. See Annex III for a classification of Italian administrative territories.

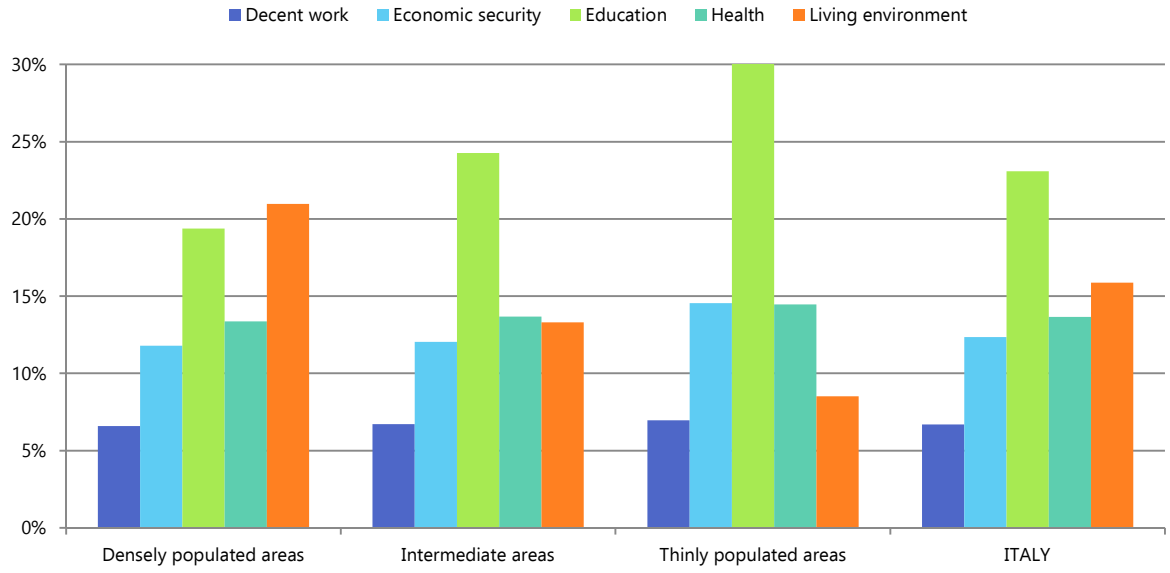
and bad health conditions compared to the average rates of the area. Conversely, Liguria and Piedmont show the highest unemployment levels of the North, along with frequent cases of poor human health and environmental conditions.[72] As also shown above, the farther South we go, the more important income poverty becomes. Around one every five people living in Campania, Apulia and Basilicata relies on an income that is not sufficient to get along and in Sicily this proportion attains 32%.

Figure IV.1. Marginal distributions of deprivations by geographical area



Source: own elaborations based on EU-SILC 2011

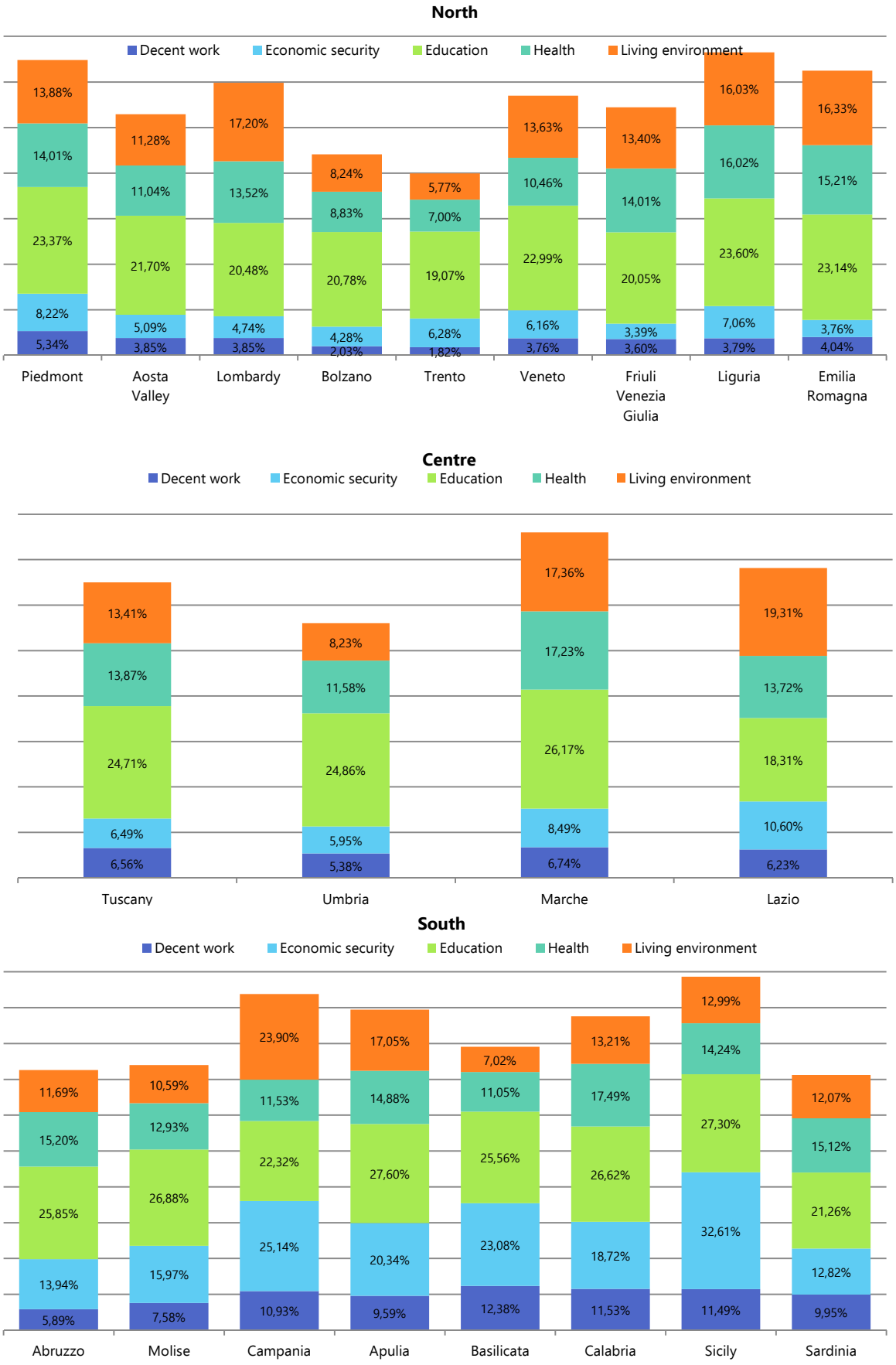
Figure IV.2. Marginal distributions of deprivations by degree of urbanisation



Source: own elaborations based on EU-SILC 2011

[72] Liguria and Piedmont have the highest proportion of retired people every 100 inhabitants of the country. In 2012, against a national average of 18.98%, in Liguria there were 24.37% retired people every 100 inhabitants, while in Piedmont the proportion attains 24.4% (source: *Statistiche della previdenza e dell'assistenza sociale. I trattamenti pensionistici*, accessible online at I.Stat).

Figure IV.3. Marginal distributions of deprivations by region



Source: own elaborations based on EU-SILC 2011

Deprivations in decent work are also widespread in Basilicata (12.38%), Calabria (11.53%) and Sicily (11.49%). Concerning the Living environment dimension, Campania, Lazio, Lombardy and Marche have the highest incidence of people reporting to live in bad environmental conditions, while Umbria and Basilicata are the most virtuous regions after the provinces of Bolzano and Trento. As seen in Figure IV.2, deprivations in living environment are concentrated where the population is more urbanised. In fact, taken together, Campania, Lombardy and Lazio are the region where resides one third of the entire Italian population (Istat, 2014a). Obviously, the quality of the living environment – especially when natural environment is taken into account – also depends on the structure of regional productive systems, which can have a considerable impact on the quality of the air or on landscape (OECD, 1999). This is the case of the economies of northern regions like Piedmont and Emilia Romagna, where deprivations in living environment are a concern and whose local productive systems are characterized by a stronger industrial presence compared to the rest of the country (Istat, 2013).

Figures about multiple deprivations incidence for all regions are reported in Table IV.4.[73]

Table IV.4. Relative frequencies of marginal distributions of deprivations by region

Region	Decent work	Economic security	Education	Health	Living environment
Piedmont	5.34%	8.22%	23.37%	14.01%	13.88%
Aosta Valley	3.85%	5.09%	21.70%	11.04%	11.28%
Lombardy	3.85%	4.74%	20.48%	13.52%	17.20%
Bolzano	2.03%	4.28%	20.78%	8.83%	8.24%
Trento	1.82%	6.28%	19.07%	7.00%	5.77%
Veneto	3.76%	6.16%	22.99%	10.46%	13.63%
Friuli Venezia Giulia	3.60%	3.39%	20.05%	14.01%	13.40%
Liguria	3.79%	7.06%	23.60%	16.02%	16.03%
Emilia Romagna	4.04%	3.76%	23.14%	15.21%	16.33%
Tuscany	6.56%	6.49%	24.71%	13.87%	13.41%
Umbria	5.38%	5.95%	24.86%	11.58%	8.23%
Marche	6.74%	8.49%	26.17%	17.23%	17.36%
Lazio	6.23%	10.60%	18.31%	13.72%	19.31%
Abruzzo	5.89%	13.94%	25.85%	15.20%	11.69%
Molise	7.58%	15.97%	26.88%	12.93%	10.59%
Campania	10.93%	25.14%	22.32%	11.53%	23.90%
Apulia	9.59%	20.34%	27.60%	14.88%	17.05%
Basilicata	12.38%	23.08%	25.56%	11.05%	7.02%
Calabria	11.53%	18.72%	26.62%	17.49%	13.21%
Sicily	11.49%	32.61%	27.30%	14.24%	12.99%
Sardinia	9.95%	12.82%	21.26%	15.12%	12.07%
ITALY	6.70%	12.34%	23.09%	13.67%	15.87%

Colour legend: red = highest deprivation rates; green = lowest deprivation rates. For insights on how to read the table, please see footnote 73.

Source: own elaborations based on EU-SILC 2011

[73] Please note that percentages shown in Table IV.4 for each region *do not* coincide with the headcount of deprived people for that region, presented further on in this Section. This can be explained by recalling that when we study the joint distribution of deprivations every individual could be deprived in more than one dimension; still, they would count as one in the computation of the overall headcount. Table IV.4 therefore does include double counting.

Regions that have the highest deprivation rate in any dimension – Basilicata, Sicily, Apulia, Calabria and Campania – are highlighted in red, while the best-performing ones – namely, Trento, Friuli Venezia Giulia and Lazio – are highlighted in green. It is certainly no surprise that southern regions rank among the worse-off, while regions like Trento or Emilia Romagna, where quality of life levels are indeed among the highest ones in Italy (see for instance Istat's report on Equitable and Sustainable Well-being, 2014; and Quars 2011 from *Sbilanciamoci!* campaign, Gnesi et al., 2012) report lower deprivation scores. However, marginal distributions figures reveal also some intermediate situations that are worth highlighting: Marche, for instance, has deprivation rates above the national average in four dimensions out of five, namely decent work, education, health and living environment.

4.1.2. The role of age

Let us now focus on the distribution of deprivations among the five dimensions at aggregate level, presented in detail in Table IV.5.

Table IV.5. Relative frequencies of marginal distributions of deprivations by cohort

Cohort	Decent work	Economic security	Education	Health	Living environment
16-24	13.87%	19.14%	2.02%	2.52%	16.09%
25-39	12.34%	15.93%	3.37%	4.70%	15.11%
40-54	6.77%	14.06%	7.55%	9.16%	15.59%
55-64	3.89%	9.03%	27.47%	15.51%	16.71%
65+	0.30%	6.50%	63.67%	30.02%	16.31%
ITALY	6.70%	12.34%	23.09%	13.67%	15.87%

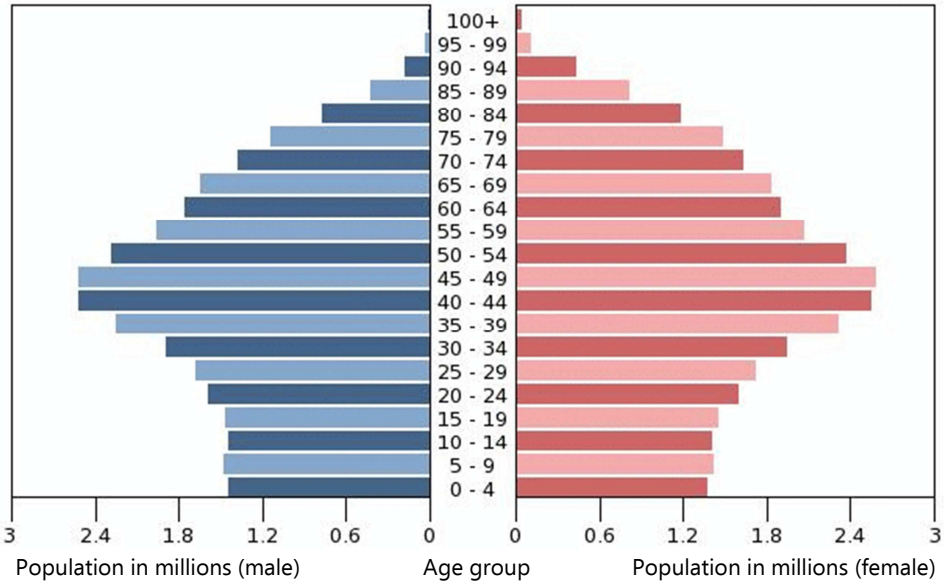
Colour legend: red = highest deprivation rates; green = lowest deprivation rates. For insights on how to read the table, please see footnote 73.

Source: own elaborations based on EU-SILC 2011

A common feature for all Italian regions is the extremely high incidence of poverty in terms of educational attainment, which is confirmed by a proportion of 23% of the whole population reporting deprivation in the education dimension, meaning that in Italy about one every four persons has not completed the lower secondary school. Such evidence is not only an alarmingly bad performance in terms of educational attainment but could also be read as a sign of failure in complying with national laws regulating compulsory schooling. However, this evidence needs to be crosschecked with the age structure of the Italian population, whose ageing index (attaining 154.1 in 2014, according to Istat, 2014b) reveals a clear prevalence of people aged 65 and over on the population under 15. The age pyramid (Figure IV.4) confirms this unbalanced composition towards the elderly that certainly affects the preponderance of certain deprivations over others throughout the Italian population.

Age certainly has an influence on people's quality of life. Breaking down marginal distributions by cohort (Figure IV.5) reveals that there exist clear trends of life domains to improve or deteriorate according to the different life stages to which people belong. Income poverty and unemployment are a major concern

Figure IV.4. Age pyramid of the Italian population



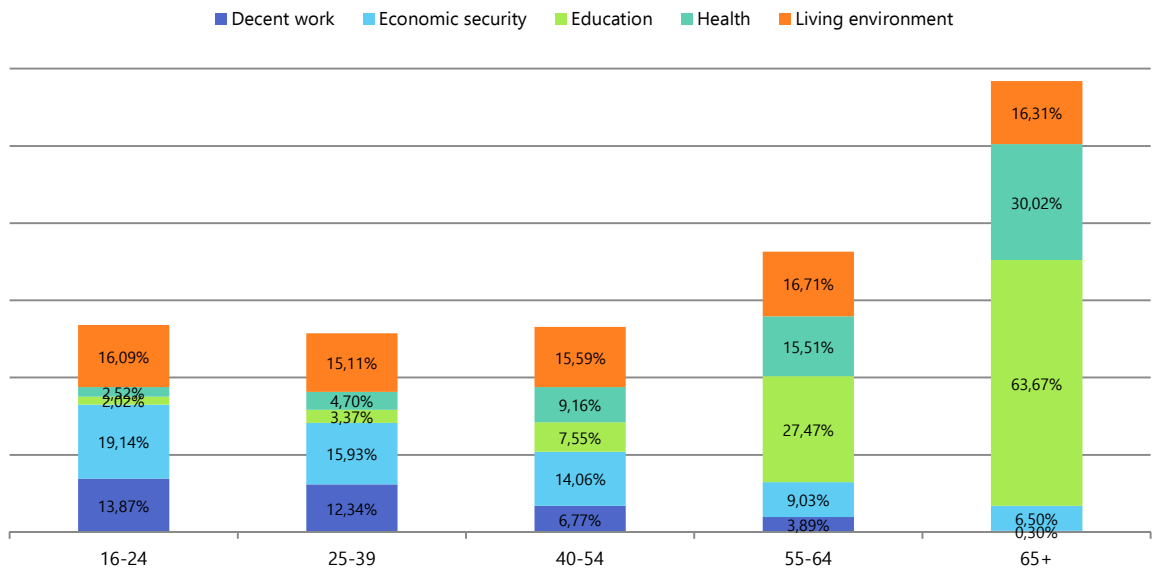
Source: CIA World Factbook 2014 (via www.indexmundi.com)

for people aged 16-24 and for young adults. Deprivations across the five dimensions are more evenly distributed among people aged 40-54 (each dimension ranging from roughly 7% to 15%), while for the cohort 55-64 and people aged 65 and over health-related problems and low educational attainments are more diffused. This trend is confirmed also by the study of the contribution of cohorts to dimensional deprivations shown in Figure IV.6: 70% of unemployed people are represented by the under 40, who also account for more than 50% of the entire income poor population. Among the elderly, who are not deprived in terms of decent work[74], contribute to roughly 10% to deprivations in economic insecurity, 20% to poor environmental or housing conditions, to almost 50% to bad health to more than 60% to low educational attainment. The older the individuals are, the higher their weight in dimensional deprivation in living environment, health and education.

Within the health dimension, age seems to play a role as well in determining the distribution of different deprivations across the population. As shown in Figure IV.7, as age increases cases of chronic illness and unmet medical needs become more important. The majority of the people aged 16-64 reports to be in good health, while the elderly represent around 60% of those who suffer from very bad health conditions. Conversely, the deprivation rate in living environment remains the same across all cohorts. It might be worth recalling that three out of five components of this dimension are self-reported and subjectively evaluated – namely, noise, crime and pollution. These three indicators identify a deprived condition whenever the individual feels that any of them represents a problem for the area where she lives. As a consequence, deprivations in living environment are apparently not affected by psychological or physical factors depending on one's life stage.

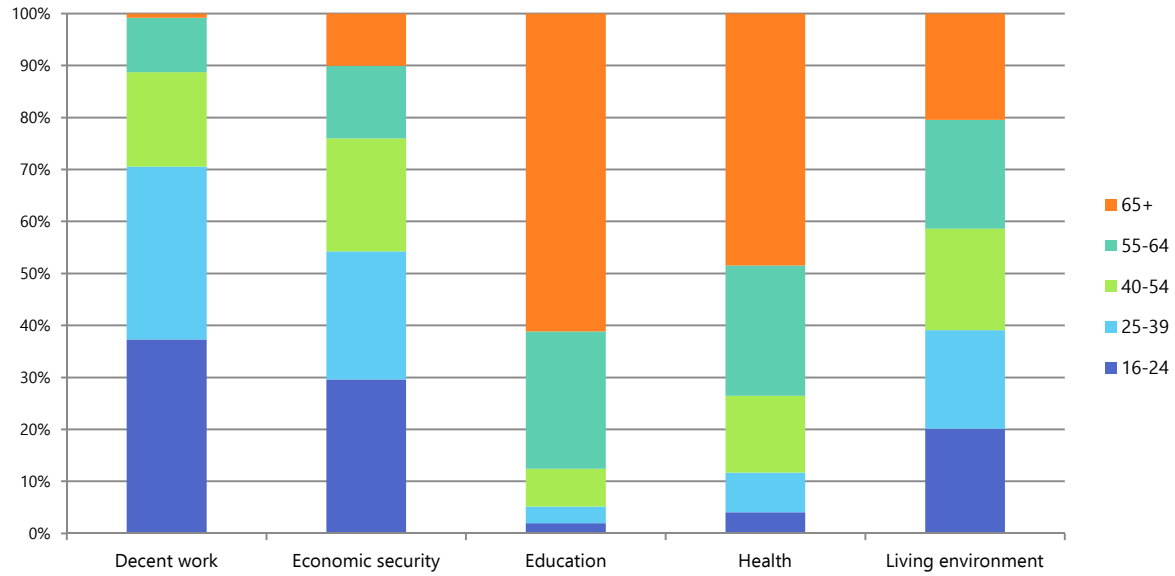
[74] As shown in Table IV.1, the way the variable 'activity status' has been set to account for unemployment excludes retired people from the total count of the unemployed.

Figure IV.5. Marginal distributions of deprivations by cohort



Source: own elaborations based on EU-SILC 2011

Figure IV.6. Contribution of cohorts to dimensional deprivations

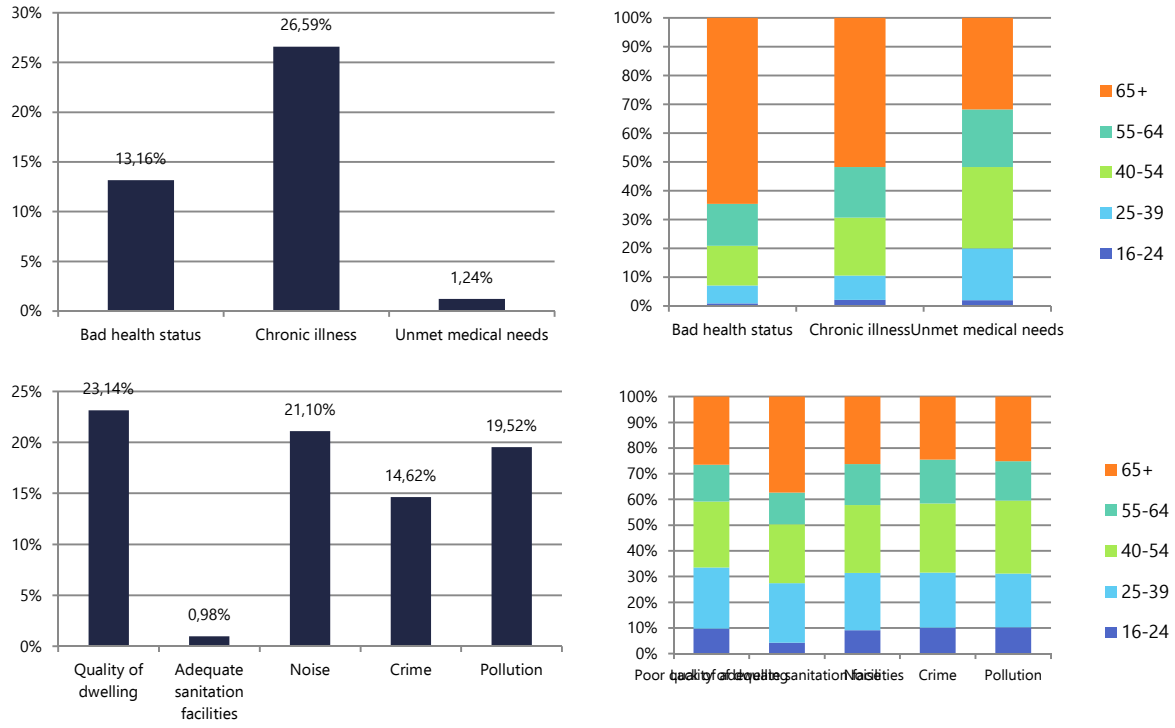


Source: own elaborations based on EU-SILC 2011

At national level, the stronger contribution to deprivations in health is given by chronic illness (26.6%), followed by self-reported general health (13.1%) and unmet medical needs (1.2%), showing that access to medical care is not an issue in Italy but bad health statuses are a concern for one tenth of the population. Within the living environment dimension, great part of the total deprivation score is driven by dwellings in bad conditions (23.1%) and situated in areas where noise (21.1%) and pollution (19.5%) are an issue. Problems related to crime and physical insecurity are less diffused but still a concern for 14.6% of the

population, while the lack of basic indoor sanitation facilities for the sole use of the household is a rarely encountered problem.

Figure IV.7. Relative frequencies of marginal distributions in health and living environment by cohort

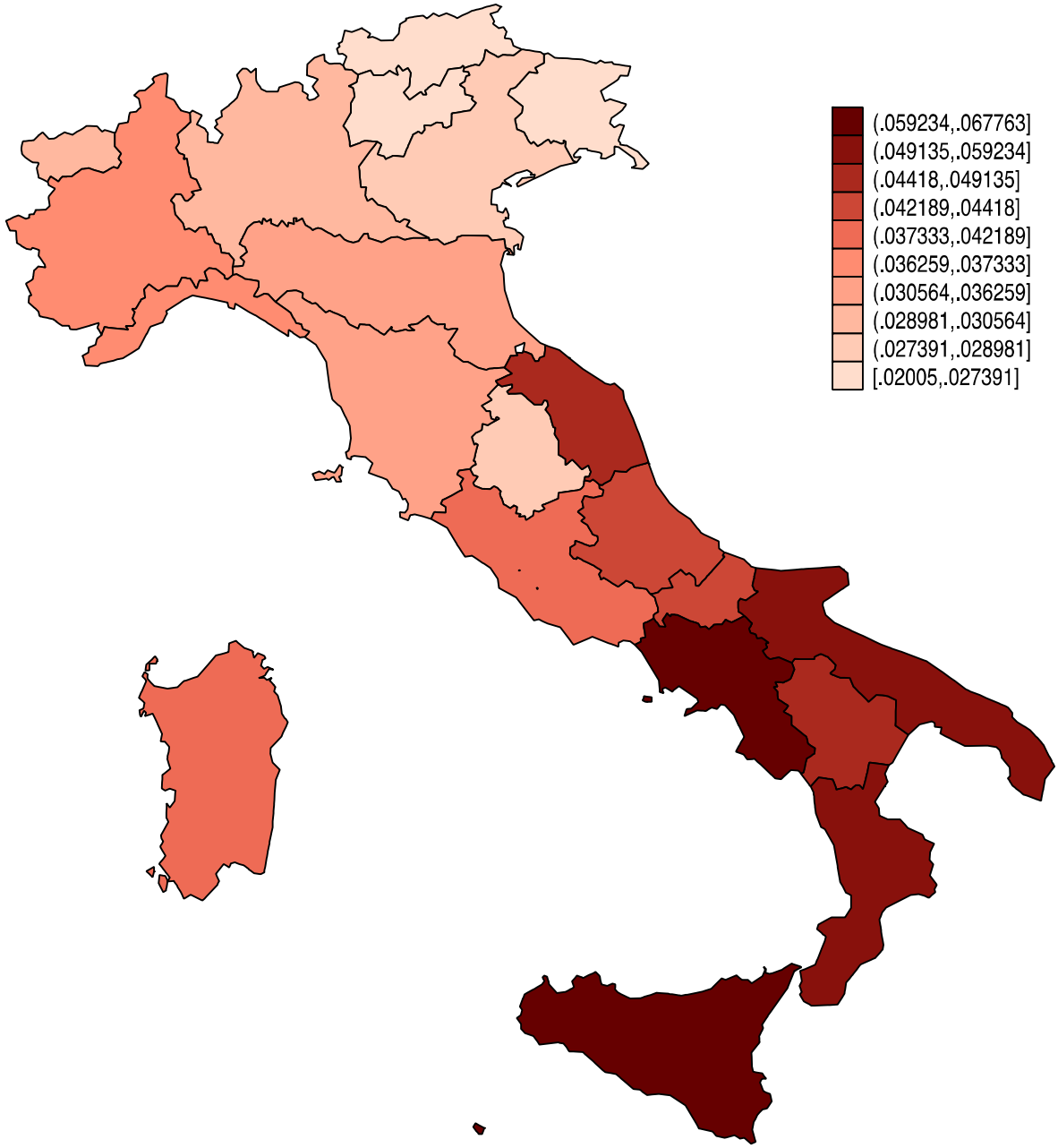


Source: own elaborations based on EU-SILC 2011

4.2. Territorial disparities: incidence, intensity and inequality

Figure IV.8 shows the multidimensional poverty map of Italy according to ISPI estimates for year 2011. Not surprisingly, the South of Italy shows the highest multidimensional poverty score of the country and the majority of southern regions – Sicily, Campania, Apulia, Calabria and Basilicata – are at the bottom of the regional ranking. At aggregate level, the Centre and the North get poverty scores not too far from each other – respectively 0.038 and 0.031 – although within each group there are remarkably different situations: Marche, for instance, has one of the highest scores of the entire ranking, 0.046, placing at an even lower position compared to a number of southern regions. Umbria, on the contrary, shows very low multidimensional poverty levels, with a score that is quite close (0.029) to those of the better-off territories, namely the provinces of Trento and Bolzano. At aggregate level, the North-East shows considerably lower levels of multidimensional poverty compared to the rest of the country. Intermediate areas are the less poor, followed by densely and thinly populated areas, which get a score well beyond the national average. Detailed figures about multidimensional poverty scores broken down by region, geographical area and degree of urbanisation are provided in Table IV.6.

Figure IV.8. Multidimensional poverty map, Italy 2011



Source: own elaborations based on EU-SILC 2011

Table IV.6. Multidimensional poverty levels by region, geographical area and degree of urbanisation

		Three I's of poverty			Categories of incidence by poverty severity					Contribution of dimensions to ISPI						
Region	ISPI	Incidence	Intensity	Inequality	HC_1	HC_2	HC_3	HC_4	HC_5	Decent work	Economic security	Education	Health	Living environment	Istat relative poverty	Eurostat AROPE
Piedmont	0.036	69.11%	0.035	1.4993	35.98%	24.19%	8.19%	0.75%	0.00%	10.55%	15.95%	38.84%	20.11%	14.56%	5.90%	20.11%
Aosta Valley	0.029	58.11%	0.033	1.5068	31.65%	18.06%	7.65%	0.75%	0.00%	10.30%	11.69%	44.20%	19.00%	14.82%	4.30%	12.82%
Lombardy	0.031	71.84%	0.028	1.5356	40.36%	22.45%	8.60%	0.40%	0.03%	8.42%	10.60%	40.20%	21.54%	19.24%	4.20%	15.40%
Bolzano	0.022	51.21%	0.030	1.4172	32.44%	14.23%	4.35%	0.19%	0.00%	5.46%	10.41%	52.12%	19.52%	12.48%	10.40%	10.52%
Trento	0.020	45.99%	0.030	1.4459	30.56%	12.60%	2.47%	0.36%	0.00%	5.82%	18.52%	50.01%	16.76%	8.89%	3.40%	15.14%
Veneto	0.029	67.63%	0.028	1.4957	39.53%	20.91%	6.62%	0.55%	0.01%	8.16%	13.12%	45.41%	17.59%	15.73%	4.30%	15.86%
Friuli Venezia Giulia	0.027	66.98%	0.026	1.5482	37.29%	21.88%	7.36%	0.46%	0.00%	8.03%	9.01%	43.53%	23.58%	15.85%	5.40%	16.96%
Liguria	0.037	71.65%	0.034	1.5118	38.49%	22.94%	8.94%	1.21%	0.06%	6.29%	13.75%	40.57%	21.90%	17.49%	6.20%	19.95%
Emilia Romagna	0.033	69.90%	0.032	1.4780	36.37%	23.55%	9.71%	0.25%	0.03%	7.99%	7.92%	42.71%	22.13%	19.25%	5.20%	14.12%
Tuscany	0.036	67.34%	0.037	1.4433	35.20%	23.39%	8.06%	0.68%	0.01%	11.66%	12.15%	41.04%	20.18%	14.97%	5.20%	20.78%
Umbria	0.029	58.57%	0.037	1.3530	34.30%	18.31%	5.73%	0.23%	0.00%	10.07%	11.79%	47.76%	20.26%	10.12%	8.90%	21.32%
Marche	0.046	77.01%	0.039	1.5314	36.34%	26.40%	12.45%	1.67%	0.15%	10.41%	13.78%	38.25%	21.70%	15.86%	5.20%	22.32%
Lazio	0.038	73.03%	0.035	1.4970	39.92%	23.05%	9.18%	0.87%	0.01%	10.74%	18.76%	31.36%	19.53%	19.60%	7.10%	23.79%
Abruzzo	0.043	70.92%	0.042	1.4631	37.45%	21.98%	10.24%	0.83%	0.42%	9.53%	21.15%	38.88%	19.48%	10.96%	13.40%	27.82%
Molise	0.044	69.55%	0.045	1.4041	34.49%	22.04%	11.93%	1.09%	0.00%	12.42%	24.71%	36.83%	16.59%	9.45%	18.20%	33.46%
Campania	0.062	80.14%	0.055	1.4115	36.82%	28.58%	12.08%	2.49%	0.17%	13.20%	28.46%	26.53%	12.29%	19.52%	22.40%	47.16%
Apulia	0.059	75.83%	0.056	1.4034	35.25%	24.85%	13.05%	2.52%	0.17%	12.51%	24.65%	32.70%	16.15%	13.99%	22.60%	41.83%
Basilicata	0.049	67.59%	0.055	1.3272	37.77%	19.93%	8.16%	1.67%	0.07%	16.53%	30.46%	33.40%	13.49%	6.12%	23.30%	49.25%
Calabria	0.057	73.56%	0.057	1.3745	32.82%	25.34%	13.16%	2.24%	0.00%	14.09%	22.08%	33.50%	19.02%	11.30%	26.20%	44.36%
Sicily	0.068	77.39%	0.065	1.3476	33.76%	27.94%	12.44%	3.05%	0.21%	12.88%	33.74%	29.34%	13.92%	10.12%	27.30%	53.82%
Sardinia	0.042	66.48%	0.046	1.3825	32.73%	22.22%	10.65%	0.86%	0.02%	15.13%	21.09%	31.54%	20.06%	12.17%	21.10%	31.99%
North	0.031	69.19%	0.030	1.5122	38.26%	22.27%	8.13%	0.51%	0.02%	8.47%	11.81%	41.65%	20.74%	17.33%	4.90%	16.26%
Centre	0.038	70.63%	0.036	1.4769	37.53%	23.22%	8.98%	0.87%	0.03%	10.93%	15.56%	36.35%	20.11%	17.05%	6.40%	22.46%
South	0.059	75.75%	0.056	1.3912	35.08%	26.08%	12.11%	2.32%	0.16%	13.06%	27.82%	30.35%	15.01%	13.75%	23.30%	44.82%
Densely populated areas	0.042	75.24%	0.037	1.5291	39.44%	24.81%	9.68%	1.26%	0.07%	11.29%	20.01%	30.88%	17.10%	20.72%	11.80%	26.38%
Intermediate areas	0.041	70.14%	0.040	1.4624	36.43%	22.92%	9.56%	1.17%	0.07%	11.34%	19.92%	37.36%	18.32%	13.05%	12.04%	26.79%
Thinly populated areas	0.046	66.31%	0.051	1.3559	31.95%	23.16%	9.96%	1.17%	0.09%	10.25%	21.33%	41.46%	18.76%	8.21%	14.55%	31.53%
ITALY	**0.042**	**71.75%**	**0.040**	**1.4748**	**37.01%**	**23.78%**	**9.68%**	**1.21%**	**0.07%**	**11.13%**	**20.21%**	**35.25%**	**17.86%**	**15.55%**	**11.10%**	**27.38%**

Source: own elaborations based on EU-SILC 2011, Eurostat (http://appsso.eurostat.ec.europa.eu/nui/show.do) and Istat (2012)

We have then analysed on a comparative basis how the ISPI and Istat's relative poverty indicator respectively depict poverty at national level. Being Istat's official measure a headcount, we have made use of ISPI incidence sub-indicator to facilitate the comparative analysis. Headcounts generated with the two measures are not directly comparable though, because while Istat applies a poverty cut-off to identify the poor, Rippin's identification function is constructed so as to behave like a fuzzy approach: it differentiates between individuals who score 0 (i.e., those who do not suffer from any deprivation at all) and those who score any value between greater than 0 and 1 (i.e., individuals who are deprived to any extent in the selected dimensions). Therefore, individuals that are deprived to *any* degree of poverty severity are counted in the overall headcount. Such a way to identify the poor entails the important advantage of avoiding the strict dichotomization of the population but one important drawback of the methodology could be represented by its tendency to overestimate the prevalence of the phenomenon. To overcome the risk of misinterpreting the results of the index, we have followed Rippin's suggestion (2012b) to split the overall ISPI headcount (which in our case corresponds to roughly 71% of the Italian population) into sub-categories representing different levels of poverty breadth, one for each 'category' of deprivation-affected: (1) HC_1, representing those individuals deprived in only one dimension; (2) HC_2, or those affected by any two deprivations at once; (3) HC_3, who experience three out of the five possible deprivations; (4) HC_4, or those who suffer from four out the five possible deprivations; and (5) HC_5, corresponding to those individuals affected by deprivations in all five dimensions at once. From such a categorization, it emerges that 37% of the Italian population – quite evenly distributed throughout the national territory, with a slightly highest concentration in the North and in densely populated areas – experiences deprivation in only one dimension. Roughly 24% of the population is deprived in any two dimensions, while people deprived in any three (9.8%), four (1.2%) or five (0.07%) dimensions are concentrated in the South, with Apulia, Campania and Sicily being the regions most concerned by the breadth of multidimensional poverty. Deprivation in all five dimensions, that is, the highest degree of multidimensional poverty, is a phenomenon that concerns only some regions, among which the most prominent examples in 2011 were Sicily and Abruzzo.

As a first step, we have studied how Italian regions rank according to multidimensional poverty statistics computed for each level of poverty severity in comparison with the official ranking provided by Istat for year 2011.[75] The first column of Table IV.7 shows relative poverty figures computed by Istat, while in the other columns multidimensional poverty headcount figures for all poverty cut-offs are shown: when the poverty cut-off is set at $d \geq 2$, only people deprived in 2 to 5 dimensions are counted (HC_2 to HC_5); when $d \geq 3$, people deprived in 3 to 5 dimensions are counted (HC_3 to HC_5); and finally, when $d \geq 4$, people deprived in 4 to 5 dimensions are counted (HC_4 to HC_5). Given the exiguous number of people deprived in all 5 dimensions ($d = 5$), the incidence of category HC_5 is shown together with HC_4. Correlations with Istat's ranking are accounted for by Spearman's rho coefficients.

[75] Istat does not provide official absolute poverty figures decomposed by region. Therefore, for sake of comparability, we have to rely on relative poverty figures, though it would be more consistent to compare ISPI results to absolute poverty data. Please also note that Istat poverty figures are computed at household level while ISPI headcounts are computed at individual level.

Table IV.7. Ranking of Italian regions: Istat vs. multidimensional poverty headcount (all poverty cut-offs)

Region	#	Istat relative poverty	#	ISPI headcount d≥1	#	ISPI headcount d≥2	#	ISPI headcount d≥3	#	ISPI headcount d≥4
Trento	**1**	3.40%	**1**	69.11%	**1**	13.67%	**1**	2.83%	**4**	0.36%
Lombardy	**2**	4.20%	**15**	58.11%	**8**	21.92%	**9**	9.04%	**5**	0.43%
Aosta Valley	**4**	4.30%	**3**	71.84%	**4**	20.77%	**6**	8.40%	**9**	0.75%
Veneto	**3**	4.30%	**9**	51.21%	**5**	21.48%	**4**	7.19%	**7**	0.57%
Emilia Romagna	**5**	5.20%	**12**	45.99%	**14**	24.65%	**11**	9.99%	**3**	0.28%
Tuscany	**6**	5.20%	**7**	67.63%	**9**	27.41%	**7**	8.75%	**8**	0.69%
Marche	**7**	5.20%	**19**	66.98%	**18**	32.50%	**17**	14.27%	**17**	1.82%
Friuli Venezia Giulia	**8**	5.40%	**6**	71.65%	**6**	20.73%	**5**	7.82%	**6**	0.46%
Piedmont	**9**	5.90%	**10**	69.90%	**11**	26.50%	**8**	8.94%	**10**	0.75%
Liguria	**10**	6.20%	**14**	67.34%	**12**	23.30%	**13**	10.21%	**15**	1.28%
Lazio	**11**	7.10%	**16**	58.57%	**10**	26.66%	**12**	10.06%	**12**	0.88%
Umbria	**12**	8.90%	**4**	77.01%	**3**	20.76%	**3**	5.96%	**2**	0.23%
Bolzano	**13**	10.40%	**2**	73.03%	**2**	14.63%	**2**	4.54%	**1**	0.19%
Abruzzo	**14**	13.40%	**13**	70.92%	**13**	28.40%	**14**	11.49%	**14**	1.25%
Molise	**15**	18.20%	**11**	69.55%	**16**	29.59%	**16**	13.02%	**13**	1.09%
Sardinia	**16**	21.10%	**5**	80.14%	**15**	28.20%	**15**	11.53%	**11**	0.88%
Campania	**17**	22.40%	**21**	75.83%	**20**	39.35%	**18**	14.74%	**19**	2.66%
Apulia	**18**	22.60%	**18**	67.59%	**17**	36.01%	**21**	15.73%	**20**	2.68%
Basilicata	**19**	23.30%	**8**	73.56%	**7**	26.77%	**10**	9.90%	**16**	1.73%
Calabria	**20**	26.20%	**17**	77.39%	**19**	35.49%	**19**	15.40%	**18**	2.24%
Sicily	**21**	27.30%	**20**	66.48%	**21**	39.73%	**20**	15.70%	**21**	3.25%
ITALY	-	**11.10%**	*0.431**	**71.75%**	*0.619**	**34.73%**	*0.687**	**10.95%**	*0.666**	**1.28%**

*Spearman's rho.

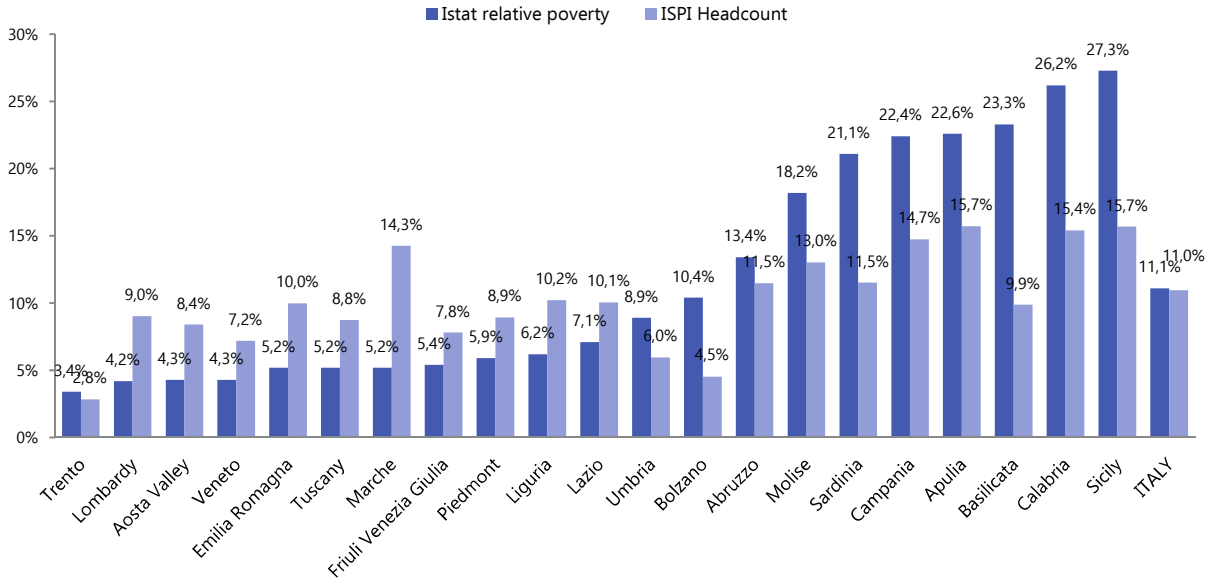
Source: own elaborations based on EU-SILC 2011 and Istat (2012)

As shown in Table IV.7, the use of multidimensional poverty metrics does not completely reverse the regional rank; at the same time, results generated by the ISPI are not trivial, as also proved by Spearman's rho, whose values range from 0.43 to 0.69, indicating the existence of a positive, medium-high correlation between the ranks (0.6 on average). In all cases, the bottom and the top of the rankings are robust, while changes occur more often in the midst of the rank.

As a second step, we have decided to select one poverty cut-off to comment on multidimensional poverty headcount figures, in order to facilitate the targeting for poverty anti-alleviation policies. Hereinafter, we will show incidence rates of multidimensional poverty computed by setting the poverty cut-off at three dimensions or above ($\boldsymbol{d \geq 3}$). We choose to do so for two main reasons: the first one follows the argument that a multidimensional analysis requires that at least two dimensions are taken into account to be able to observe a joint distribution of deprivations. This makes us exclude the category HC_1. The second one holds that, coherently with choices made to set the cut-offs within deprivation indicators, the overall poverty cut-off is supposed to identify as multidimensionally poor those who suffer from acute deprivation conditions. As a consequence, we exclude also those who suffer from deprivations in only two dimensions and set the overall poverty cut-off at three or more dimensions. This helps taking into account conditions of severe hardship while keeping poverty incidence at a still cautiously low level, i.e.,

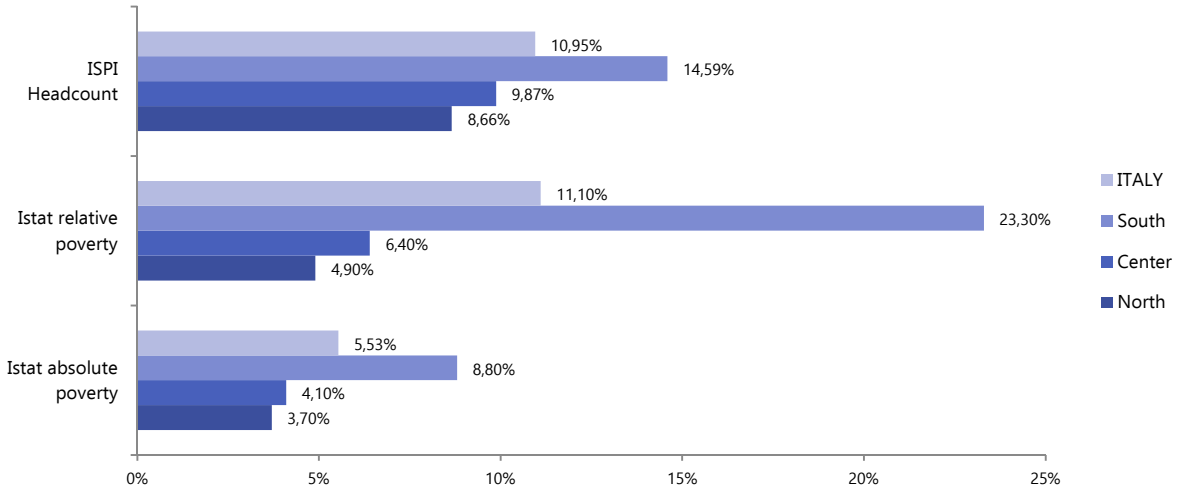
covering at least 50% of all possible deprivations.[76] Figure IV.9 presents Istat's relative poverty indicator broken down by region in comparison with ISPI headcount for year 2011, while Figure IV.10 displays both relative and absolute poverty incidence broken down by geographical area for the same year.

Figure IV.9. Multidimensional poverty headcount vs. Istat relative poverty indicator by region



Source: own elaborations based on EU-SILC 2011 and Istat (2012)

Figure IV.10. Multidimensional poverty headcount vs. Istat poverty indicators by geographical area



Source: own elaborations based on EU-SILC 2011 and Istat (2012)

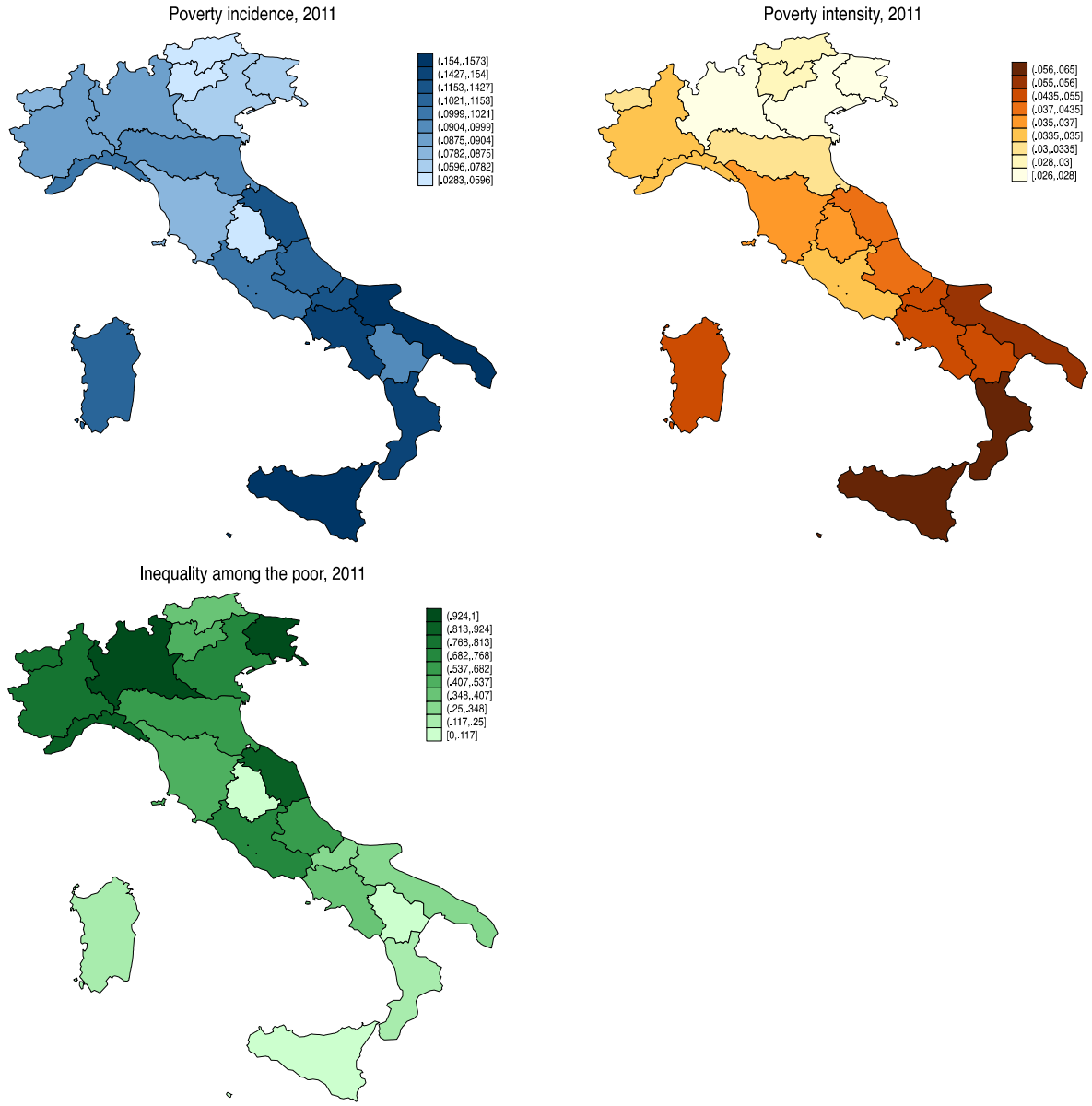
[76] Another reasonable way to proceed would have been to retain the minimum number of dimensions required to perform a multidimensional analysis – that is, two – as lacking stronger theoretical reasons to set a higher poverty cut-off, it could have been considered reasonable to make a conservative choice so as to include a higher proportion of people in the analysis and to avoid a possible loss of information. However, for sake of consistency with normative choices made in previous steps of this analysis, we have us leaned towards the $d \geq 3$ cut-off.

As illustrated in Chapter III Section 2.1, in Italy a household of two members is considered relatively poor if its average monthly expenditure for consumption is equal or less than the average monthly per capita expenditure. Istat's ranking shows that a great diversity of living standard characterizes the Italian territory. At national level, relative poverty is a concern for 11.10% of the population, while between the top- and the bottom-ranking regions – respectively Trento and Sicily – there exists a gap of roughly 24 percentage points. In fact, as aforementioned, the South of Italy is far poorer than the rest of the country: with the remarkable exception of Lazio, Umbria and Bolzano – the latter having a surprisingly high percentage of its population (10.4%) in relative poverty conditions – all regions placing in the second half of the ranking are southern ones. Multidimensional estimates reveal that approximately the same proportion of the total population, i.e., 10.95%, is multidimensionally poor. Geographical areas rank in the same way according to both poverty measures: the South remains the area of the country where poverty is more diffused, while the North shows lower incidence of multiple deprivations. Sicily is the region where poverty is more widespread according to Istat and the second to last according to the ISPI, but with a score that is extremely close to the worst-off, i.e., Apulia. Also Calabria, Apulia and Campania maintain their positions at the bottom of both rankings. Trento is the best-performing region according to both multidimensional and unidimensional poverty measures, followed by other northern regions like Veneto and Aosta Valley. However, the two rankings of Italian regions reveal some remarkable differences as well. In Bolzano, for instance, multidimensional poverty is much less diffused – i.e., it gets the 2nd place according to the ISPI – than relative monetary poverty, according to which it ranks 13th, and the same reasoning applies to Umbria. Moreover, as already emphasized by observing marginal distributions of deprivations, Marche shows surprisingly high levels of hardship from a multidimensional standpoint falling by ten positions (from the 7th place to the 17th). Lombardy's situation is reversed as well, ranking 9th according to ISPI while getting the 2nd place within Istat's. Basilicata also is also surprisingly far better-off in terms of incidence of multiple deprivations (10th) than in monetary poverty (19th).

Maps shown in Figure IV.11 display how the three components of poverty – incidence, intensity and inequality – are distributed on the Italian territory. The map in orange shows where poverty is more severe and concentrated, that is, where poor people experience in average a larger number of deprivations out of all possible deprivations. It is pretty clear that the South is the most hardly hit area of the country not only in terms of poverty diffusion but also in terms of poverty intensity. Calabria, Sicily, Apulia Basilicata and Campania are the worse-off regions, while the North-East hosts again the better-off. Whether incidence is concentrated where most people live, i.e., in urbanised areas, poverty intensity is rather a concern for scarcely populated areas, like Sardinia or regions like Basilicata, where most of the territory is mountainous. Conversely, the map in green displays that Friuli Venezia Giulia, Lombardy, Marche and Liguria have the highest level of poverty inequality, while the South of Italy, along with Umbria and Tuscany, is characterized by the lowest level of inequality among the poor.[77]

[77] Normalized values of the Generalized Entropy index used to measure inequality are shown in the map.

Figure IV.11. Multidimensional poverty maps – incidence, intensity and inequality



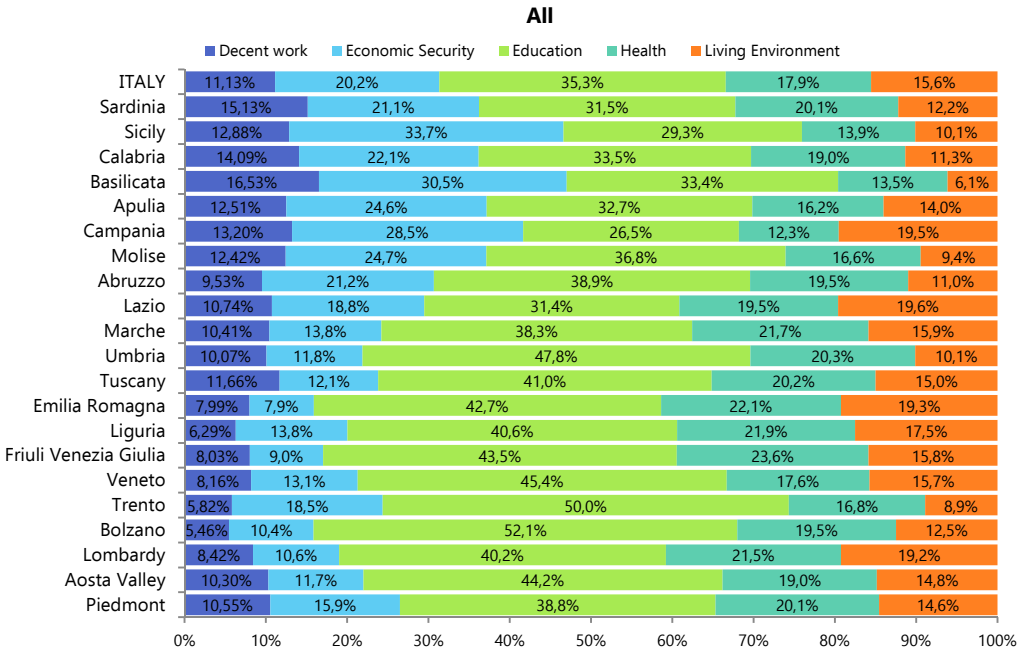
Source: own elaborations based on EU-SILC 2011

4.3. Contribution of dimensions

Figure IV.12 shows how each dimension we have selected by applying the Constitutional Approach contributes to overall multidimensional poverty in Italy and in each one of its regions. The dimension that contributes the most to overall poverty in Italy is clearly education. Even if the cut-off set for this dimension is well below the minimum legal requirement for compulsory schooling, at national level more than two thirds – in some cases even 50% within regions – of overall multidimensional poverty is explained by deprivation in educational attainment. As already said, the rather high average age of our sample (48.88 years) obviously has an important effect on deprivation levels in this dimension. However, computations of the ISPI for the subsample aged 16-64 (see Figure IV.13) reveal that the contribution of deprivation in Education remains important in most regions even when the old population is not taken

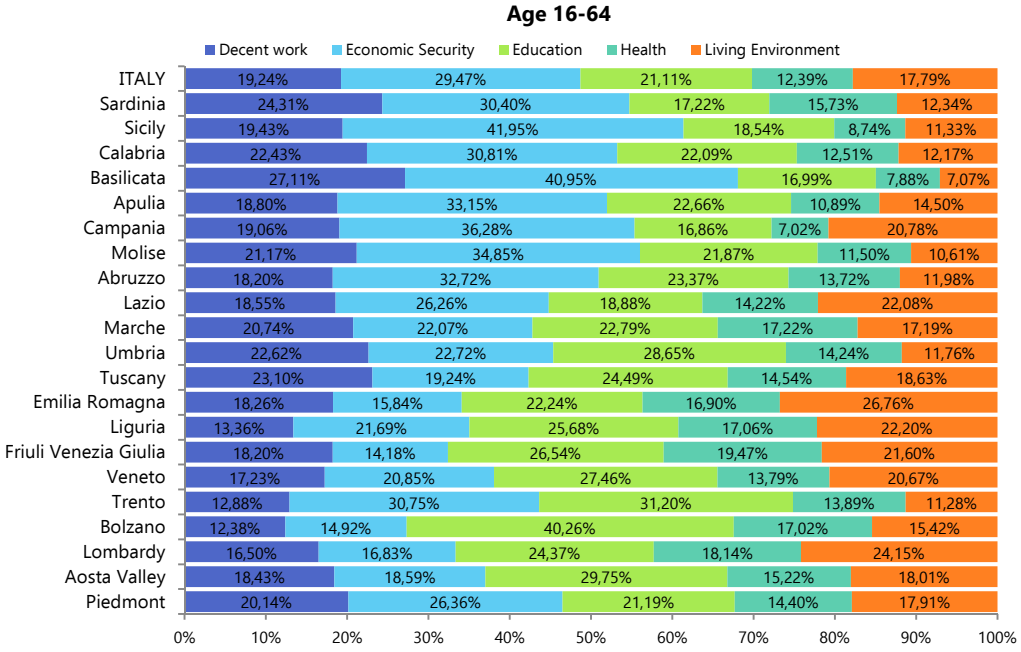
into account, especially in the North of Italy, while at national level it still counts more than deprivations in decent work. Statistics computed by Istat on the Labour Force Survey for the report *Noi Italia* (Istat, 2013) also confirm that the Italian proportion of population aged 25-64 that has attained at most a lower secondary educational level is among the highest in Europe (44.3%), where Italy is only tracked by Spain, Portugal and Malta.

Figure IV.12. Contribution of dimensions to multidimensional poverty by region



Source: own elaborations based on EU-SILC 2011

Figure IV.13. Contribution of dimensions to multidimensional poverty by region (age 16-64)



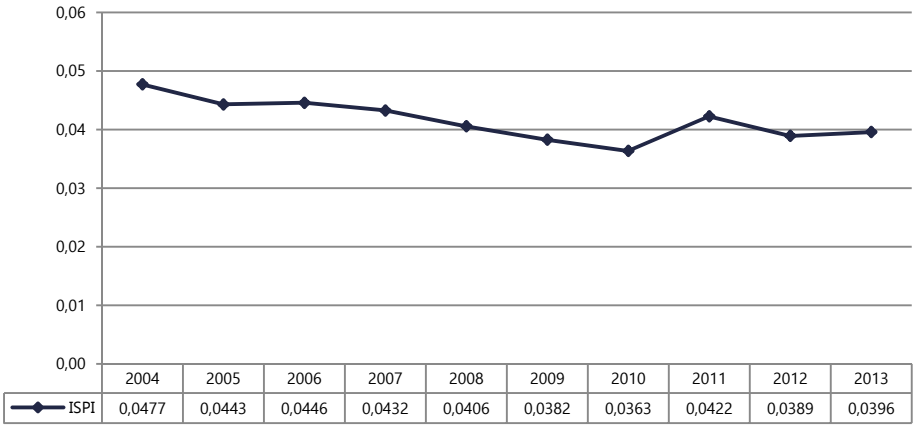
Source: own elaborations based on EU-SILC 2011

At country level and considering all cohorts, in terms of the extent of dimensional contributions to poverty, the education dimension is tracked by economic security, health, living environment and decent work. Income poverty is thus predominant in Italy, while, compared to the other deprivation indicators, unemployment seems to play a minor role: 11.13% of the total weighted deprivations are generated by joblessness. Clearly, when excluding people aged 65 and above from the sample, the contribution is significantly higher (19.24%).

4.4. Over time

Availability and timeliness of EU-SILC data allows plotting poverty figures for a period of ten years going from 2004 to 2013. The trend shown in Figure IV.14 highlights a path of multidimensional poverty reduction that stopped in 2010 and rapidly increased for one year, while subsequently stabilizing starting 2012.[78] The contribution of dimensions to this poverty path is provided in Figure IV.15, where lines of different colours represent the trends of the five dimensions used to build the ISPI. Plots are made for both the whole population and for the population aged 16-64 only. The only two dimensions that follow a declining path over time are education and living environment, whose flexion is however less drastic than the one occurred in education. The overall improvement in educational attainment levels is likely due to the gradual exit from the sample of the elderly, who are less educated on average compared to the rest of the population. Living conditions in decent work, economic security and health, on the contrary, steadily degraded from 2004 to 2013: unemployment rates have known a raise starting 2007, but from 2010 the increase has become even sharper. The health dimension has followed the same path: it reported a slight increase from 2004 to 2007 and then a further increase starting 2010 after three years of stability. Income poverty, as also confirmed by official poverty figures computed by Istat plotted in Figure IV.16, has undergone a steady increase starting 2007.

Figure IV.14. Multidimensional poverty trend, Italy 2004-2013



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
ISPI	0,0477	0,0443	0,0446	0,0432	0,0406	0,0382	0,0363	0,0422	0,0389	0,0396

Source: own elaborations based on EU-SILC 2004-2013

[78] Please note that in the EU-SILC income-based indicators generally refer to the previous calendar year (in this case, 2010) whereas most of the deprivation items refer to the situation in the survey year (i.e., 2011).

Figure IV.15. Contribution of dimensions over time

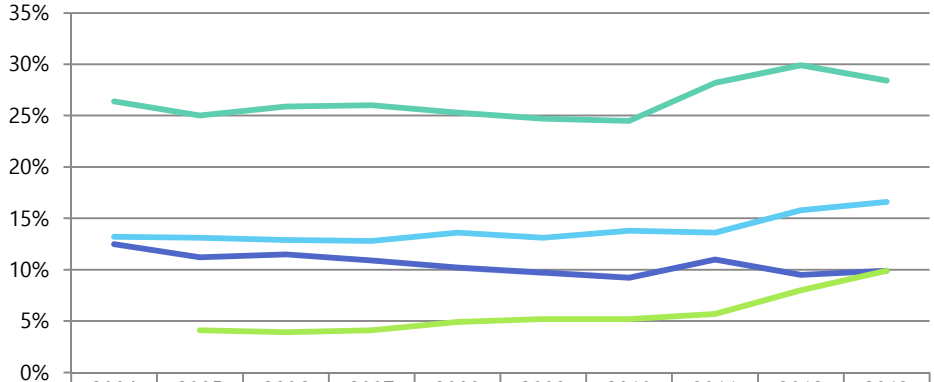
Source: own elaborations based on EU-SILC 2004-2013

Comparing multidimensional poverty trends with official poverty measures over time allows understanding how different poverty indices reflect possible socio-economic changes and how robust they are to exogenous shocks, like the spread of the economic crisis. For sake of comparability among the indices, instead of the ISPI we plot multidimensional poverty headcounts, whose trend approximates the overall multidimensional poverty trend quite closely. Though conveying different concepts of poverty, Istat's relative and absolute indicators depict the same paths of changes in living standard in Italy during the period 2004-2013. According to both indicators, poverty slightly increased from 2006 to 2010 and then saw an outburst starting 2011. A general degradation in living standards is also confirmed by the lowering of relative poverty lines occurred from 2011 onwards (see Annex IV for a graphical

representation), which reflects a reduction in households' average monthly expenditure, especially in larger size ones.

Relative monetary poverty was by the way less sensitive to real economy mechanisms because of its intrinsic features: as shown in Chapter III Section 1.2, the magnitude of even big changes affecting the whole distribution could be not reflected by relative poverty measures, which remain linked to the standard of living enjoyed by most of the country. The AROPE, on the other hand, shows a trend that is much more similar to the one depicted by the ISPI: it remained quite stable until 2010 and then started rapidly increasing afterwards, with a slight decline in 2013.

Figure IV.16. Poverty paths: multidimensional poverty headcount vs. Istat's monetary poverty and AROPE



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
ISPI Headcount	12,50%	11,20%	11,50%	10,90%	10,20%	9,70%	9,20%	11,00%	9,50%	9,90%
Istat relative poverty	13,2%	13,1%	12,9%	12,8%	13,6%	13,1%	13,8%	13,6%	15,8%	16,6%
Istat absolute poverty		4,1%	3,9%	4,1%	4,9%	5,2%	5,2%	5,7%	8,0%	9,9%
AROPE	26,4%	25,0%	25,9%	26,0%	25,3%	24,7%	24,5%	28,2%	29,9%	28,4%

Source: own elaborations based on EU-SILC 2004-2013

Concluding remarks

As explained by Sen in a seminal paper of 1976, poverty measurement implies two fundamental steps: the first is the identification of the poor among the total population and the second is the aggregation of the available information into one measure through the use of a poverty index. In Chapter IV, we have carried out a detailed analysis of multidimensional poverty in Italy during the period 2004-2013 by making use of the cross-sectional component of the EU-SILC. We have accomplished the identification task through the lens of the Rawlsian approach to multidimensional poverty measurement identified in the second Chapter: an analysis of the Italian Constitution has allowed us selecting five relevant dimensions, i.e., decent work, economic security, education, health and living environment; then, following the concept of social primary goods, we have identified suitable indicators, weights and cut-offs to construct an Inequality-Sensitive Poverty Index (ISPI) for Italy.

As a first step, we have studied how deprivations are distributed among individuals. Two main factors tell

the story of deprivation in Italy: age and geography. Deprivations follow a clear pattern through the different stages of life: the youth are threatened by unemployment and economic insecurity, while the elderly report more deprivations in health conditions and educational attainment. Geographically, multidimensional estimates confirm the existence territorial disparities already accounted for by official monetary poverty measures, but with some remarkable exceptions: Lombardy and Marche, for instance, get surprisingly high poverty scores compared to Istat's figures, while Umbria and Basilicata show lower levels of hardship than suggested by expenditure-based indicators. Poverty is mainly nested in the South and in scarcely populated areas. We have also broken down the ISPI by its three components – incidence, intensity and inequality, or the 'three I's of poverty' (Jenkins and Lambert, 1997) – which allowed us to study the phenomenology of multiple deprivations in Italy. Poverty breadth is higher in the South, as well as poverty intensity; conversely, inequality among the poor is widespread in the North, especially in north-western regions. The availability of data from 2004 to 2013 allowed us to observe how multidimensional poverty levels have changed during the past ten years. Computations of ISPI for that period show that poverty has steadily decreased until 2010 and it started increasing without a clear pattern afterwards. Dimensions that contributed to this change of direction are decent work and health, while education and living environment conditions have improved across time. Comparing ISPI figures to official statistics on poverty suggests possible explanations about what are the factors to which different indicators are more likely to be sensitive. Compared to the relative poverty indicator, the absolute monetary poverty one has responded more dramatically to the exogenous shock represented by the spread of the economic crisis. The relative poverty indicator, in turn, has started reflecting the increase in income poverty levels starting 2011, when Italian households' expenditure for consumption started declining.

Our study has shown that it is possible to broaden the informative base for the assessment of living standards to include dimensions that go beyond the mere lack of financial resources without losing the capability of reflecting structural changes in the real economy. Multidimensional estimates have highlighted not only where poverty is nested and which socio-economic groups are the most affected by hardship, but also which deprivations are more likely to occur at once. Such an analysis enables policy makers to target more carefully those groups whose conditions deserve special care. Analyzing the association among dimensions might also ensure that policies are designed and implemented more efficiently.

The framework developed in this volume and tested on Italy can be successfully applied to all democratic constitutional regimes. Provided a source for deriving an overlapping consensus on values and public action priorities, it can be also extended at supranational level to explain changes in living conditions in wider communities, i.e., at European Union level. A generalization of this study to the assessment of multidimensional poverty in Europe is therefore proposed as an area for further research.

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ANNEX I.

Aggregate indices of deprivation

ANNEX I.A. Partial indices based on AF methodology and related poverty measures

Partial index	AF poverty measure
$H = q/n$	
$A = \|c(k)\|/qd$	$M_0 = HA = \mu(g^0(k))$
$G = \|g^1(k)\|/\|g^0(k)\|$	$M_1 = HAG = \mu(g^1(k))$
$S = \|g^2(k)\|/\|g^0(k)\|$	$M_2 = HAS = \mu(g^2(k))$

Source: adapted from Alkire and Foster (2011a)

ANNEX I.B. Rippin's identification function main features

	Inequality aversion (α)	Identification function (ρ_{CS})
Perfect complementarity	$0 < \alpha < 1$	Union
Complementarity	$0 < \alpha < 1$	Concave
Perfect substitutability	$\alpha > 1$	Intersection
Substitutability	$\alpha > 1$	Convex
Neutrality	$\alpha = 1$	Linear

Source: adapted from Rippin (2012b)

ANNEX I.C. Axiomatic derivation of inequality-sensitive cardinal poverty measures

To introduce the IS axiom, Rippin builds on the axiomatic literature on inequality issues that, in the unidimensional framework, are generally interpreted by means of the Pigou-Dalton Transfer Principle (PD)[79] saying that a regressive transfer should decrease the social welfare (Adler, 2013). One axiomatic formulation of PD is given by the following sentence:

UNIFORM MAJORIZATION AXIOM (UM). Formally, for any for any $z \in \mathbf{Z}$ and $\mathbf{X} \in \chi_n$, if $\mathbf{X}^P = \mathbf{B}\mathbf{X}'^P$ and $\mathbf{B}$ is not a permutation matrix, then $P(\mathbf{X}; z) \leq P(\mathbf{X}'; z)$, where $\mathbf{X}^P(\mathbf{X}'^P)$ is the attribute matrix of the poor corresponding to $\mathbf{X}(\mathbf{X}')$ and $\mathbf{B} = (b_{ij})$ is some bistochastic matrix of appropriate order.

[79] Originally, the Pigou-Dalton principle was suggested by Arthur Pigou in 1912, 'Wealth and Welfare' (New York: Macmillan) and Hugh Dalton in 1920, 'The Measurement of the Inequality of Incomes', Economic Journal 30, 348-361.

Conceptually, UM holds that a transformation of the attribute matrix $\mathbf{X}'^{P}$ of the poor in $\mathbf{X}'$ into the corresponding matrix $\mathbf{X}^{P}$ of the poor in $\mathbf{X}$ by an equalising operation does not increase poverty.

UM clearly regulates how transfers changing the spread of specific dimensional achievements should be reflected by the poverty index. It thus account for inequality-increasing (or decreasing) switches within dimensions. The other kind of inequality – i.e., between dimensions – has been traditionally accounted for by the formulation of axioms on correlation (or association) increasing transfer issues (see, for instance, Tsui, 1999), like the NDCI introduced earlier in this Section. However, even if satisfying efficiency requirements, some of these axioms do not take into account distributive justice issues as they neglect to take into account possible increases in within-dimensional inequality caused by switches of attributes, as in the case of Bourguignon and Chakravarty's (2003) Non-increasingness under Correlation Increasing Arrangement Axiom (NICI).[80]

In order to overcome this weakness in the literature on axiomatically derived poverty measures, Rippin develops a group of axioms to finally introduce the IS property. Firstly, the author strengthen the NICI axiom to ensure Pareto-efficiency:

NON-INCREASINGNESS UNDER PARETO-EFFICIENCY ASSOCIATION INCREASING SWITCH (NIPA). For any $\mathbf{X}, \mathbf{X}' \in \chi_n$ such that $\mathbf{X}'$ is obtained from $\mathbf{X}$ by an association increasing switch of complement attributes between two poor individuals g and h with $\min\{\mathbf{x}_g\} \leq \min\{\mathbf{x}_h\}$ and $x'_g = x_g \barwedge x_h, x'_h = x_g \barvee x_h$ and $x'_m = x_m \forall m \notin \{g, h\}$, then $P(\mathbf{X}; z) \geq P(\mathbf{X}'; z)$.[81] For every two poor individuals each of whom is deprived in all dimensions, sensitivity to Pareto-efficient association increasing switches – in connection with UM – makes it possible to account for both within- and between-dimensional inequality (Rippin, 2012a). In case the two persons suffer from different numbers of simultaneous deprivations, Rippin argues that – given the association increasing switch takes place – the kind of transfer that is 'preferable' depends on the relationship between attributes: in case they are substitutes, the beneficiary of the switch should be the individual that is deprived in more attributes; in case they are complements, Pareto-efficient switches should be preferred (that is, the individual with the higher minimum achievement level). Hence, as a second step, Rippin introduces two more axioms, the first one extending the association increasing switch concept and the second one accounting for sensitivity to inequality:

WEAK ASSOCIATION INCREASING SWITCH (WAI). Define $d_i = \#\{c_{ij} | c_{ij} = 1\}$. For any two vectors $x = (x_1, \ldots, x_k)$ and $x' = (x'_1, \ldots, x'_k)$, define the two operators $\overline{\barwedge}$ and $\overline{\barvee}$ as follows: $x \overline{\barwedge} x' = (\min\{x_1, x'_1\}, \ldots, \min\{x_k, x'_k\} \forall x_j < z_j; x_j = x'_j \forall x_j \geq z_j)$ and

$x \overline{\barvee} x' = (\max\{x_1, x'_1\}, \ldots, \max\{x_k, x'_k\} \forall x_j < z_j; x_j = x'_j \forall x_j \geq z_j)$.

[80] With the NICI, which was formulated in response to Tsui's NDCI, Bourguignon and Chakravarty's (2003) claimed that in case attributes are complements poverty should decrease, even though association increasing switches lead to an increase in within dimensional inequality (Rippin, 2012a).

[81] For any two vectors $x = (x_1, \ldots, x_k)$ and $x' = (x'_1, \ldots, x'_k)$, the two operators $\barwedge$ and $\barvee$ are defined as follows: $x \barwedge x' = (\min\{x_1, x'_1\}, \ldots, \min\{x_k, x'_k\})$ and $x \barvee x' = (\max\{x_1, x'_1\}, \ldots, \max\{x_k, x'_k\})$ (Rippin, 2012a). Notation used here borrows from the cited source.

For every $\mathbf{X}, \mathbf{X}' \in \chi_n$, $\mathbf{X}'$ is obtained from $\mathbf{X}$ by a weak association increasing switch if $\mathbf{X}'$ is not a permutation matrix of $\mathbf{X}$ and if for some poor individuals g and h, $x'_g = x_g \,\overline{\overline{\wedge}}\, x_h$, $x'_h = x_g \,\overline{\overline{\vee}}\, x_h$ and $x'_m = x_m \forall m \notin \{g, h\}$.

INEQUALITY SENSITIVITY (IS). Define $d_i = \#\{c_{ij} | c_{ij} = 1\}$. For some $\mathbf{X}, \mathbf{X}', \mathbf{X}'' \in \chi_n$, if $\mathbf{X}'$ and $\mathbf{X}''$ are obtained from $\mathbf{X}$ by a weak association increasing switch between two poor individuals g and h with $d_g > d_h > 1$ such that: $x'_g = x_g \,\overline{\overline{\wedge}}\, x_h$, $x'_h = x_g \,\overline{\overline{\vee}}\, x_h$ and $x'_m = x_m \forall m \notin \{g, h\}$ and $x''_g = x_g \,\overline{\overline{\vee}}\, x_h$, $x''_h = x_g \,\overline{\overline{\wedge}}\, x_h$ and $x''_m = x_m \forall m \notin \{g, h\}$, then in case attributes are substitutes $P(\mathbf{X}''; z) \leq P(\mathbf{X}'; z)$; in case attributes are complements, $P(\mathbf{X}''; z) \leq P(\mathbf{X}'; z)$ if and only if $\min\{x''_g\} \geq \min\{x''_h\}$.

Then, Rippin derives a family of poverty indices that satisfy different levels of sensitivity to inequality within and between dimensions. For cardinal poverty measures, the index is as follows:

$$P_{IS} = \frac{1}{n} \sum_{i \in S_j} \delta_i^{\alpha} \sum_{j \in \{1, \ldots k\}: c_{ij} = 1} a_j \left(\frac{1 - x_{ij}}{z_j} \right)^{\theta}$$

where $a_j > 0; \sum_{j=1}^{k} a_j = 1; \theta > 1; 0 \leq \alpha \leq 1$ in case of attributes are complements and $\alpha \geq 1$ in case attributes are substitutes (Rippin, 2012a).

ANNEX II.

Joint and marginal distributions of deprivations

ANNEX II.A. Associations between deprivation indicators (Cramér's *V*), year 2011

	Income poverty	Low educational attainment	Bad health status	Chronic illness	Unmet medical needs	Poor quality of dwelling	Lack of basic sanitation facilities	Noise	Crime	Pollution
Unemployment	0.214***	-0.087***	-0.037***	-0.059***	0.002	0.055***	0.008	0.036***	0.019***	0.024***
Income poverty	1.00	0.013*	0.006	-0.041***	0.007	0.062***	0.036	0.019	0.001	0.025***
Low educational attainment		1.00	0.350***	0.312***	0.005	0.055***	0.036***	-0.006	-0.026***	-0.027***
Bad health status			1.00	0.532***	0.043***	0.099***	0.032***	0.032***	0.021***	0.017***
Chronic illness				1.00	0.042***	0.10***	0.018***	0.054***	0.056***	0.058***
Unmet medical needs					1.00	0.030***	0.003	0.028***	0.033***	0.023***
Poor quality of dwelling						1.00	0.031***	0.111***	0.080***	0.098***
Lack of basic sanitation facilities							1.00	-0.006	0.003	-0.004
Noise								1.00	0.22***	0.485***
Crime									1.00	0.275***
Pollution										1.00

* p<0.10, ** p<0.05, *** p<0.01

Source: own elaborations based on EU-SILC 2011

ANNEX II.B. Associations between dimensions (Cramér's *V*), all years

Year 2004	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.18***	-0.07***	0.05***	0.05***
Economic security		1.00	0.05***	0.02***	0.06***
Education			1.00	0.33***	0.04***
Health				1.00	0.04***
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Year 2005	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.18***	-0.08***	0.06***	0.04***
Economic security		1.00	0.06***	0.03***	0.05***
Education			1.00	0.33***	0.03***
Health				1.00	0.07***
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Year 2006	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.18***	-0.08***	0.05***	0.05***
Economic security		1.00	0.04***	0.02***	0.06***
Education			1.00	0.31***	0.04***
Health				1.00	0.07***
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Year 2007	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.18***	-0.08***	0.06***	0.04***
Economic security		1.00	0.06***	0.02**	0.05***
Education			1.00	0.32***	0.03***
Health				1.00	0.07***
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Year 2008	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.18***	-0.08***	0.05***	0.05***
Economic security		1.00	0.05***	0.02***	0.04***
Education			1.00	0.32***	0.02**
Health				1.00	0.06
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Year 2009	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.18***	-0.08***	0.06***	0.05***
Economic security		1.00	0.04***	0.02***	0.06***
Education			1.00	0.32***	0.02***
Health				1.00	0.06***
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Year 2010	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.20***	-0.08***	0.05***	0.06***
Economic security		1.00	0.02***	0.03***	0.07***
Education			1.00	0.31***	0.04***
Health				1.00	0.07***
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Year 2011	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.21***	-0.09***	0.06***	0.06***
Economic security		1.00	0.01*	0.04***	0.06***
Education			1.00	0.37***	0.03***
Health				1.00	0.07***
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Year 2012	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.20***	-0.09***	0.07***	0.04***
Economic security		1.00	0.00	0.04***	0.07***
Education			1.00	0.37***	0.03***
Health				1.00	0.06***
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Year 2013	Decent work	Economic security	Education	Health	Living environment
Decent work	1.00	0.24***	-0.09***	0.07***	0.04***
Economic security		1.00	0.01	0.03***	0.07***
Education			1.00	0.35***	0.04***
Health				1.00	0.08***
Living environment					1.00

* p<0.10, ** p<0.05, *** p<0.01

Source: own elaborations based on EU-SILC 2004-2013

ANNEX II.C. Contingency tables between dimensions, year 2011

Decent work	Economic security					
	No		Yes		Total	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*
No	32,860	84.70	3,218	8.29	36,078	93.00
Yes	1,768	4.56	949	2.45	2,717	7.00
Total	34,628	89.26	4,167	10.74	38,795	100.00

Pearson chi2(1) = 1.8e+03 Pr = 0.000

Cramér's V = 0.2144***

Decent work	Education					
	No		Yes		Total	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*
No	27,487	70.85	8,591	22.14	36,078	93.00
Yes	2,460	6.34	257	0.66	2,717	7.00
Total	29,947	77.19	8,848	22.81	38,795	100.00

Pearson chi2(1) = 295.6752 Pr = 0.000

Cramér's V = -0.0873***

Decent work	Health									
	No		1 indicator		2 indicators		All indicators		Total	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*
No	25,562	65.89	6,311	16.27	4,105	10.58	100	0.26	36,078	93.00
Yes	2,194	5.66	338	0.87	180	0.46	5	0.01	2,717	7.00
Total	27,756	71.55	6,649	17.14	4,285	11.05	105	0.27	38,795	100.00

Pearson chi2(3) = 124.7323 Pr = 0.000

Cramér's V = 0.0567***

Decent work	Living environment									
	No		1 indicator		2 indicators		3 indicators		4 indicators	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*
No	19,736	50.87	9,394	24.21	4,395	11.33	2,027	5.22	515	1.33
Yes	1,271	3.28	733	1.89	403	1.04	221	0.57	89	0.23
Total	21,007	54.15	10,127	26.10	4,798	12.37	2,248	5.79	604	1.56

Decent work	Living environment			
	All indicators		Total	
	Obs	*%*	*Obs*	*%*
No	11	0.03	2,717	7.00
Yes	0	0.00	38,795	100.00
Total	11	0.03	36,078	93.00

Pearson chi2(5) = 128.3689 Pr = 0.000

Cramér's V = 0.0575***

Economic security	Education					
	No		Yes		Total	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*
No	26,795	69.07	7,833	20.19	34,628	89.26
Yes	3,152	8.12	1,015	2.62	4,167	10.74
Total	29,947	77.19	8,848	22.81	38,795	100.00

Pearson chi2(1) = 6.3788 Pr = 0.012

Cramér's V = 0.0128*

Economic security	Health									
	No		1 indicator		2 indicators		All indicators		Total	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*
No	24,600	63.41	6,094	15.71	3,847	9.92	87	0.22	34,628	89.26
Yes	3,156	8.14	555	1.43	438	1.13	18	0.05	4,167	10.74
Total	27,756	71.55	6,649	17.14	4,285	11.05	105	0.27	38,795	100.00

Pearson chi2(3) = 56.9097 Pr = 0.000

Cramér's V = 0.0383***

Economic security	Living environment									
	No		1 indicator		2 indicators		3 indicators		4 indicators	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*
No	18,934	48.81	9,008	23.22	4,290	11.06	1,915	4.94	472	1.22
Yes	2,073	5.34	1,119	2.88	508	1.31	333	0.86	132	0.34

Total	21,007	54.15	10,127	26.10	4,798	12.37	2,248	5.79	604	1.56

Economic security	Living environment			
	All indicators		Total	
	Obs	*%*	*Obs*	*%*
No	9	0.02	34,628	89.26
Yes	2	0.01	4,167	10.74
Total	11	0.03	38,795	100.00

Pearson chi2(5) = 135.1429 Pr = 0.000

Cramér's V = 0.0590***

Education	Health									
	No		1 indicator		2 indicators		All indicators		Total	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*
No	23,850	61.48	4,385	11.30	1,659	4.28	53	0.14	29,947	77.19
Yes	3,906	10.07	2,264	5.84	2,626	6.77	52	0.13	8,848	22.81
Total	27,756	71.55	6,649	17.14	4,285	11.05	105	0.27	38,795	100.00

Pearson chi2(3) = 5.3e+03 Pr = 0.000

Cramér's V = 0.3705***

Education	Living environment									
	No		1 indicator		2 indicators		3 indicators		4 indicators	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*
No	16,360	42.17	7,602	19.60	3,772	9.72	1,748	4.51	458	1.18
Yes	4,647	11.98	2,525	6.51	1,026	2.64	500	1.29	146	0.38
Total	21,007	54.15	10,127	26.10	4,798	12.37	2,248	5.79	604	1.56

Education	Living environment			
	All indicators		Total	
	Obs	*%*	*Obs*	*%*
No	7	0.02	34,628	89.26
Yes	4	0.01	4,167	10.74
Total	11	0.03	38,795	100.00

Pearson chi2(5) = 39.3342 Pr = 0.000

Cramér's V = 0.0318***

Health	Living environment									
	No		1 indicator		2 indicators		3 indicators		4 indicators	
	Obs	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*
No	16,049	41.37	6,795	17.52	3,157	8.14	1,418	3.66	332	0.86
1 indicator	3,008	7.75	1,970	5.08	1,038	2.68	494	1.27	138	0.36
2 indicators	1,919	4.95	1,323	3.41	584	1.51	327	0.84	127	0.33
All indicators	31	0.08	39	0.10	19	0.05	9	0.02	7	0.02
Total	21,007	54.15	10,127	26.10	4,798	12.37	2,248	5.79	604	1.56

Health	Living environment			
	All indicators		Total	
	Obs	*%*	*Obs*	*%*
No	5	0.01	27,756	71.55
1 indicator	1	0.00	6,649	17.14
2 indicators	5	0.01	4,285	11.05
All indicators	0	0.00	105	0.27
Total	11	0.03	38,795	100.00

Pearson chi2(5) = 636.3018 Pr = 0.000

Cramér's V = 0.0739***

ANNEX II.D. Contingency table: income poverty (AROP) vs. financial strain, year 2011

Poverty indicator (AROP)	Financial burden of the repayment of debts from hire purchases or loans									
	Heavy burden		Somewhat a burden		Not a burden at all		.		Total	
	Obs	%	Obs	%	Obs	%	Obs	%	Obs	%
No	3,418	8.81	3,621	9.33	190	0.49	25,231	65.04	32,460	83.67
Yes	749	1.93	272	0.70	15	0.04	5,299	13.66	6,335	16.33
Total	4,167	10.74	3,893	10.03	205	0.53	30,530	78.70	38,795	100.00

Pearson chi2(3) = 292.7180 Pr = 0.000

Cramér's V = 0.0869***

Source: own elaborations based on EU-SILC 2011

ANNEX III.

Classification of Italian administrative territories

Geographical areas	Regions
NORTH	Piedmont, Aosta Valley, Lombardy, Trento*, Bolzano-Bozen*, Veneto, Friuli Venezia Giulia, Liguria, Emilia Romagna,
CENTRE	Tuscany, Umbria, Marche, Lazio
SOUTH	Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, Sicily, Sardinia

*Autonomous provinces.

ANNEX IV.

Average monthly expenditure for consumption by household size in Italy 2004-2013

HH size	Year									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	551.99	561.95	582.2	591.81	599.8	589.81	595.48	606.62	594.53	583.51
2	919.98	936.58	970.34	986.35	999.67	983.01	992.46	1011.03	990.88	972.52
3	1223.57	1245.65	1290.55	1311.85	1329.56	1307.4	1319.97	1344.67	1317.87	1293.45
4	1499.57	1526.63	1581.65	1607.75	1629.46	1602.31	1617.71	1647.98	1615.13	1585.21
5	1747.96	1779.5	1843.65	1874.07	1899.37	1867.72	1885.67	1920.96	1882.67	1847.79
6	1987.16	2023.01	2095.93	2130.52	2159.29	2123.3	2143.71	2183.82	2140.3	2100.64
7+	2207.95	2247.79	2328.82	2367.24	2399.21	2359.22	2381.9	2416.47	2378.11	2334.05

Absolute values in Euros are shown.
Source: I.Stat