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Assessing sufficient capability: A new approach to economic evaluation

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ABSTRACT

Amartya Sen's capability approach has been discussed widely in the health economics discipline. Although measures have been developed to assess capability in economic evaluation, there has been much less attention paid to the decision rules that might be applied alongside. Here, new methods, drawing on the multidimensional poverty and health economics literature, are developed for conducting economic evaluation within the capability approach and focusing on an objective of achieving "sufficient capability". This objective more closely reflects the concern with equity that pervades the capability approach and the method has the advantage of retaining the longitudinal aspect of estimating outcome that is associated with quality-adjusted life years (QALYs), whilst also drawing on notions of shortfall associated with assessments of poverty. Economic evaluation from this perspective is illustrated in an osteoarthritis patient group undergoing joint replacement, with capability wellbeing assessed using ICECAP-O. Recommendations for taking the sufficient capability approach forward are provided.

1. Introduction

Economic assessment is concerned with determining how best to use resources to achieve particular ends. Most economic evaluations in healthcare are currently conducted from a particular interpretation of the "extra-welfarist" normative stance in which the aim is to maximise health gains resulting from interventions (Brouwer et al., 2008; Coast et al., 2008d). The quality-adjusted life year (QALY), which combines health-related quality of life (HRQoL) and life years into a single outcome (Drummond et al., 2005), has become the standard outcome in health economic evaluations in the UK and beyond, although disability-adjusted life years (DALYs) are also used within this "extra-welfarist" approach (Culyer, 1989; Murray and Lopez, 1996). However, there is a narrative that suggests both QALYs (Drummond et al., 2009) and more recently DALYs (Nord, 2013) are narrowly defined in terms of health, rather than something "extra" to welfare assessment used in traditional cost-benefit analysis (Birch and Donaldson, 2003).

The application of Sen's capability approach (Sen, 2009) within health economics enables a broader measurement of wellbeing to be considered compared to existing approaches. Research in this area has focussed on developing questionnaires that capture capability for use in health interventions (Al-Janabi et al., 2012; Anand et al., 2009; Coast et al., 2008a; Kinghorn et al., 2015; Lorgelly et al., 2008; Netten et al., 2012; Simon et al., 2013). However, there is currently little guidance on how such measures should be used to aid healthcare resource allocation decisions within the capability approach. One suggestion is that capability measures be adjusted for time, thereby enabling assessment of gains in terms of 'years of full capability equivalence' (Flynn et al., 2015). This option has been used by some authors (Henderson et al., 2013; Makai et al., 2015).

In existing approaches to economic evaluation there is a focus on maximising outcomes (Birch and Donaldson, 2003; Coast, 2009), irrespective of the distribution of outcomes within society (Hurley, 1998). Although there have been some attempts to consider different aspects of equity within a health maximisation approach, these are secondary to maximisation and are selective in choice of equity considerations, focusing either on adjusting for non-health inequities in life (for example, income and ethnicity (Asaria et al., 2015)) or proportional shortfalls in health (van de Wetering et al., 2013); they have also seldom been used in practice. The capability approach has equity at its core, both theoretically and empirically (Anand and Dolan, 2005; Coast et al., 2008c; Sen, 2009; Simon et al., 2013; Venkatapuram, 2011). The

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capability approach is concerned with people's ability to do valuable things in their life, rather than only focusing on things they actually do. The approach has been used to target those worst off in capability terms rather than seeking an optimal social welfare function of capabilities (Alkire et al., 2008; Clark and Qizilbash, 2008). Indeed, Ruger has theoretically explored the idea of focusing on shortfall equality in health capability as an appropriate decision-rule (Ruger, 2010).

The theoretical focus on those who are worst-off is also apparent in much of the empirical capability research. Research into human development and international poverty assessment has developed multidimensional poverty indices (MPIs) referred to as the Alkire–Foster (AF) measures (Alkire and Foster, 2011a). Alkire and Foster (2011a) do not focus on a single indicator of poverty such as income, arguing that such a focus can be misleading in describing the true levels of poverty within a given society. Instead, they present a method that allows for additional factors to be considered. Since 2010, multidimensional poverty has been compared across countries using the MPIs generated by the United Nations and are reported in their human development reports. The measure is based on three dimensions (health, education and living standards) across ten indicators of states of poverty (UNDP, 2010). This multidimensional approach is not unique to the poverty measurement, as the Organisation for Economic Co-operation and Development Better Life Initiative also draws on multiple indicators of wellbeing, including health, to develop a better life index as their alternative to relying solely on GDP for assessing a nation's progress (Stiglitz et al., 2009).

This general approach to focusing on those who are worst-off in society may provide an alternative decision rule for economic evaluation conducted from a capability perspective. This means interpreting equity objectives in terms of absolute (rather than relative) shortfalls in capability, in which this is understood as an absolute deprivation in what a person is able to do and be in life. It is therefore worth considering the AF method in more depth. The AF measures focus on two key issues of poverty measurement: first the "identification method", which considers how an individual is identified as being poor or not poor; and second the "aggregation method" which measures the deprivation for those identified as poor (Alkire and Foster, 2011a). Each of these is discussed now in detail.

1.1. Identification method

Within a one-dimensional poverty measure, there is a relatively straightforward process involved in defining whether a person is in poverty – although that is not to understate the complexity of the actual decisions involved. It is a case of determining the threshold on that one dimension below which a person is considered to be in poverty (e.g. the World Bank uses less than $1.25 a day to define an individual as poor (Ravallion et al., 2009)).

This "identification method" becomes more complex in multidimensional poverty measurement. Here, the classification of an individual as poor requires a decision about the number of dimensions in which a person has to fall below the threshold. Atkinson (2003) outlines two common identification approaches in poverty assessment. First, the "union approach", whereby a person is classified as poor if they fall below the threshold on ***any*** single dimension. Second, the "intersection approach", whereby a person is poor only if they fall below the threshold in ***all*** included dimensions (Atkinson, 2003).

Alkire and Foster (2011a) found flaws with both identification methods and developed an alternative "in between" method for AF measures, referred to as the "dual cutoff" method. The dual cutoff method operates by first identifying a cutoff for each dimension below which a person is classed as deprived in that dimension, and second determining the number of dimensions in which an individual must be deprived to be classified as poor. These cutoffs can vary with context, enabling flexibility for specific purposes, whether it be a cross-national comparison of multidimensional poverty or a more specific policy question (Alkire and Foster, 2011b).

1.2. Aggregation method

The AF measures provide a number of different aggregation methods, depending on the complexity of the poverty measurement required. Common to all is a "censoring" step, whereby those who do not meet the criteria for poverty (i.e. individuals not deprived in the required number of dimensions) are censored from the remainder of the poverty measurement exercise. Four methods of aggregation capture four different AF measures of multidimensional poverty. These consider (i) whether a person is poor or not poor (Headcount ratio (H)), (ii) for those identified as poor, how many dimensions they are poor, accounting for the *breadth* of poverty over dimensions considered (Adjusted headcount ratio (M_0)), (iii) how far away an individual is from the threshold on each dimension in which they are deprived, accounting for poverty *depth* within a dimension (Adjusted poverty gap (M_1)), and (iv) whether different weights across dimensions are attached to the same levels below the thresholds on dimensions, accounting for *severity* of poverty across dimensions (Adjusted Foster-Greer-Thorbecke (FGT) measure (M_2) (Foster et al., 1984)). The formulae for the four AF measures are presented in Appendix A.

Alkire and Foster (2011a) illustrated their AF measures for the United States, by measuring multidimensional poverty between three ethnic groups (African-American, Hispanic and White) across four dimensions (income, health status, health insurance, education level), with a cutoff of deprivation in two dimensions for a person to be considered poor. Using the Headcount ratio (H), Alkire and Foster (2011a) found the African-American population in their sample were the most impoverished when analysing income only. However, when using their dual cutoff approach for the Adjusted headcount ratio (M_0), the Hispanic population group were the most deprived overall, because health insurance and education attainment indicators were considerably worse for Hispanics. An example of the AF measure calculations is presented in Appendix B. Although these methods are proving popular in the human development literature (Alkire and Santos, 2013), to utilise this approach within economic evaluations requires modification to account for the longitudinal effectiveness of health interventions.

The aim of this paper is to develop and illustrate a new approach for using capability instruments to inform health and social care decision-making, drawing from the literature on health economic evaluation and the Alkire–Foster measures for assessing poverty. We refer to this method as the "sufficient capability approach". By adapting and further developing the Alkire and Foster (2011a) multidimensional poverty methods, we demonstrate how capability deprivation can be measured in a health setting (although the method is not limited to this setting) and across time.

First, the paper focuses on the development of these novel methods for conducting economic evaluation from a capability perspective by generating the sufficient capability approach. Three steps are considered: defining a threshold of sufficient capability; developing a sufficient capability score; and generating methods for assessing sufficient capability over time. Second, the application of the approach is then illustrated using a joint replacement dataset for osteoarthritis patients. A discussion on the sufficient capability approach, in light of previous attempts to use the capability approach concludes this paper.