

Rank Robustness of Composite Indices: Dominance and Ambiguity^{*}

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Abstract

Many common multidimensional indices take the form of a “composite index” which aggregates linearly across several dimensions using a vector of weights. Judgments rendered by composite indices are contingent on the selected vector of weights. A comparison could be reversed at another plausible vector; or, alternatively, the comparison might be robust to variations in weights. This paper presents general robustness criteria to discern between these two situations. We define a robustness quasiordering requiring unanimity for a set of weighting vectors, and utilize methods from Bewley’s (2002) model of Knightian uncertainty to characterize this quasiordering. We then focus on a particular set of weighting vectors suggested by the epsilon-contamination model of ambiguity; this allows the degree of confidence in the initial weighting vector to vary analogous to Ellsberg (1961). We provide a practical vector-valued representation of the resulting “epsilon robustness” quasiordering, and propose a related numerical measure by which the robustness of any given comparison can be gauged. Our methods are illustrated using data on the Human Development Index from the 2006 Human Development Report.

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