

## Abstract

Stochastic Dominance approach allows for welfare comparison between countries or regions both across space and/or time. A major drawback of First and Second Order Stochastic Dominance approach (FOD/SOD) is dominance indetermination. Levy and Leshno in 2002 suggested Almost Stochastic Dominance as a remedy in the uni-dimensional case.

The study proposed two modifications to the multidimensional FOD of Arndt et al (2011): multidimensional FOD using total number of deprived dimensions (MFOD-T) and multidimensional FOD using the weighted sum of the number of the deprived dimensions (MFOD-W). To solve the indetermination problem, these modifications are used to generalize Almost FOD/ SOD to the multidimensional setup (MAFOD-T/MASOD-T, MAFOD-W/MASOD-W). Bootstrap was used in the literature to solve the indetermination problem, therefore for comparison purposes; it is used with the two modifications for the purpose of comparisons. Using the percent of in-determinant cells, a comparison among the proposed Multidimensional Almost FOD/SOD and bootstrap approaches is performed. The proposed methodology allows the ordinal ranking of regions and governorates of Egypt in terms of children wellbeing based on their probability of domination with the minimal number of indetermination cells.

**Keywords:** Stochastic dominance; Multidimensional poverty; deprivation indicators; MAFOD\_T; MASOD-T; MAFOD-W; MASOD-W; Bootstrap technique.