

Determining optimal road safety performance scores under weight and  
orness restrictions

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In this paper, 21 European countries are compared on their road safety performance. More specifically, several safety performance indicators are combined in one road safety index. The weighting and aggregating of indicators are essential aspects in this respect. Based on a profound evaluation of several techniques, data envelopment analysis appeared to be the most promising method. Therefore, this technique is further elaborated in order to deduce the optimal road safety score under a number of restrictions for each country. On the one hand, the opinion of experts on the relative importance of each indicator is incorporated; on the other hand, the aggregation idea of policymakers is reflected by the inclusion of an orness restriction. Orness is an often used concept in the field of aggregation. Here, it is used to allow good and bad performances (or high and low indicator values) to contribute differently to the overall index. In other words, two types of weight restrictions are used; one referring to the meaning of an indicator (using budget allocation results) and one referring to the magnitude of a performance (a panel discussion revealed the idea of emphasizing bad performances in the context of road fatalities). That way, best possible yet acceptable weights are obtained resulting in a valuable index.

The theoretical model as well as its advantages and limitations are discussed. Furthermore, country specific results in terms of the overall performance concerning alcohol, speed, protective systems, vehicle, roads and trauma management are examined. Best and underperforming countries can be revealed.