Multiple Criteria Decision Making: Some Connections with Economic Analysis

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Abstract

Multiple Criteria Decision Making (MCDM) has been perhaps the fastest growing area of Decision Analysis in the last twenty years. However, despite its popularity and wide range of applications, there are very few research efforts connecting MCDM with economics. In this context, this paper shows the potentiality of Compromise Programming, a popular MCDM approach, in tackling some basic problems in economics.

Introduction

The basic traditional structure underlying any choice problem can be summarized as follows. First, the consideration of different constraints define the feasible or attainable set of the problem analyzed. Second, a criterion function which suitably reflects the preferences of the decision maker (DM) is introduced. This function associates a number to each feasible solution so that the feasible set can be ranked or ordered to find the optimal choice.

The logical soundness of the above decisional paradigm is unquestionable. However it does not faithfully reflect many real life decision situations. In fact, the DM is not interested in many occasions in ordering the feasible solutions according to a well defined criterion but wants
to undertake that task according to different criteria reflecting his preferences. In few words, the DM strives in real life to find an optimal compromise amongst several conflicting criteria.

For the above reasons, researchers from many areas -mainly Operational Research/Management Science fields- have developed in the last twenty years an alternative decision paradigm known as multiple criteria decision making (MCDM). This ambitious theoretical attempt represents perhaps the fastest growing area of Decision Analysis in the last years, at least in terms of theoretical developments, as well as practical applications. In fact, it is difficult to find any applied field where MCDM techniques have not proved to be highly effective in solving problems.

Despite their popularity, there has been little research effort trying to connect MCDM with economic analysis. However, most economic models seem to underly a multi-criteria decisional problem. This paper illustrates the potentiality of a specific MCDM approach, Compromise Programming (CP), to address some analytical models in economics. Specifically, we reformulate Baumol's sales revenue hypothesis within a compromise perspective. This might be just an example of a methodology easily applicable to other relevant models in a bi-criteria context, see last section.

Background of Baumol's Sales Revenue Hypothesis

In 1959, Baumol proposed the following ingenious hypothesis: The behaviour of oligopolistic firms is explained by the maximization of sales revenue subjected to a minimum profit restraint. This conjecture was initially considered a precise and acute alternative to the neoclassical hypothesis of maximum profit. Although Baumol proposed his hypothesis within an oligopolistic context, it can be extended to other market structures whenever the size of the firm is big. Baumol's seminal idea is really important and seems a sensible conjecture, even though it does not explain the behaviour of big enough companies by introducing a bi-criteria objective function. However, as Rosenberg (1971) pointed out, the specific form of the objective function chosen by Baumol is very questionable, if not untenable, for the following reasons.

Baumol's hypothesis implies the acceptance of the existence of a lexicographic ordering of preferences between both attributes, profits and sales revenue. Thus, only when the minimum profit has been fully achieved can the attribute sales revenue be taken into consideration.