Resource allocation in non-parametric methods in the presence of desirable and undesirable outputs

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Production function is the basis of technical inefficiency analysis that is generally dealt within theories of microeconomics. This function shows the maximum produced amount for each unit in which inputs (outputs) are independent of each other; however, in a number of cases this independence does not hold especially when the sum of inputs (outputs) must remain constant. Noticing the correct allocation of resources and production is important in most countries around the globe because limitations in resources and production are of priority in every country's policy and planning. Assume a circumstance in which the goal is keeping demands constant, so if a producer tries to increase his/her production, other producers should decrease their production by the same amount to set keep demand level constant. a different perspective, this objective is followed concerning the production of undesirable factors; that is, if the objective is noticing the allowed amount of production of undesirable resources in production, and if mangers are unable to decrease it, they should make decisions to make the set of whole production of undesirable factors constant in order to obey the allowed amount of production of such factors. Realizing this needs a sound managerial perspective to avoid possible chaos. Researchers have proposed different methods to measure the efficiency of decision-making units in all the objective is to keep the set of outputs (desirable and undesirable) constant. In such methods, units reach a common equilibrium efficient frontier of 1. This, in fact, requires a tremendous amount of interaction between efficient and inefficient units which is not possible in reality. In the current dissertation, besides discussing the available methods in the literature, a sound method through the use of data envelopment analysis (DEA) is provided in which units try based on their ability to enhance their current efficiency; therefore, an acceptable and accurate allocation of in the enhancement of units is measured simultaneously. The proposed method in

this dissertation is aiming at avoiding personal decisions while evaluating organizations in a better procedure; this causes that managers reach a unified result. On the other hand, this method keeps the way open for managers for their required managerial changes to implement in order for them to reassess the required changes before implementation.

Keywords : data envelopment analysis (DEA), efficiency, desirable output, undesirable output, common equilibrium efficient frontier