

Loss Distance Functions and Profit Function: General Duality Results

Juan Aparicio^a, Fernando Borrás^a, Jesus T. Pastor^a and Jose L. Zofio^b

February 2015

^a Center of Operations Research, University Miguel Hernandez of Elche,
Av. universidad s/n, Elche 03202, Spain

^b Departamento de Analisis Economico: Teoria Economica e Historia Economica. Universidad Autonoma
de Madrid, 28049 Madrid, Spain

Abstract

The concept of loss distance functions is introduced and compared with other functional representations of the technology including the Hölder metric distance functions (Briec and Lesourd (1999)), the directional distance functions due to Chambers et al. (1996, 1998), and the Shephard's input and output distance functions as particular cases of the directional distance functions. Specifically, it is shown that, under appropriate normalization conditions defined over the (intrinsic) input and output prices, the loss distance functions encompass a wide class of well-known and much less known distance functions. Additionally, a dual correspondence is developed between the loss distance functions and the profit function, and it is shown that all previous dual connections appeared in the literature are special cases of this general correspondence. Finally, we obtain several interesting results assuming differentiability.

Key words: Loss distance functions, directional distance functions, Hölder distance functions, duality, profit function.