Chapter 14
Productivity and Public Funds: A Directional Distance Function Approach Applied to the Italian Agricultural Sector

Greta Falavigna  
CNR-Ceris, Italy

Alessandro Manello  
CNR-Ceris, Italy

Sara Pavone  
University of Insubria, Italy & CNR-Ceris, Italy

ABSTRACT
This chapter aims at evaluating the effect of Italian regional policies in the agricultural field. Performances of regional systems have been evaluated through an extension of Data Envelopment Analysis (DEA), the Directional Distance Function (DDF), which allows one to consider emissions of ammonia as undesirable output. Productivity and efficiency of agricultural systems are based not only on agri-production but also on the contraction of emissions deriving from the fertilizer’s usage. Results show that a convergence path between productivity and public funds exists and that there are differences among Italian macro-areas considering both efficiency and productivity dynamics. In particular, if efficiency scores are interpreted with the amount of public funds distributed by the Rural Development Programs over the period 2000-2006, empirical evidence suggests that more resources are received by disadvantaged areas. Findings underline that the most disadvantaged areas, in terms of productivity, are those receiving more structural public funds.

INTRODUCTION
The main purpose of this chapter is to describe an application of a particular Data Envelopment Analysis (DEA) to the Italian agricultural industry with the aim to evaluate public regional policies. The value added of this study is the application of the Directional Distance Function (DDF) to regional agricultural systems using emissions as undesirable output. In particular, authors test that the most disadvantaged areas, in terms of productivity, are those receiving more structural public funds. In this meaning, productivity dynamics affect public policies.

DOI: 10.4018/978-1-4666-4474-8.ch014
Increasing the environmental sustainability of agricultural sector is, during the last decade, one of the main objectives of EU interventions. The so called Common Agricultural Policy (CAP), in fact, has, among its objectives, the achievement of high standards of environmental care. In particular, this chapter analyses the role of the first slot of Rural Development Programs (RDPs) in the period 2000-2006, for which a specific measure F is created in order to stimulate the adoption of environmental friendly practices. In detail: is there a correlation between funds’ flows and the level of production sustainability among Italian regions? If this is the case, the hypothesis on a significant reduction of initial inequalities among Italian local systems will be formally tested. The main innovation concerns the consideration of bad outputs in the model, in order to obtain productivity level and TFP growth indexes, which reflect the environmental sustainability of agricultural practice. Indeed, one of the more easy way to boost land productivity, the usage of fertilizers, comes out at an high price. Nitrogen fertilizers, the most common and cheaper, are one of the biggest source of ammonia (NHO3) released into the environment (ISPRA, 2011).

The chapter has been structured in the following way: in the first part a literature review is presented; the second section illustrates the applied methodology and the main data issue are shown in section 4; finally, results and conclusions are provided.

**LITERATURE REVIEW**

Efficiency in agricultural industry is a field very common in literature because from the one hand people are interested to know what they are eating; from the other hand, Governments are interested to have feedbacks on their policies.

The importance of the rural development policy appears clear considering that more than the 90% of the entire European territory could be classified as rural. Moreover, it is estimated that the 56% of European population resides in these areas. These considerations show the necessity to preserve the countryside and to support economical activities localized in disadvantaged regions.

The concept of rural development is increasingly important in policy and research and, for this reason, findings from productivity analysis will be interpreted considering the distribution of public funds. The main aim of this work is to control if policies are able to stimulate a convergence path.

Even more EU directives have had the aim to protect the environment and then to encourage the adoption of sustainability criteria and certifications (2004/35/CE).

In particular, on the webpage of the European Commission there is the clear incentive for farmers to produce preserving the environment.

To acknowledge this directive, each Country of European Union promulgated agricultural policies with the aim to translate in national laws the eco-sustainability issues. Starting from this point of view, many authors analyzed the effects of the implementation of these directives, simulating possible scenarios, as the work of Bartolini et al. (2007), where the impact of the water policy, relating to the directive EC 60/2000, is studied.

To doing this, many authors focused their work on the analysis of interactions of ecological and economic factors in the field of Land Degradation (LD), considered as the most representative variable in both environmental projections and policy strategies (Salvati and Zitti, 2008). An interesting analysis on performances of rural districts in relation to the Land Degradation field has been done by Salvati and Carlucci (2011). They approached the problem starting from the definition of productivity and eco-