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Internalising external environmental effects in efficiency analysis

The Swedish pulp and paper industry 2000–2007

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Abstract

This paper investigates the efficiency in the Swedish pulp and paper industry using national account data. By using a directional distance function approach we are able to investigate different aspects of efficiency relating to the direction of scaling. In the first analysis, desired output (pulp and paper) and undesired output (pollution) are considered equally important. This analysis shows that there is a 12% potential to simultaneously reduce pollution and increase the production of pulp and paper. In the second analysis, only undesired output is considered. The analysis shows an average potential reduction in pollution of 22%. If, on the other hand, this potential is computed in terms of desired output, keeping undesired output constant, the average potential increase in desired output is 14%. In a fourth analysis we discuss the potential to evaluate the costs of environmental regulations using the DEA methodology. Finally, our paper demonstrates that data from national accounts can be used to investigate different aspects of environmental efficiency.

Keywords: environmental efficiency, directional distance function, cost of environmental regulation

JEL: D24; Q25; Q28

1 Introduction

In this study we use official Swedish environmental account data to explore various aspects of efficiency accounting for both desired and undesired output. The industry in the study is the Swedish pulp and paper industry. The desired outputs are pulp and paper and the undesired outputs that are included in this study are emissions of carbon dioxide and sulphur dioxide.