Chapter 6

Benchmarking Mobile Operators Using DEA: An Application to the European Mobile Markets

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ABSTRACT

Improving efficiency is becoming crucially important for the European mobile industry due to the increased competition and market saturation over the last years. However, even though there exist diverse studies measuring efficiency using Data Envelopment Analysis (DEA) in wire telecommunications, there is a lack of empirical studies measuring the efficiency of the mobile operators. This chapter first outlines the main techniques that are used to measure efficiency of mobile operators. Second, the chapter reviews the use of DEA in the telecommunications industry. Third, the authors estimate the efficiency of more than seventy European mobile companies between 2007 and 2009. The findings of the DEA employed indicate that the least efficient mobile operators belong to recently joined European Union countries or South East European countries. Finally, they draw the conclusions together with policy and managerial implications based on the DEA results.

INTRODUCTION

The mobile telecommunications industry has undergone major changes during the last decade, both in the services that offers (e.g. data transmission and other services related to the new economy), and the market competitive conditions. Regulators establish different policies in order to promote competition in the market. The development of competition in mobile markets has taken longer than expected, with the first operator to launch often retaining a significant portion of the market, after it has been joined by two or three other operators in each European country. Given the increased competition and market saturation of the mobile industry, improving efficiency is be-
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coming crucially important for mobile operators in the near future.

Efficiency measurement allows comparing different firms within a specific sector and identifying performance gaps among firms. From a regulatory perspective, efficiency indicators are important in the evaluation of different regulatory policies. The use of benchmarking then is twofold. Firms can improve their efficiency level based on their competitive benchmarks and regulators can adjust the incentive regulation schemes accordingly.

Efficiency analysis has been used in sectors like electricity, water, and telecommunications. The majority of the studies in the telecommunications industry have focused in wire communications, some by measuring the relative efficiency across countries (Lien and Peng, 2001; Giokas and Pentzaropoulos, 2008) and others by evaluating the impact of regulation in the change of productivity of wired telecommunications carriers (Uri, 2000; Resende, 2008, among others). However, there is a lack of empirical studies measuring the efficiency of the mobile operators in Europe. There is a limited number of studies in the wireless telecommunications focusing mainly on cross-country efficiency (Azadeh, Asadzadeh, Bukkari and Izadbaksh, 2011; Liao and González, 2009) and, at firm level, they have analyzed the efficiency of one Korean mobile company (Cooper, Park and Yu, 2001; Zhu, 2004), four mobile companies in USA (Kwon, Stoeberl and Joo, 2008) and non-European operators from Brazil, India and China (Resende and Tupper, 2009; Liao and González, 2009).

Following these considerations, the aim of this chapter is to address the following objectives:

1. Present the main efficiency measurement techniques focusing on Data Envelopment Analysis (DEA).
2. Review the use of DEA methodology and its empirical findings in the telecommunications industry literature.
3. Evaluate the efficiency of a sample of mobile operators in Europe. This analysis enables a cross-firm efficiency comparison, namely to identify the most efficient operators which are used as competitive benchmarks.
4. Draw final conclusions based on the DEA model and provide a set of practical recommendations for the mobile telephony market managers and researchers.

The chapter is organized as follows. First, an introduction of different efficiency measurement techniques are presented along with the advantages and disadvantages related to each method. Second, the literature in the field of efficiency assessment in telecommunications is reviewed. Third, we estimate the relative efficiency of the 73 European mobile operators among 2007 and 2009 using DEA. Fourth, the final conclusions are drawn based on the results obtained in the previous section.

EFFICIENCY MEASUREMENT TECHNIQUES

Benchmarking using relative efficiency techniques allows us to understand the drivers of the efficiency of the firms in a specific industry and could serve as a useful tool for improving their competitive position. Efficiency analysis has been widely used in the public utilities sectors like electricity, water, health or telecoms as a regulatory ex-post mechanism to determine the deviation of the firms of the regulatory targets, and as a useful ex-ante tool in the process of liberalization.

The efficiency measurement techniques can be categorized to parametric and non-parametric. Parametric techniques make use of econometric modelling to calculate the efficiency while non-parametric ones use mathematical programming. The main parametric techniques are Corrected Ordinary Least squares (COLS) and Stochastic...