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INTEGRATING QUALITY OF SERVICE IN INCENTIVE REGULATION –EXPERIENCE FROM NORWEGIAN ELECTRICITY DISTRIBUTION

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Overview

In the 1990s, various countries introduced incentive regulation regimes into the national electricity markets. Theoretical (for a seminal article Spence, 1975) as well as recent empirical findings (Ter-Martirosyan, 2003) show that such mechanisms incentivise reductions of quality of service. The quality level under incentive regulation might – if not regulated otherwise - tend to deviate from the socio-economic optimum therefore. As the first country in Europe, Norway reacted on that and decided to implement quality of service components in the electricity incentive regulation regime in 2001. Major mean of that change in regulation was the valuation of energy not supplied with a customer group specific cost factor, adding up to the Cost of Energy Not Supplied CENS. In this paper, we analyse how the companies' total efficiency – the direct and external cost efficiency – developed under the new regulatory set-up. Modelling production cost and CENS as substitutes, we identify different strategies of quality improvement by analysing factor elasticities. Controlling for environmental influences on firms' quality and efficiency – both economically relevant technical and meteorological aspects - we apply the random effects stochastic frontier panel data model proposed by Battese and Coelli (1992) in a distance function setup. By estimating technical as well as allocative efficiency, we are able to calculate company individual deviation from a socially optimal cost-quality relation.

Methods

To analyse the efficiency development over time, we estimate a random effects stochastic frontier model with time-varying efficiency (Battese & Coelli, 1992) in a distance function setting, approximating the underlying production technology with a translog functional form. Having identified both production cost and CENS driving environmental variables by regressing either cost on topographic and climate influences, we fit the estimator by introducing environmental factors in the production technology itself rather than letting them influence the inefficiency of a utility.

Results

For a panel of 131 and the period from 2001 to 2004, we find that efficiency remains rather constant over time. Although the time trend indicates increasing cost for the sample period, the cross sectional average efficiency scores do not differ significantly, letting the random effects estimator lead to identical results as a time invariant random effects model (Pitt & Lee, 1981).

Conclusions

After all, the introduction of the CENS mechanism in the Norwegian electricity regulation does not seem to have changed the quality of service level substantially. It might – however – having stabilised it.

References

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