

Estimating Marginal Cost of Quality Improvements: The Case of the UK Electricity Distribution Companies

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**Tooraj Jamasb, Luis Orea, and Michael G.
Pollitt**

In recent years many regulators have adopted incentive regulation of natural monopoly electricity distribution networks. Within this context, an important issue has been how to ensure the utilities provide the right level of quality of service. Improving quality of service is costly and there is reason to believe that the marginal cost of quality increases with level of quality. From a theoretical point view, quality of service should be improved up to the point where the marginal cost of quality equals the willingness-to-pay of the customers for the extra level of quality.

Meanwhile, estimating the cost of improving quality can vary from network to network and it is inherently difficult for the regulator to assess due to information asymmetry. However, the cost of improving service quality can be observed and estimated ex-post.

The main aim of this paper is to develop an econometric approach to estimation of marginal costs of improving quality of service. We then implement this methodology, applying it to the case of the UK electricity distribution networks. The UK distribution networks have been subject to incentive regulation since 1990 (based on benchmarking since 1995) and present a suitable and interesting case to empirically apply our method.

In addition, the estimated marginal costs of quality allow us to shed light on the effectiveness of the current UK incentive regulation with regards to improving service quality, and to derive optimal quality levels and associated welfare economic losses due to provision of

sub-optimal levels of service quality. Moreover, the proposed method also allows us to measure the welfare effect of the observed quality improvements in the UK networks between 1995 and 2003.

Our results suggest that while the incentive schemes established by the regulator to encourage utilities to reduce network energy losses lead to improvement in sector performance, they do not provide utilities with sufficient incentives to avoid service outages interruptions. We find that the observed improvements in service quality during the period of this study only represent 30% of the potential customer welfare gains (based on 2004 willingness to pay survey values), and hence indicate that there was still a substantial scope for further improvements in quality of service.

Contact
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T.Jamasb@hw.ac.uk
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