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Yardstick and Ex-Post Utility Regulation by Norm Model: Empirical Equivalence, Pricing Effect, and Performance in Sweden

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The history of the search for workable regulatory models and efficient incentive schemes for energy networks dates back to the inception years of the utility industry. However, since 1980s, ries there has been a number of innovations in incentive regulation. In Europe, notably in the UK and Norway, incentive regulation schemes have been based on the RPI-X price/revenue cap model following Littlechild (1983) and aided by collective frontier-based benchmarking of utilities. In the US, performance based regulation (PBR) has mainly been in the form of price caps or profit sharing schemes and the result of one-to-one agreements between the public utility commissions (PUCs) and individual utilities. In several Latin American countries as well as in Spain and Sweden regulators have used incentive regulation based on engineering-designed reference models or norm models of network utilities as benchmarks.

This paper examines the effects of the application of norm models within an ex-post incentive regulation of electricity distribution networks in Sweden. In 2003 the Swedish electricity regulator (STEM) implemented an incentive regulation model for electricity distribution by which the utilities' actual revenues are benchmarked against the cost of its engineering-designed model developed by the network performance assessment model (NPAM). The models are not intended to represent the efficient frontier or best practice but rather to represent 'reasonably' efficient networks. Norm models are used to screen out utilities whose performance in terms of costs and/or access charges is significantly worse than their fictive peers and to subject them to detailed regulatory scrutiny.

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This paper uses econometric models to examine the representatativeness of the model firms, their pricing behaviour, and their performance in terms of cost saving and quality of service. We first examine the empirical equivalence of norm models to real utilities. Next, we estimate the effect of regulation on pricing behaviour and performance of utilities in average costs, quality of service, and network energy losses. The norm models seem to reflect the main network features, demand characteristics, and capital stocks of real utilities. However, the price of labour faced by the utilities affects relative performance insofar as utilities serving rural areas, where labour cost is generally lower, will be disfavoured.

Also, quality of service has not affected the relative performance of utilities, indicating that incentives may be weak. Moreover, on the whole, utilities respond to norm models and incentives and reduce their average prices. However, investor-owned utilities that perform better than their norm models behave strategically and increase their prices.

We also find that investor-owned utilities reduce (inflate) their average cost if they perform worse (better) than the benchmark. Public utilities have not adjusted their costs significantly in response to the incentives. We do not find evidence of improvement in quality of service and reduction in network energy losses although less efficient investor-owned networks seem to have improved on both fronts. Finally, efficient investor-owned utilities seem to have reduced their quality of service in terms of outage length.

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