frontier economics

Bulletin

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Competing monopolists

A NEW ERA FOR YARDSTICK COMPETITION

The Netherlands is liberalising its energy markets. As part of this process, the Energy Regulator, DTe, is establishing a coherent framework for regulating natural monopolies, such as the electricity distribution businesses. DTe's approach to this question has a number of innovative elements. For example, while in other countries comparative analysis merely informs the regulator's judgement, benchmarking is central to price determination in the Netherlands. Furthermore DTe has announced that it will adopt explicit yardstick competition for the second regulatory period. Frontier Economics has been helping DTe throughout the regulatory process.

Networks pose a common problem to economic regulators. Where they are "natural monopolies" – that is to say, duplication would be expensive and unnecessary – regulators cannot rely on direct competition to put upward pressure on efficiency and downward pressure on profit margins. Electricity networks are a classic example. To →

protect the consumer, regulators have to find other ways of delivering these two most important benefits of competition.

The problem is complicated by the fact that, for half the job, the regulator is struggling in the dark. While actual costs are observable, and so profit margins can be controlled, it is impossible for a regulator to observe directly the extent to which these actual costs are at the right ("efficient") level. This information problem leads to the key question: How do we provide the companies with the right incentives to make efficiency improvements that benefit customers?

One approach is to allow them to keep the profits from efficiency gains, for a period long enough to create a real incentive to reduce costs and reveal their efficient cost level. However, it is not easy to judge the appropriate length, and the wrong choice could have far-reaching consequences. Plainly, if the period is too short, the efficiency gains will not be worth the effort, but if it is too long, excess profits may build up. In either case, the outcome may undermine the credibility of the regulatory process.

One way out of this dilemma is to use information over which the firm has no influence in setting its prices, but which nonetheless provides a reasonable indication of what the firm's costs should be. For example, if a firm's prices were regulated according to others' costs, rather than its own, each would have a strong incentive to improve efficiency. Setting prices in line with an exogenous 'yardstick' is likely to generate greater benefits for customers. Businesses are, in effect, being made to compete against each other's performance, as the regulator creates a regime that simulates a competitive market. The use of comparative information to set regulated prices in this way is called yardstick competition.

TWO STEPS TO YARDSTICK COMPETITION

In practice, however, there is a problem. Companies do not all begin at the same level of efficiency. If all firms were required to reduce their prices at the same rate, this would have the effect of rewarding the inefficient. The least efficient companies would most easily increase their efficiency (and thereby overshoot their target, generating profits) while the most efficient companies, already at the frontier of best practice, would be penalised.

In the Netherlands, DTe therefore decided on a 2-step strategy for the regulation of the distribution companies:

- Step1 (benchmarking); 2001-2003: Companies are 'benchmarked' at the outset and required to catch up to the efficiency frontier by 2003, so that they all start on Step 2 from a roughly equal footing.

- Step 2 (yardstick competition); from 2004: All companies should expect to be subject to similar price controls, reflecting the fact that the productivity growth rate of the companies should be similar once the initial differences in efficiency have been reduced.

This process is quite different from the approach that has been applied in other regulatory environments such as the UK. In the regulation of UK electricity and water companies, a benchmarking analysis of efficiency is conducted at each review, but this merely informs the regulator's judgement as to what the price control should be. It is not central to the price determination itself.

Furthermore, the benchmarking analysis adopted by DTe is quite different from that which is practised elsewhere. Firstly, the conceptual framework for the benchmarking exercise is very different from those so far used elsewhere. Secondly, the efficiency analysis is based upon aggregate cost and output information. It does not include benchmarking of the individual costs and processes within each firm. A clear objective of DTe is to avoid micro-management of the businesses. Instead, it prefers to leave firms to maximise their own profits within a clear set of regulatory targets.

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WHICH MODEL?

In designing the framework, DTe had not merely to choose the appropriate benchmarking model, but also determine the input and output variables to be used. The regulator decided on Data Envelopment Analysis (DEA) as the appropriate benchmarking tool. DEA extends simple ratio analysis to situations where the firm produces a number of outputs from a range of inputs. It aims to address the fundamental question: how efficient are you in delivering outputs to customers for the money you receive from them?

DEA differs from the econometric modelling that is often used for benchmarking because it does not attempt to explain whether an output drives cost or otherwise. Instead, this approach asserts what the outputs should be, and assesses efficiency and the efficient level of costs and revenues on that basis.

WHICH INPUTS?

DTe decided to treat all costs symmetrically, to avoid the danger of distorting incentives. It makes no sense to distinguish operating expenditure from capital costs (depreciation and return) where networks can either be maintained by incurring operating expenditures, or replaced by investing, or where capitalisation policies differ. The same kinds of issues arise with respect to staff costs, which may be distorted by decisions to contract out or carry in-house. Separate treatment of these different types of costs may encourage inefficient input choices. So the input used for the model is 'total controllable cost', which is the sum of operating expenditure and capital costs.

In this area, DTe has learnt from the UK experience. The 1995 price controls for the UK electricity distributors were derived by setting operating expenditure targets (on the basis of an operating expenditure benchmark), whilst past investment was added to the regulatory asset base with little regulatory scrutiny. In response to these regulatory signals, companies had a strong incentive to choose an investment solution where a maintenance option would have been cheaper.

This had the effect of making an individual distributor look more efficient (on the regulator's model), whilst at the same time the money was safeguarded by being added to the regulatory asset base, on which a return could be earned. A number of companies responded to these signals and as a consequence over-invested in their networks.

WHICH OUTPUTS?

The most important outputs of an electricity network business are those that directly affect customers: the electricity distributed, the capacity provided, the quality of service and the number of customers served. However, some companies face more onerous operating conditions: In the Netherlands, the principal differences relate to population density and dispersion. We analysed a range of model specifications on behalf of DTe, working from a very simple model to more complex ones that incorporated these firm-specific characteristics. DTe ultimately selected the complex model.

X MARKS THE DISTRIBUTOR

Having determined the efficiency frontier, and how far each individual firm lies from this frontier, it is then necessary to set 'X factors'. These set out the percentage price reduction (relative to inflation) that each firm must achieve per annum. Ideally, the most inefficient firms will have the highest X factors. Our analysis suggested that there are large differences in efficiency across distributors in the Netherlands. The 'raw' X factors, which range from –19% to +3%, reflect both these differences in efficiency and differences in profitability. However, such high X factors may be unachievable, since it is unlikely that inefficiency on such a scale can be eliminated rapidly.

Consequently, in the second stage of the process DTe capped the maximum X factor at 8%. This X factor is consistent with the requirement to reduce operating inefficiency (which was also benchmarked) in the period, whilst providing a longer period of time for the companies to improve capital efficiency.

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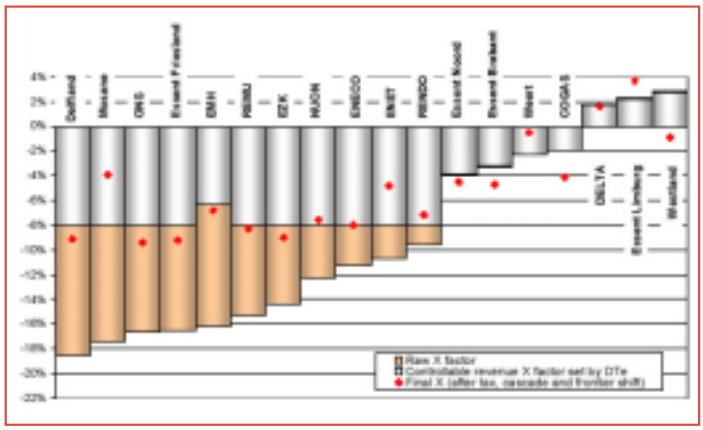
The third stage of the process incorporated a range of other effects. First, the companies will be required not only to catchup with the frontier but also to push it out at a rate of about 2% per year. After all, even best-practice firms can improve. Second, the impact of new taxes on the sector had to be modelled. Third, the cascade effect of price controls higher up the supply chain (e.g. electricity transmission) on the prices of the downstream distributor had to be calculated.

The chart below illustrates the 'raw' X factors and the capped X factors applied to controllable revenue in the first two stages, and the final X factor that was calculated to complete the third stage.



Price controls for the Dutch electricity distributors

Source: DTe

As the chart shows, the final X factors vary considerably, reflecting differences in efficiency and in historical pricing policy. For example, five businesses were allotted very low price reductions (or even price rises) both because they were efficient and because their current prices were too low to earn a reasonable return on capital, as a consequence of earlier social pricing decisions by their municipal owners. Three efficient companies were allotted significant price reductions simply because their current prices generated excess returns, which the regulator did not wish to persist in the new regime. The price controls on a further five companies were largely driven by the regulatory objective that customers should not pay for inefficiency. Finally, five companies exhibited both excess returns and inefficiency and were allotted high X factors as a result.

SIGNALS FOR THE FUTURE

By the end of this first regulatory period (at the end of 2003), DTe expects the Dutch electricity distribution companies to have moved to the efficient frontier or - in the case of the least efficient firms - as far towards the frontier as possible in this time scale. From this starting point, DTe will introduce a system of yardstick competition, with the prices of individual companies linked to average performance in the sector. Companies that improve their efficiency by more than the industry average will benefit, while those that improve efficiency at a slower rate will not. The regulator hopes, in short, to have created a regime that replicates the pressures exerted by a competitive market environment – giving every business a continuing incentive to operate as efficiently as possible, in order to stay ahead of its competitors.

CONTACT	**Phil Burns** philip.burns@frontier-economics.com
	Frontier Economics, 150 Holborn, London, EC1N 2NS UK
frontier economics	BOSTON | LONDON | MELBOURNE
	www.frontier-economics.com