Energy Policy 37 (2009) 1323–1330

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

Statistical benchmarking in utility regulation: Role, standards and methods

Mark Newton Lowry, Lullit Getachew *

Pacific Economics Group, 22 E. Mifflin Street, Suite 302, Madison, WI 53703, USA

ARTICLE INFO

Article history:
Received 11 July 2008
Accepted 17 November 2008
Available online 21 January 2009

Keywords:
Benchmarking
Regulation
Performance standards

ABSTRACT

Statistical benchmarking is being used with increasing frequency around the world in utility rate regulation. We discuss how and where benchmarking is in use for this purpose and the pros and cons of regulatory benchmarking. We then discuss alternative performance standards and benchmarking methods in regulatory applications. We use these to propose guidelines for the appropriate use of benchmarking in the rate setting process. The standards, which we term the competitive market and frontier paradigms, have a bearing on method selection. These along with regulatory experience suggest that benchmarking can either be used for prudence review in regulation or to establish rates or rate setting mechanisms directly.

1. Introduction

Statistical benchmarking is being used with increasing frequency around the world in the regulation of energy utilities. Its application in this sphere though differs in terms of the motivation for its use, the standards used to judge utilities' performance, and the methods applied. In some jurisdictions, statistical benchmarking has been considered as part of a traditional cost of service prudence review whereas in others it has been used as the main tool for setting multi-year rates. Implicit or explicit in this use are various standards used to set the benchmark. One is the *competitive* market standard, which centers on the performance of the typical or average utility in a certain data sample. Alternative standards include the apparent best or *frontier* performance in the sample and the performance that would define the margin of the *top quartile* of performers. In addition, methods used to conduct benchmarking, aided by a sizeable literature, differ widely. The most commonly used methods are econometric modeling, including constrained ordinary least squares (OLS) and stochastic frontier analysis (SFA), indexing such as unit cost and TFP indexes, and data envelopment analysis (DEA).

The purpose of this paper is to analyze some of these issues and propose guidelines that ensure benchmarking is used in ways that create benefits to customers and shareholders alike in the regulatory setting. Towards this, we first address the role of statistical benchmarking in regulation in Section 2, drawing on our own experience and previous scholarly treatments. Our discussion includes precedents and circumstances under which benchmarking is most fruitful in utility regulation. We also address cases where benchmarking might have drawbacks, both theoretically and in practice. Second, for regulators who are seriously interested in statistical benchmarking, we examine the performance standards that have been implicitly used in benchmarking in Section 3. These are affected by the motivation of the use of benchmarking and affect the types of methods that are used to benchmark utility performance. We address briefly the various methodologies used in statistical benchmarking. We then propose standards and methods that best serve the interest of all stakeholders. We provide concluding remarks in Section 4.

2. Role of benchmarking in regulation

Here we present the conditions under which benchmarking is useful in utility rate regulation. We begin by presenting cases where benchmarking has played a role in rate setting to date. These precedents not only provide a general historical background on the role of benchmarking, but they also suggest guidelines for its usefulness in regulation. We then present arguments for and against the use of benchmarking in regulation. We include discussions from the literature for this purpose. Based on these we propose the potential and beneficial roles that benchmarking can play in regulation in the last section.

2.1. Precedents

Statistical benchmarking has to date played its most prominent role in utility regulation in Western Europe,[1] where it has been

* Corresponding author. Tel.: +1 608 257 1522.
E-mail address: lgetachew@earthlink.net (L. Getachew).

[1] Pollitt (2001) provides a useful review of the precedents of the use of benchmarking in regulation.

0301-4215/$ - see front matter © 2008 Elsevier Ltd. All rights reserved.
doi:10.1016/j.enpol.2008.11.027

used by regulators in several countries. Best known, perhaps, has been its use by Britain's Office of Gas and Electricity Markets (OFGEM) to regulate the operating expenditures (opex) of jurisdictional power distributors.[2] OFGEM's sister agency, OFWAT, also uses benchmarking to appraise the opex of Britain's water and sewerage utilities.[3]

Both employ national rather than international data and econometric benchmarking to determine efficient level of opex for each utility. For instance, OFGEM has employed constrained OLS (COLS) to gauge power distributors' opex. As Pollitt (2005) indicates though benchmarking is part of a broader exercise undertaken to set the X-factor in RPI-X-based price reviews.[4] In this application, benchmarking is used to identify efficient operating cost, which for the typical UK power distributor constitutes around 30% of allowed revenue.

The Dutch electricity regulator (DTe) has also used national data to benchmark Dutch electric utilities.[5] The benchmarking method used in the first regulatory period of 2001–2003, which was subsequently revoked by court order, relied on DEA to set allowed revenues and hence tariffs. The second regulatory period of 2004–2006 also relied on benchmarking to set revenues.[6] The Norwegian regulator (the Norwegian Water Resources and Energy Directorate—NVE) has also used DEA to benchmark power distribution efficiency, which was then used to determine allowed revenue for each utility.[7]

Regulators in North America have rarely commissioned statistical benchmarking studies for use in regulation. However, such studies are occasionally filed by utilities in support of rate filings. Examples include studies filed by AmerenUE, Atlanta Gas Light, Bay State Gas, Boston Gas, Central Vermont Public Service, Enbridge Gas Distribution, Enersource Hydro Mississauga, Hydro One Networks, Kentucky Utilities, Louisville Gas and Electric, Oklahoma Gas and Electric, Pacific Gas and Electric, San Diego Gas and Electric, Southern California Gas and Toronto Hydro Electric. All were based on US data. Econometric and indexing methods are the most widely used approaches in these studies.

Benchmarking studies for jurisdictional power distributors have been initiated by regulators in three Australian states.[8] Various methods have been used. Satisfaction with the studies was mixed. Two of the commissions did not use statistical benchmarking in subsequent rate updates after concluding that good benchmarking studies are hard to conduct and that their benefit thus is outweighed by their cost. Australian gas and electric power distributors have voluntarily filed studies on several occasions. Several of the studies were based on US data.[9] New Zealand, which had used statistical benchmarking to set part of the X-factor in its CPI-X threshold regimes for power utilities, has recently amended the Commerce Act of 1986 to prohibit the use of benchmarking in regulation.[10]

In Latin America, statistical benchmarking has been used in regulation in only a few countries. Regulators in Bolivia and Colombia have been leaders. Various benchmarking methods have been used. The most common application has been in power distribution.

2.2. Benchmarking pros and cons

To appraise the continued promise of benchmarking in utility regulation, it is necessary to consider arguments for and against its usefulness in this arena. On the positive side, benchmarking is principally useful in utility regulation for its ability to reduce regulatory cost, and 'externalize the terms of service' in regulation. We will address each in turn.

Benchmarking is likely to yield cost advantages in situations where regulators have little experience with rate cases, have jurisdiction over numerous utilities, or are grappling with a prudence review issue that is particularly challenging using traditional methods. Such circumstances go a long ways towards explaining why some regulators have pioneered the use of benchmarking in regulation. For example, the Ontario Energy Board has accumulated experience with cost of service regulation (COSR) through its longstanding jurisdiction over investor-owned gas distributors in the province. However, it was recently assigned the additional task of regulating more than 90 provincial power distributors.[11] In this case, it has chosen to incorporate benchmarking in setting the rates of power distributors in the province.[12] In Western Europe, national agencies have been created in the last 20 years to regulate recently privatized power distributors. These agencies in many cases have jurisdiction over 10 or more companies and have little experience with COSR.[13] In the United States, on the other hand, regulators have long experience with COSR. Furthermore, most have jurisdiction over only a handful of energy utilities that are in the same business.

In addition, benchmarking in regulation is advantageous because of its ability to externalize the terms of service or permit the setting of rates based on external targets rather than the utility's own cost of service. This provides utilities with incentives to reduce cost and perform efficiently. The incentive benefits of benchmarking have been noted by several authors.[14] First, data from a sample of industry participants is used to arrive at a target level of performance, such as efficient cost. While the operating conditions of each sample utility are taken into consideration to arrive at the target, each utility's actual performance is compared to this target that embodies an external standard. The utility then has the incentive to be efficient, such as by controlling its costs, since it keeps the savings beyond the set target. Second, certain conditions provide stronger incentives and hence elicit better performance when benchmarking is used in utility regulation. If utilities are allowed to keep all or most of the savings attained under a rate plan, set using benchmarking, they have greater incentive to control costs. For instance, if a utility is operating under a 5 year rate plan and knows that, due to benchmarking, its rates at the start of the next plan will not be trued up entirely to its cost of service it will have greater incentives to boost performance.[15]

[2] OFGEM (1999, 2004).
[3] OFWAT (1999, 2004).
[4] RPI is retail price index used in the UK and is similar to the CPI.
[5] DTe (20 November 2002a, b).
[6] van Dame, 2005. In the third regulatory period of 2007–2009 industry TFP was used to set tariffs.
[7] Norwegian Water Resources and Energy Directorate (April 2002).
[8] Office of the Regulator-General (2000b), Essential Services Commission (2005b), Queensland Competition Authority (2001, 2005), and Independent Price and Regulatory Tribunal (2004).
[9] Two such examples are studies file by Energex and Ergon to the Queensland Competition Authority (November 2000a, b).
[10] http://www.legislation.govt.nz/act/public/2008/0070/latest/DLM1194520.html.
[11] Ontario Energy Board, File No RP-2004-0188.
[12] Ontario Energy Board, EB-2007-0673.
[13] Germany's energy regulator, the Bundesnetzagentur (BnetzA) or the Federal Network Agency, which was established in 2005 to regulate recently privatized government network monopolies, is an example of this.
[14] Joskow (2006), Shleifer (1985), Vogelsang (2002) and Yatchew (2001).
[15] The externalization of rates that benchmarking facilitates can also help to reduce concerns about cross-subsidization that prompt regulators to discourage certain utility operating practices. Suppose, for example, that a utility wishes to outsource its customer care services, for example billing and information services, to an affiliated company that seeks scale and scope economies by offering the same services to other utilities. Regulators are naturally interested in such a case to ensure that earnings from the regulated activity are not used to subsidize this