Benchmarking Procedures in RIIO for National Grid

Tom Weyman-Jones
Professor of Industrial Economics
School of Business and Economics
Loughborough University, UK

Introduction

The RIIO consultation for National Grid published in July 2012, Ofgem (2012), makes use of independent consultant reports by the consultancy groups: PPA, Poyry. These reports have been commissioned to address benchmarking issues in assessing cost projections. However, each of the reports uses a *non-controlled unit cost analysis* which is not only several decades out of date, but also violates widely accepted international benchmarking procedures, including those developed by Ofgem over many years. Moreover the procedures used run counter to the benchmarking process which Ofgem announced in 2011 would be a key part of the RIIO process, Ofgem (2011). Finally, the procedures omit virtually all of the widely accepted data collection, collation, comparison and testing mechanisms approved by the European Council of Regulators and which are now widely practised throughout Europe, the USA and other developed economies. In an authoritative published survey of benchmarking practices co-authored by Ofgem's own in-house economic adviser, Haney and Pollitt (2009), Ofgem's well-established previous procedures were shown to rank highly in international comparisons. These established, successful and admired procedures have been completely abandoned in the consultants' reports in favour of a set of comparisons based on unsubstantiated opinion and without any controls for exogenous factors. The latter factor – non-control of exogenous factors – is well known in regulatory practice to destroy incentive mechanisms. Consequently, the current RIIO consultation risks undoing more than two decades of Ofgem's own work and bringing the RIIO regulatory process seriously into disrepute.

Benchmarking Principles

Regulatory benchmarking for cost efficiency has become a widely recognised set of processes in recent years, partly led by Ofgem's own work over two decades of price control reviews. The key ideas were established in the classic paper by Shleifer (1985) and widely applied in every regulatory sector worldwide since then.

A simple expression of these ideas can be given as follows. A sample of N companies is used and, for each company, cost is measured: c_i, $i = 1 \ldots N$. This cost measure could be *totex*, i.e. total expenditure on a cash flow or capital consumption basis, load related and non-load related operating and capital expenditure, *opex* and *capex*, or non-controlled unit cost analysis. Non-controlled unit cost is the raw figure for cost divided by a measure of the scale of the production activity under scrutiny.

The term *non-controlled unit cost* , means that no adjustments (controls) have been made for the potential differences amongst the group of non-identical companies comprising the sample, and non-controlled unit cost is simply the sample mean of the cost data, i.e. $\overline{c}$. Shleifer introduced the term 'yardstick competition' to represent a price control based on $\overline{c}$, i.e. *non-controlled unit cost.* To adjust the raw data to the benchmarked level of controlled unit costs, the regulator needs to recognise that all companies in the sample are non-identical in factors such as operating characteristics, output scales, input prices, or market conditions. Shliefer (1985: 325) states "if the regulator observes the characteristics that make firms heterogeneous, yardstick competition [i.e. the use of $\overline{c}$, *non-controlled unit cost*] is not the best way he can regulate. Instead, a multivariate regression defines a price rule that can bring us back to the first best". In this context, Shleifer uses the term"…not the best way to regulate…" to mean a failure to produce any incentive for the company to behave efficiently, or even to participate in the regulatory game. Non-participation in the regulatory game in practice means that equity is withdrawn from the company since failure to provide incentives leads to increased regulatory risk of arbitrary rulings and the share price falls. Shleifer observes that "If firms have observable exogenous characteristics,"…"The regulator can now estimate [the regression] by using the data on costs and firm-specific characteristics."

Tools for cost assessment

Ofgem (2011) contains a long and detailed discussion of the tools for cost assessment in *RIIO-T1*, explaining the initial ideas, responses to the public consultation and its latest thinking. Two quotations from the consultation Ofgem (2011) are worth noting: "Stakeholders were broadly supportive of the methods and principles outlined for this assessment tool. However, they expressed concern with the use of FERC data as the international comparator data and emphasised the need to use previously analysed benchmarking data and processes with appropriate adjustments for international differences and differences in the characteristics of the networks.", and "Stakeholders recognised that totex cost benchmarking is a better guide than disaggregated (eg opex or capex) benchmarking."

The discussion in Ofgem (2011) includes extensive details on regulatory benchmarking procedures embedded in the processes that Ofgem developed over many years, and encapsulates many of the ideas described above and originated in Shleifer (1985). The discussion also includes a long list of potential cost drivers that can be used to explain variations in unit cost data. The role of these can be explained as follows.

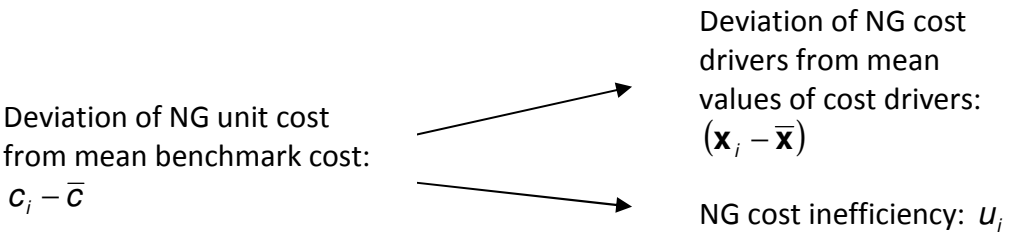
Suppose National Grid is the company observed with unit cost: c_i. The regression model described by Shleifer (1985) is:

$$c_i = \overline{c} + \mathbf{b}'(\mathbf{x}_i - \overline{\mathbf{x}}) + u_i \qquad i = 1 \ldots N$$

The term $\mathbf{x}_i$ is the list of values of the observed cost drivers that account for the variation in unit costs around the mean, and $\overline{\mathbf{x}}$ is the list of values of these for the

statistical mean company, i.e. the regulator's benchmark. The term u_i represents the inefficiency component of the difference between the mean unit cost and the unit cost of National Grid. The concept is shown in schematic form below. There are several ways of constructing the inefficiency measure: *data envelopment analysis* is a procedure that uses mathematical programming to compute u_i as a spatial distance, while *stochastic frontier analysis* uses statistical regression analysis to treat u_i as a random variable. Ofgem (2011) describes this procedure and the different modelling approaches in considerable detail and emphasises that it will be the key component of the toolkit[1] for *RIIO-T1* cost assessment. This document goes into considerable detail about the nature and type of relevant cost drivers, the issues of data collection and collation, particularly the creation of an international dataset to provide the sample comparisons. The description of how the toolkit would be used follows directly in a long tradition of similar procedures that have been used in every price control since 1994. The procedure described here is elaborated on and compared with the procedures used by other European and international regulators in Haney and Pollitt (2009) and the leading role of Ofgem's approach as a template for good regulatory practice is noted.

Factors determining the variation of NG costs from the regulator's benchmark



By contrast, in Ofgem (2012) the procedure described above is absent and appears to have been abandoned entirely and without explanation only 17 months after it was proposed as the key component of the cost assessment toolkit. Only speculation can be offered as to why the toolkit approach has been abandoned and the most likely explanation is that Ofgem has failed to make any of the models work at a satisfactory level. By default therefore the cost benchmarking has to fall back on uncontrolled unit cost analysis which in this context is known to be at most second best and seriously open to challenge

Evaluation of the Ofgem benchmarking procedures in previous price controls

The paper by Haney and Pollitt (2009) has become a widely cited summary of how European and other international regulators have used cost efficiency benchmarking embodying the principles in the Ofgem (2011) toolkit report in the last two decades.

[1] The toolkit is illustrated in table 2.1 in Ofgem (2011)

The authors' survey received 43 responses from regulatory authorities in 40 countries describing their benchmarking methods, processes and experience. The survey indicated that regulators regarded empirical economic analysis as a key component of the benchmarking process, something that Ofgem has used extensively in the past but that has been abandoned in RIIO-T1 – or at least has not been used in the consultants' reports. They state that the incorporation of environmental factors in the cost drivers, i.e. variables accounting for the differences amongst companies – the **x** factors represented above – is an indicator of best regulatory practice. The authors construct a best regulatory benchmarking practice index. Based on the cost assessment used in its previous price control reviews, Ofgem is ranked internationally as seventh out of 43 electricity regulatory authorities with a score of 4.5/8 and fourth amongst gas regulatory authorities. They conclude "It is clear from the results of our survey that only a small number of regulators do not use or are not actively considering the use of advanced benchmarking techniques in analyzing the efficiency of gas and electricity network companies." Ofgem does not explain why it has abandoned this type of advanced benchmarking process and reverted to an old-fashioned and outmoded procedure of asking consultants to raise doubts about the NG proposals without having to defend their arguments with publicly available and transparent rigorous benchmarking that incorporates large sample information in a systematic, statistically-defensible way. There is ample literature on how the procedures can be implemented, e.g. in Jamasb et al (2008) and the references cited there.

RIIO-T1: Initial Proposals for National Grid Electricity Transmission and National Grid Gas, Ofgem (2012)

Ofgem has fast tracked two transmission operating companies (SHETL and SPTL) but has not fast-tracked NGET or NGG NTS. This strategy is predictable in a benchmarking context because if there is any room for cost reductions, the major part is likely to be found in National Grid simply due to the much greater size of the organisation. Therefore, Ofgem has fast tracked the two smaller TOs in order to provide external benchmarks for NG, without the need to feedback into the costs of the other two operators. By fast-tracking the smaller TOs, Ofgem recognises that a benchmarking exercise will impose costs on the regulatory body and accepting the unit cost data of the smaller operators is the price paid by the regulator for access to information that could be potentially useful for benchmarking the larger TO, National Grid. There should be no assumption that SHETL and SPTL are more efficient than National Grid simply on the basis of the fast tracking, which is a device by Ofgem to generate benchmarking information. Consequently, we could expect Ofgem to benchmark National Grid against similar tables for SHETL and SPTL, probably by asking engineering consultants to judge the unit cost comparisons. What is missing is a clear indication of the comparative size of drivers. In particular since National Grid will not have access to the unit cost data of the smaller TOs, it is relatively difficult for the company to make meaningful comments on the benchmarking process. Nevertheless all three consultants' reports indicate that their

authors have made the false conclusion that because National Grid was not fast-tracked there must be a problem with National Grid's forecasts.

The Initial Proposals document contains no description of regression or other sample-based, comparative analysis. There is no information about the sample data used or the sample size, or even whether the same sample was used for all comparisons. We learn that there exist in-house company databases owned by the consultants, but no information is provided about them. There is no mention of any benchmarking procedures such as those described above. Instead, all that is on offer is a set of comments by the consulting engineers that dispute the National Grid data in various ways and simply offer alternative opinions about benchmark costs for which no *testable* evidence is provided. Critically, there is no recognition that there are measurable cost drivers which can explain the deviation of the National Grid unit costs from the unit cost of the (unrevealed) consultants' benchmark company. Put simply, National Grid is assumed to be identical in every respect except unit cost to every company in the consultants' database (to which no access is provided). This has the effect of making the term $\left(\mathbf{x}_i - \overline{\mathbf{x}}\right)$ simply a list of zeros, so that all variation in $c_i - \overline{c}$ is assumed to be due to inefficiency. To substantiate these claims, the following analysis is offered. While the consultants' reports are those of engineering experts, these comments are made from the point of view of an economist and not from that of an engineer. Nevertheless they remain relevant because the reports are attempting to fulfil an economic benchmarking purpose albeit using an engineering approach.

PPA: *RIIO-T1 Stage 4: National Grid System Operator Electricity and Gas - Capex and Opex Initial Assessment – Summary Report*

Page 3 of this short report identifies nine 'concerns' of which numbers 2 through to 8 are purely the expression of subjective opinions with no substantiating evidence. Since PPA has been hired to query National Grid's costs, the mere expression of subjective differences of opinions indicates nothing more than that PPA has been 'captured' by its paymaster. Point number 1 concerns the scale of cost increases, but no benchmark comparisons are presented by the consultants. Point 9 concerns supplier contracts and it appears that the consultants have failed to understand the design of these contracts.

A major means of achieving cost efficiency is by incentive contracting in which the contractor entity shares the benefits and costs of projects with the consumer entity, in the sense of sharing the gains and losses of innovation. This is one of National Grid's strengths because efficient design of incentive procurement contracts can substitute for the need for benchmarking, see Shleifer (1985). Given National Grid's relative size in the market, its incentive contracting is likely to keep a limit on costs that is more effective than for smaller TOs since the suppliers will need the National Grid business to survive in the market. From my discussions with the National Grid team in December 2011, I gained the impression that incentive contracting based on long-term relationships with suppliers was now the norm. I understand that a first

test is the achievement of a basic level of certain key performance indicators, KPIs. After that the supplier and National Grid share the efficiency gains equally, unless there is less than 100% achievement of the KPIs. This form of sharing contract appears to be optimally designed to reward the risks of taking on these major investments from the supplier's point of view while allowing National Grid to reap benefits as well that can be passed onto consumers (and of course shareholders).

Pöyry (2012 a) *RIIO-T1 STAGE 4: NGET FINAL ASSESSMENT*

This is a 26 page report; pages 1-8 and page 26 of this report are taken up with advertising material for the consultants and a copy of Ofgem's description of the RIIO process. On page 2 the consultants adopt the same false conclusion about the fast-tracking game that was made by PPA. On pages 2-3, the consultants state a seven point basis for their conclusions. Six of these bases refer only to National Grid's own data and therefore are the expressions of opinion not comparative benchmarking in the usual sense of the term. Only one relates to comparative data from the other two fast-tracked TOs and these data appear not to have been made available to National Grid or stakeholders in the wider economy. As a benchmarking procedure therefore this report lacks the most basic requirements for objectivity.

This report makes one valuable point, page 6 : "*One of the major challenges for the uncertainty mechanisms is that a number of the volume drivers are effectively linked to inputs rather than outputs"* but no alternative suggestion is offered. Cost reductions for *LR capex* are suggested without any evidential basis, so once again we are in the territory of unsubstantiated opinion. In relation to non-load related capex, Pöyry states on page 13: "*unit costs in substation plant areas were higher than our industry benchmarks and some comparable numbers from other TOs*". This is representative of the nature of their analysis, and it fails elementary tests of (i) transparency since the industry benchmarks are not identified nor quantified, and (ii) controllability since no attempt is made to model the exogenous cost drivers that determine inter-company heterogeneity; this is an especially serious problem when the apparent comparators may be of a completely different order of magnitude.

The essence of this consultants' report is contained on page 19: "*The levels and size of ranges of potential adjustment and size of the range at a subcomponent level reflects variation in our degree of comfort with (a) NGET proposals and supporting justification in their own right, and (b) review of all relevant information provided including via Q&A as we felt necessary to form a fully informed view*." The key idea here is that the report is an expression of opinion and argument; it contains no testable comparative cost evidence, no consistent definition of the comparator samples, and no attempt to explain or understand the basic heterogeneity amongst the TOs of vastly different size.

Pöyry (2012 b) *RIIO-T1 STAGE 4: Summary Report – Gas*

This report carries on in the same vein as the others. Table 2 on page 13 is a typical example of the approach. National Grid's pipeline costs are supposedly compared

with a single "*overseas client which include technical considerations similar to those addressed by UK practice*" then all the cost data are redacted. As an evidence-based argument, this fails on virtually every principle of benchmarking analysis. This is simply not consistent with a best practice objective benchmarking comparison for all of the reasons we have already identified: weak or unaddressed sample properties, non-transparency, non-comparability due to heterogeneity and replacement of objective evidence with subjective opinion. The only strength in the opinionated statements is that they indicate some of the arguments that National Grid itself will have had internally, but as a benchmarking procedure, this document remains a list of contrary opinions and very little else.

In the context of operating costs and non-operating capex, there is finally an attempt to confront some comparative and testable evidence, page 23. This is concerned with projected figures for annual efficiency gains. The discussion treats productivity change and efficiency change as if they were synonymous and interchangeable terms but they are not[2]. Productivity is defined in economics as the ratio of output to input[3]. Productivity change is a dynamic concept which can be measured over long time periods. Efficiency is defined as (for example) the ratio of potential minimum cost to actual cost[4] . It is a one-off measurement, which may not be repeatable. Efficiency change could be one component of productivity change, but it is possible for an already efficient company to experience productivity growth without being able to achieve further efficiency change. Alternatively it is possible for a company to improve its efficiency but to experience negative productivity growth if there is some external factor restraining the demand for its output – for example if the economy is in recession. There is no recognition of this distinction in the report which suggests the authors either have not thought through their analysis or are unaware of important economic concepts. The report confuses internal company efficiency targets with productivity change observed in different time periods and different industries with no attempt to discuss comparability. The report states (page 23) "*we believe that 2% per annum efficiency target is achievable and should be set as the target for NGC*". It is apparent that the report is attempting to make a statement about a possible one-off efficiency change but has expressed it wrongly as a sustained productivity change concept. In fact the UK economy as a whole has managed 2% annual productivity change on only a few occasions in the last half-century. The same is true for most of the EU and the USA. The concept is not the same as economic growth which could be expected to average close to 2% per annum over the long term for the UK economy. The statement therefore is flawed and seriously confused. The remainder of the report records the authors' different opinions about National Grid assumptions without offering any substantiating evidence.

[2] There is a well-known engineering-physics definition of efficiency: *useful output energy/input energy*, but it is the economics based definitions which are relevant in this context.

[3] If several outputs and inputs are used, then productivity is the ratio of weighted outputs to weighted inputs, where the issue of the relevant weights to use is open to debate.

[4] See Fried et al (2008)

Confidence levels

It has become standard practice amongst UK and EU regulators to make probabilistic statements about benchmarks rather than definitive statements, i.e. using confidence interval estimates rather than point estimates. For example, a regulator might state "we are 95% confident that average efficiency can be improved by x% based on the sample examined" - Ofgem, Ofcom, Ofwat, Council of European Regulators have all used language like this in the past - and it shows that they have allowed for the variation in costs amongst the sample before making a judgement. In my view none of the consultants' reports have recognised this concept so that there is no indication when they make a forecast (say of what unit cost could be) about how much confidence they can place in it. This is a departure from established good practice.

Conclusions

The conclusion from this analysis can be stated very briefly. Ofgem in the past has developed an admired and rigorous large sample benchmarking procedure that takes account of differences in the variables that can affect costs in different companies before making transparent and testable efficiency inferences. In the current review, it has abandoned this process and relied wholly on the backup procedure of asking consultants to develop ‘bottom-up’ doubts about National Grid’s own data without having to make transparent testable supporting arguments that account for inter-sample differences. In doing so, it is undermining the regulatory process that it has previously established successfully.

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