

Appendix 8.3.B – Peer review of residential retail cost assessment

Wessex Water

September 2018

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Review of ‘Household Retail Cost Assessment for PR19’. Economic Insight’s Draft Report for Bristol and Wessex Water

1 General Comments on the Modelling Approach in the Analysis

Our overall assessment is that the approach to the modelling was appropriate and the estimation results were clearly reported and well interpreted. The modelling comprised four parts: (i) construction of general models; (ii) general-to-specific-modelling; (iii) construction of the efficiency scores; and (iv) triangulation.

The appropriate approach was adopted at the outset to construct the general models by initially including all the potential cost drivers. Economic Insight chose the measure which they felt best reflected each driver. In most cases this was a single measure but for socioeconomic factors a number of measures were used as Economic Insight correctly recognised that these factors have multiple facets. In this respect and in addition to the IMD income score, Economic Insight included the house price to income ratio to measure house affordability and the number of mortgage reposessions as a measure of financial difficulty.

The path Economic Insight followed when moving from the general models to the specific models was entirely reasonable as they omitted variables with coefficients that had counterintuitive signs and those with coefficients that were not significant at the 10% level (except for the correctly signed meter drivers in the alternative total operating cost models). It is common in applied econometric modelling to include some variables with coefficients that are not significant at marginal levels but which have the right signs. This is because one may have a strong prior view that the variables should be included as determinants, which is certainly the case with the meter drivers; and/or including variables that are not significant may affect the signs of other coefficients in the model, as well as the magnitude and significance of these coefficients.

With regard to the computation of the efficiencies, they were computed on a model-by-model basis. This is an important feature of the analysis because it recognises that changing the model specification will lead to a change in the frontier/benchmark. Finally, the approach to triangulation for PR14 was followed to bring together the efficiencies from the COLS model and the random effects panel data model. We next discuss some specific aspects of the analysis which include, among other things, support for basing the triangulation on the PR14 approach.

2 Detailed Comments on Specific Aspects of the Analysis

2.1 *Weighting of the Different Models*

In the triangulation analysis Economic Insight weight the efficiencies from COLS and the random effects panel data model equally. In our view this is a very sensible approach at this stage for three reasons. Firstly, as Ofwat have not finalised the modelling approach that will be adopted for PR19 it is sensible at this stage to work on the basis of the PR14 approach rather than making conjectures about what the PR19 approach might be. Secondly, equal weighting removes any subjectivity regarding what the unequal weights should be. Thirdly, it is informative to adopt a PR14 modelling approach using data for PR19 as the analysis can be used to examine how the efficiency of water companies has changed holding the modelling approach constant.

More specifically, taking the COLS efficiencies and the efficiencies from the random effects panel data model forward to triangulation is sensible because these models have complementary features. The advantage of the random effects panel data model is that it accounts for unobserved heterogeneity of the companies that is not explicitly accounted for by the explanatory variables. The disadvantages are that the efficiencies are time-invariant and the calculation of the efficiencies is not just based on

the random effects, as would ideally be the case, but also noise. This is because distributional assumptions are not made to distinguish between the random effect of a company and noise (see 2.3 of this review for more details on this). Time-invariant efficiencies, however, is not such a big issue in this analysis as the sample covers only a short time period. The advantage of COLS is that the efficiencies are time-variant and no inappropriate measure enters into the calculation of the efficiencies as is the case with panel data random effects model. The disadvantage of COLS is that it does not account for the unobserved heterogeneity between the companies.

2.2 Variation in Efficiencies from Different Models

There are differences between the efficiencies Economic Insight report from the COLS and panel data random effects models. This is not unexpected because of: (i) differences between the model specifications; (ii) differences between the approaches to compute the efficiencies; and (iii) the efficiencies being time-variant in the case of COLS and time-invariant in the case of the panel data random effects model. To illustrate, the companies in the sample are very heterogeneous in some cases so it is not unexpected that accounting for unobserved heterogeneity impacts on the efficiencies. Despite the differences in the efficiencies from the COLS model and the panel data random effects model, one can take the view that it is beneficial for these two sets of efficiencies to both be used in triangulation because of the complementary features of the models that we outlined in 2.1.

2.3 Brief Appraisal of Alternative Modelling Approaches

In addition to COLS or a panel data model with a composed error comprising the random effect for a company and noise, an alternative branch of efficiency models is known as stochastic frontier models. Whereas COLS uses the noise to compute the efficiencies, pooled or cross-sectional stochastic frontier models distinguish between inefficiency and noise using distributional assumptions, which involves assuming a normal distribution for noise and inefficiency is typically assumed to have a half-normal distribution. Moreover, whereas a panel data model with a composed error comprising the random effect for a firm and noise does not distinguish between the random effect and noise in the calculation of the efficiencies, panel data stochastic frontier models can distinguish between these two error components. This again involves making distributional assumptions to distinguish between these error components.

None of the stochastic frontier models that were estimated for PR14 were taken forward to triangulation. We have been made aware, however, that Economic Insight have explored various stochastic frontier models as part of this project to enhance their preparedness for a range of PR19 eventualities.

2.4 Setting the Efficiency Benchmark

Economic Insight consider a comprehensive set of nine efficiency frontiers/benchmarks. For the latest year, the whole sample and the average over the sample three types of frontier are constructed: (i) the absolute frontier which is determined by the best performing company; (ii) the upper quartile frontier which is determined by the performance of the company at the 75th percentile in the sample; and (iii) the average frontier over the sample. Analysis of such a wide range of efficiency frontiers/benchmarks covers a wide range of situations. For example, for PR14 the frontier was set at the upper quartile, which given the high degree of heterogeneity between the companies in the sample involved setting the benchmark at a reasonable level for all companies. It has been suggested in a recent Ofwat document (2017, pp. 165), however, that a more stringent efficiency challenge may be considered for PR19 which points to the absolute frontier case that Economic Insight consider.¹

3 Implications of the Report for Ofwat's Approach to Cost Assessment

¹ Ofwat (2017): 'Delivering Water 2020: Consulting on our methodology for the 2019 price review'.

- The cost analysis in the report is based on the totex approach, which is Ofwat’s preferred approach to cost modelling (Ofwat, 2017, pp. 176).² This approach will almost certainly be adopted for PR19.
- Models 2, 3, 6 and 7 in the report analyse debt and non-debt related costs. As costs associated with debts are much higher in the water sector than they are in the electricity and gas industries and with Ofwat planning to draw on benchmarking approaches used in the electricity and gas industries, Ofwat’s approach to PR19 may involve paying close attention to debt related costs.
- In terms of the variables that have an important impact on the company efficiencies, in addition to the typical company level characteristics, the report highlights the importance of the effect of industrywide variables. These findings have potential implications for the role of industrywide variables in PR19.

² Ofwat (2017): ‘Delivering Water 2020: Consulting on our methodology for the 2019 price review’.