

Comments on Ofwat modelling consultation

On 29 March 2018, Ofwat published a consultation on econometric cost modelling as part of its work on cost assessment for the PR19 review. The consultation describes Ofwat's approach to the development and assessment of potential econometric models and provides the specification and results for a wide range of models proposed by Ofwat and by water companies.

My colleague Pedro Fernandes and I have been supporting Severn Trent with its review of Ofwat's modelling for wholesale water and wastewater activities. We have extensive experience in the development and review of econometric models to be used within the context of Ofwat's regulation of water companies in England and Wales.

Severn Trent asked that I provide some high-level comments on Ofwat's approach to the wholesale cost modelling in its consultation document. I highlight a number of points below:

1. Ofwat's modelling approach represents a major improvement on that used for PR14. Ofwat has addressed most of the concerns raised by the CMA in the *Bristol Water* reference in 2015. The improvements include: a greater focus on engineering, operational and economic factors and on the intuition of the models; modelling of base expenditure separately from enhancements; and modelling at more granular levels of expenditure.
2. Econometric benchmarking of base expenditure (botex) across the water companies in England and Wales can only provide a very approximate indication of each company's efficient expenditure "requirements" within a five-year period. Despite its inaccuracies, the use of such a benchmarking approach (supported by off-model adjustments) can be justified by its role within the longer-term incentive framework for wholesale price controls. But Ofwat should recognise the modelling limitations when using the results to set allowances, and when drawing inferences about efficiency and performance.
3. Ofwat's modelling approach treats capital expenditure as a cash expense in year, rather than amortising capital costs over estimated economic asset lives. This is understandable given the way it sets price controls, but problematic in terms of modelling accuracy given the lumpy nature of capital expenditure and the degree of company discretion on the timing of investment. If Ofwat calculates upper quartile efficiency benchmarks (or similar), it should recognise the risk that companies perceived as efficient are those that happen, through luck of timing or their attitude towards longer-term asset risk, to be investing relatively less than other companies at a given point in time. This risk is especially high given that Ofwat's models use only six years of

expenditure data. One might have expected that, for PR19, the models could be based on a longer time series of expenditure data than Ofwat's PR14 models, yet the opposite seems to be the case. This is unfortunate and I wonder whether the pros and cons of using this short time period have had sufficient consideration.

4. Ofwat's consultation document describes its approach to model development and assessment. This is good. It recognises that there is no single statistical measure or test to use to compare the relative performance across models. Instead, judgment is needed across a range of different considerations, including the consistency of estimated coefficients with engineering, operational and economic insight and checking the sensitivity of estimation results to variations in the dataset and model specifications.
5. It does not seem that Ofwat has yet had chance to fully implement its intended approach in the case of wholesale activities. The set of models presented in the consultation show good progress but there remain substantial opportunities for Ofwat to improve the models by following through on its intended approach. Some of the implied economic relationships in the models do not make sense, and not all of the explanatory variables used can be rationalised from an engineering, operational or economic perspective. Furthermore, while there are limitations in the ability to capture all relevant cost drivers in the econometric models, and Ofwat is right to recognise the implications of the small sample size, Ofwat's consultation models do not offer enough coverage of underlying cost drivers. There are signs that, in some cases, weight has been given to whether variables are statistically significant; this may come at the cost of omitting variables that could make a positive net contribution. Ofwat's models also show a pattern of cost drivers being lost in its modelling of the most aggregated levels of expenditure.
6. Given the large amounts of money at stake for investors and customers, there is a strong case for further model development work, rather than seeking to select from the current models:
 - a) Ofwat could develop a more thorough exposition of the underlying cost drivers relating to different water and wastewater activities. The brief tables in Ofwat's consultation documents do not seem adequate for wholesale activities; they focus too much on the specific variables used in Ofwat's models, and too little on the underlying cost drivers and the variety of data series that might be used to capture these. Further work here seems integral to the emphasis that Ofwat wishes to place on engineering, operational and economic factors in its modelling, and will bring two practical benefits. First, it will make it easier to see where Ofwat's current models overlook (or poorly capture) underlying cost drivers, and thereby help direct further work on model development and selection. Second, it will expose more clearly where there are several alternative variables that can proxy for an underlying cost driver, with each variable having its own limitations; the limitations of any one model can be

mitigated by using a range of models that involve a diverse set of explanatory variables and modelling approaches.

- b) Ofwat's stated approach involves review of the consistency of the sign and magnitude of estimated coefficients with engineering, operational and economic knowledge. It is usually quick and easy to check the sign, but more time-consuming to analyse the economic implications of the magnitude of estimated coefficients. There are a number of cases where the magnitude of coefficients in the consultation models seem questionable, indicating that there is still a phase of model development work to do.

The more detailed comments raised by Severn Trent in its consultation response reflect these broader concerns about the coverage and choice of cost drivers in Ofwat's consultation models and the opportunity available for further model development and refinement.

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