How and when does econometrics provide understanding of what drives costs?

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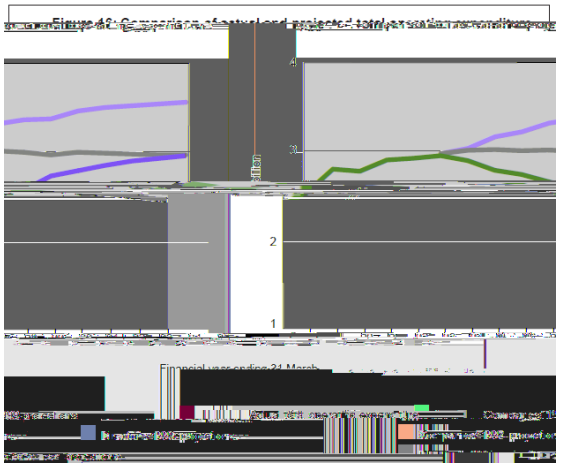
1. A reflection on the evolution of cost modelling and econometrics
2. Some background on the changes made at PR14
3. The views of the Competition and Markets Authority on the PR14 models
4. Ofwat's approach to cost assessment for PR19
5. Opportunities for improving the PR19 models:
   - Engineering and operational factors
   - Avoiding perverse incentives
6. A few concluding thoughts

	Econometric analysis used to 'test' aspects of companies business plans and derive efficiency challenges to base year costs (and in a number of cases, replace company costs)				Econometric models used to determine Ofwat's view of forecast expenditure	
	Opex	Opex, Capital maintenance (CM)	Opex, Capital maintenance	Opex	Totex (Water) Botex (W & WW) Enhancement	Botex Botex plus? Enhancement?
	Review of standardised asset lives.	5 Stage assessment approach of CM	Capital maintenance challenge (based on application of 'common framework' principles)		Policy items (costs not suitable for modelling) Cost adjustment claims (efficient costs not adequately covered by models / adjustments)	
	Cost base (stylised unit costs) to determine capex efficiency challenges					
	Bespoke review of enhancement expenditure (Quality, Enhanced Service, Supply/Demand)				Un-modelled enh. adjustment	Un-modelled enh. adjustment?
	Out-performance retained in period	Rolling outperformance incentive		Opex roller CIS menu	Menu incentive	Cost sharing incentive
	Informing approx. 50% of expenditure requirement	Informing approx. 70%	Informing approx. 70%	Informing approx. 50%	Explicitly setting approx.90%	Explicitly setting approx. 80%?

The ability of the sector to out-perform the regulatory assumption (with the greatest outperformance by those considered the least efficient) suggests that models and associated adjustments were able to identify genuine opportunity for efficiency.

PR99 FD – “Some companies have made more savings than others, with those set the greater challenges outperforming the most.”

PR04 FD - “There have been major improvements in efficiency in recent years, with all of the companies now in the top three relative efficiency bands compared with only half in 1999.”



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Need for underpinning engineering logic
Importance of coherent model coefficients

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Modelling inherently lumpy enhancement expenditure using historic expenditure is challenging

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Necessary given the small modelling data set
(econometric modelling is best suited to 1000's of independent observations)

We support Ofwat's overall approach. However, we believe there is a need when specifying models to include at least one scale driver and other primary cost drivers reflecting engineering, operational and economic logic. Therefore, it is useful to consider:

- For each model - the adequacy of primary cost driver coverage
- For each primary cost driver - the case of using alternative explanatory variables

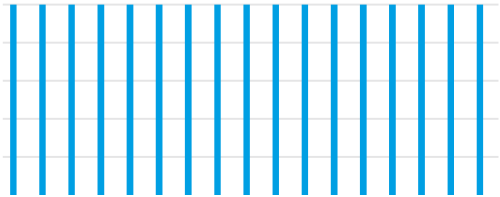
Review of modelling from 1st principles (requiring identification and coverage of primary cost drivers) Move away from Totex modelling (but uncertainty of Botex+) Simpler model forms (but at the cost of engineering logic?) More price control controls and exploration of multiple levels of aggregation (but primary cost drivers are less clear or easy to isolate in some price controls)	Good engagement through CAWG and consultation Acknowledging difference – simple models cannot perfectly replicate complex and varied business operations

We stress the need for engineering and economic logic to be the primary criteria on which models are specified. It should not be sacrificed in the drive for simplicity.

Primary cost driver because larger treatment assets reduce unit costs through reduction in fixed expenditure and opportunities for process optimisation. WTW size is driven

Primary cost driver because costs rise where raw water quality necessitates complex treatment processes (typically through power and chemicals consumption and maintenance complexity)
Whilst most Ofwat models include an explanatory variable, their explanatory power is very limited (complex processes are not sufficiently identified. All surface water WTWs in the industry as categorised in bands 3-6)

Set threshold of complex processes as 4-6, in line with cat 4 definition: "…treatment with significantly higher operating costs than in [cat 2&3]"



Primary cost driver because material operating and maintenance costs are incurred where gravity cannot be used to transport water

A third of Ofwat's wholesale models did not explicitly include a variable. Remainder sensibly use density of booster stations and service reservoirs as proxies

Include an appropriate network complexity driver in all models

Reviewing the consultation models we have identified the potential for several perverse incentives:

Network age variables have a negative coefficient. Therefore, models will predict reduced expenditure for companies that have proactively renewed their network in the past

Bulk supplies will appear more expensive relative to an equivalent owned resource due to the implicit inclusion of financing costs within in the bulk cost. Conversely, financing costs are accounted for after cost assessment for all company owned assets

Volume is a poor cost driver of wastewater treatment. It is in part driven by HBeIceneIceneIcen , 1 01n

There are always questions over the use of econometrics to estimate costs.

Therefore, if econometrics are used, models need to:

- be as good a possible to reflect engineering and operational characteristics (accounting for all primary cost drivers);
- deliver ‘credible’ results e.g. consistency over time; and
- avoid perverse incentives e.g. to maintain the network.