Options for household retail cost assessment at PR19

A paper for Northumbrian Water and United Utilities

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Economic Insight

CONTENTS

1. Summary

This section introduces and summarises our work.

This report highlights that there is a need for companies and Ofwat to actively consider the options available for retail household cost assessment at PR19 and, in particular, the choice between an "adjusted unit cost" approach and an econometric approach.

1.1. Introduction and context

Northumbrian Water and United Utilities have commissioned Economic Insight to:

- first, identify the high-level options for household retail cost assessment in PR19;
- second, develop criteria for choosing between them and illustrate how they could be applied in practice; and
- third, discuss which retail cost drivers or factors should be included in any approach.

The objective of this work is not to pre-empt or prematurely reach conclusions about how retail cost assessment should be done, but rather encourage early discussion about the pros and cons of different approaches. In doing so, we recognise that much more could be said on all of the issues in this report.

We note that at the time of writing this report, Ofwat published its final report to Defra on the costs and benefits of liberalising the household retail market. This report is relevant to all possible situations, except a situation where price cap regulation is entirely removed at the start of PR19 and so household retail cost assessment is no longer required.

After the summary below, the rest of this report is split into three sections.

» Section 2 sets out the high-level options for retail cost assessment and criteria for choosing between them.
» Section 3 sets out the main choices that need to be made when implementing a cost assessment method e.g. the cost drivers to include.
» Section 4 sets out our recommendations.

1.2. Summary

One of the defining characteristics of the household retail cost assessment at PR14 was that it involved a simple unit-cost benchmarking approach, which was augmented with various "off-model" adjustments necessary to take account of evidence showing uncontrollable differences in costs caused by:

- economies of scope;
- metering levels;
- bad debt and debt management costs;
- input price inflation; and
- new costs, associated with companies' one-off investment needs.

Another defining characteristic is that all companies received adjustments to reflect economies of scope and differences in metering levels. Some, but not all, companies received adjustments to reflect differences in debt-related costs and input price inflation.

An alternative approach involves using an econometric model to make cost comparisons between companies on a like-for-like basis, instead of making off-model adjustments. Cost drivers to capture the uncontrollable differences in costs between companies (relating, for example, to bad debt and debt management) would be included in such a model.

This report considers the pros and cons of an "adjusted unit cost approach" and an econometric approach.

We conclude that there are various advantages of the econometric approach, including:

- it can help avoid double-counting problems, which can arise when making separate off-model adjustments;
- it can be used to test directly whether there are economies of scale and/or scope; and
- it can be used to distinguish between noise and inefficiency and estimate the rate of frontier shift.

The main advantage of an adjusted unit cost approach is that it allows one to take account of factors that cannot be incorporated into an econometric analysis. It is also a comparatively simple and transparent methodology, which will yield accurate results if scale is the only (uncontrollable) driver of company costs.

At PR19, we believe that it will be important to have an early discussion about the relative advantages of the different approaches so that the most accurate, consistent (fair) and efficient one is used.

Similarly, in relation to input price inflation, the experience at PR14 suggests that an early conversation is needed around:

- whether companies should face a catch-up challenge that includes input price absorption;
- whether companies or customers should bear inflation risk;
- what inflation measure should be used; and
- whether there should be a "step reduction" in the efficiency challenge faced by upper quartile companies compared to other companies.

The choices here will inform how input price inflation should be dealt with at PR19.

2. Options for retail cost assessment

This section sets out the main choices that together define the retail cost assessment options open to Ofwat. We then suggest criteria for choosing between them and illustrate how to apply them using three high-level options: pure unit cost analysis; unit cost analysis with adjustments; and econometric analysis.

It shows that:

(i) the main choices relate to – the choice of analytical method, choices relating to "off-model" adjustments, and choices relating to how to incorporate input price pressure;

(ii) these choices should be made primarily on the basis of how accurate the resultant efficiency estimates would be; and

(iii) applying the accuracy criterion suggests that pure unit cost analysis would not be an appropriate cost assessment method at PR14.

2.1. The main choices that define the cost assessment options

The primary objective of *cost assessment* is to help the regulator (and companies) estimate the efficient cost level for a service or activity. In this section we describe the main choices that define the cost assessment options that could, in principle, deliver this regulatory objective. In section 2.2 below we set out the criteria for selecting an option.

We focus on four choices, namely:

- first, the main analytical method (or methods) used to estimate the efficient cost level e.g. unit cost or econometric approaches;
- second, the scope and nature of "off-model" adjustments to the estimates that emerge from the main analytical method, including but not limited to "special factor" claims;
- third, the criteria set by the regulator to decide whether to make or allow such adjustments and claims and, relatedly, whether the regulator or companies should carry the burden of proof; and
- fourth, how expected input price inflation should be incorporated into the cost assessment and cost allowance process.

Other relevant choices include: the balance of effort between the regulator and the companies; and timing – choices around when the work is done, when the results of the work are shared and so on. We consider these issues below, before turning to what they might mean in practice in section 2.3.

2.1.1. Choice of analytical method

The first choice relates to the analytical method used to estimate the efficient cost level. The two main methods of relevance here are ***unit cost analysis*** and ***econometric analysis***.[1]

» A ***unit cost analysis*** involves dividing the cost of a service or activity by a single scale-related cost driver, such as the number of customers or properties. Companies with low unit costs are deemed to be more efficient than companies with high unit costs.

» An ***econometric analysis*** involves estimating the relationship between the cost of a service or activity and one or more cost drivers, which would usually include scale-related cost drivers (as above) and other factors that would put upward and downward pressure on costs, but are outside of company control. Companies with costs higher than expected (given the estimated relationship between cost and the cost drivers) are deemed to be less efficient than companies with costs lower than expected. An important choice in an econometric analysis is the cost drivers to include, which turns on a decision about which factors are in company control and which are not – and whether it is better to include them in the model or make off-model adjustments (discussed below).

The main difference, therefore, between a unit cost analysis and an econometric analysis is that the latter allows the regulator to take account of multiple cost drivers in the analysis. This is important to do when there are factors outside of company control, in addition to scale, that drive costs. Failing to take account of these factors can make a company appear more or less efficient than it is, and therefore compromise the primary objective of cost assessment.

In practice, it is common to see both unit cost and econometric analyses used in cost assessment. Unit cost analysis is often used as part of "sense checking" the underlying data and developing an initial view on relative efficiency, which is then refined through econometric analysis.

In PR14, Ofwat used a unit cost approach as its main analytical method. It calculated the industry average cost to serve (per customer) for four types of customer: (a) unmetered; (b) metered dual service; (c) metered single service water; and (d) metered single service waste water.

2.1.2. Choice of "off-model" adjustments, including special factor claims

The second choice relates to the scope and nature of "off-model" adjustments to the estimates that emerge from a unit cost or econometric analysis. Such adjustments are usually made to address various limitations of the main analytical method. They can include:

- adjustments to capture industry-wide factors that, in principle, could affect the costs of all companies, but that have not been taken account of in the main analytical method;
- adjustments to capture company-specific "special factors" that cannot be captured in the

[1] *These are both types of "top-down" analysis. We do not discuss data envelopment analysis (DEA) or bottom-up analyses here, mainly because they have not been used as much as unit cost and econometric analysis in the water sector.*

modelling due to data limitations and/or because they apply to a small number of companies; and

- adjustments to deflate the estimated differences between companies' actual costs and estimated efficient costs to recognise that some (though not all) of the difference is likely caused by noise, not inefficiency.

In practice, the first type of adjustment is seen less often than the second and third types. There are various reasons for this, but the main one is that if it is possible to make off-model adjustments to capture industry-wide factors, it is also possible to include them in the model from the outset and avoid the additional step – and so that it what is done.

In PR14, Ofwat made various "off-model" adjustments including those for: economies of scope for dual service customers (applied to all companies); bad debt and debt collection costs; and metering costs.

2.1.3. Choice of criteria to decide whether to allow or make such adjustments and claims

The third choice relates to the criteria that the regulator sets to decide whether to allow or make such adjustments and claims. There are various good reasons for setting criteria, including:

- where adjustments have little or no merit, to help deter companies from seeking them;
- where adjustments have merit, to help ensure that the regulator allocates its resources appropriately, and avoids spending disproportionate time and effort spent on evaluating with lots of small adjustments; and
- again where adjustments have merit, to encourage companies to provide the information that the regulator needs to make a proper assessment of their size.

In setting the criteria, the main challenge is to strike the right balance between setting criteria too loosely (unduly encouraging or allowing adjustments without merit) or too tightly (unduly deterring adjustments or disallowing adjustments with merit).

With the above in mind, it may be appropriate to attach different weight to different criteria as the information available to the regulator evolves over time and/or flex the stringency of the criteria according the adjustment or claim in question. For example, where a previous price review process has established strong evidence or support for an off-model adjustment, it may make sense in the next price review process to:

- include the factor "in model" from the outset (for the reasons outlined above); or
- focus on the value of the adjustment(s) that should be made, rather than "whether" they should be made.

Similarly, it might make sense to set more stringent criteria for company-specific "special factors" where the regulator's ability to make comparisons between companies is more limited than for factors that affect all companies.

In PR14, Ofwat stipulated three criteria for allowing any adjustments to the industry average cost to serve. They had to be able to demonstrate with sufficient and convincing evidence that the costs: (1) were material to the company; (2) were driven by factors beyond efficient management control (having taken all the possible steps to control those costs); and (3) impacted the company in a materially different way to other companies. Ofwat also provided some guidance on how it would assess criteria 1-3, which included the provision of comparative evidence from outside of the water sector and the "upper quartile test" referred to below.

2.1.4. Choice of how expected input price inflation should be incorporated

A good cost assessment process should lead to an accurate estimate of the efficient cost level for a service or activity, *given the input prices companies face at the time of the assessment*. However, it is possible that input prices could rise or fall during the life of the price control. Regulators therefore need to how to take account of this possibility as part of determining the *cost allowance*.

The key choices here relate to:

- the extent to which companies should bear input price inflation risk – which turns on whether they can recover forecast or outturn inflation; and
- the choice of inflation measure used.

During PR14, Ofwat additionally considered: (a) whether it was necessary to take account of input price inflation for the retail price control; and, if so (b) whether input price inflation should only be allowed for more efficient companies.

In PR14, Ofwat ultimately required companies to submit evidence that their costs would be subject to input price inflation and provide inflation forecasts. Companies in the upper quartile of efficiency according to Ofwat's unit cost models and that also met other criteria, were set a cost allowance that took account of input price inflation. The sum is fixed and does not depend on outturn input price inflation and therefore they bear input price inflation risk.

2.1.5. Summary of cost assessment choices

Based on the discussion set out above, the table below summarises the different high-level choices that define the retail cost assessment options.

Table 1: Choices for cost assessment

Category	Choices
Analytical method	• Unit cost • Econometrics • Other (e.g. DEA)
Off-model adjustments	• Industry-wide factors • Special factors • Technical
Adjustment criteria	• Loose • Stringent
Inflation	• Outturn or forecast • CPI or other

2.2. Criteria for assessing the options

The criteria for assessing the above options for retail cost assessment should be linked to its objectives.

2.2.1. Primary criterion

As noted above, the primary objective of *cost assessment* is to help the regulator (and companies) estimate the efficient cost level for a service or activity.

The regulator ultimately uses this information to set a *cost allowance*, which includes an efficiency target based on the difference between a company's actual cost level and the estimated efficient cost level.

"A good cost assessment should lead to an accurate estimate of the efficient cost level…"

A "good" cost assessment should therefore lead to an accurate estimate of the efficient cost level for companies and, therefore, allow the regulator to create powerful incentives for them to realise efficiency savings. A "poor" cost assessment could lead to an inaccurate estimate and result in the regulator allowing companies to charge prices that are too high or too low (ultimately leading to service failure).

» **Primary criterion: Accuracy.**

Of course, there will always be some inaccuracy and a goal of "no inaccuracy" would be impossible to achieve (or at least very costly). Rather, meeting this criterion in this context mean answering the following question positively:

"Are there reasons to think that, with the information and data available to me, this cost assessment option is more likely to yield accurate estimates of efficient costs than another feasible option?"

2.2.2. Secondary criteria

If more than one cost assessment option satisfies the primary criterion, other criteria can help choose between them.

Our view is that the other criteria should include:

» **Secondary criterion 1: Consistency.** The option should not be expected (especially by design but also in practice) to yield a more or less accurate assessment of one company's efficiency compared to another's. In practice, this could arise because for various reasons, including:

- different analytical methods are used for different companies;
- off-model adjustments are open to some companies but not others; and
- the criteria for allowing off-model adjustments mean that some companies will, in practice, be

deterred from making meritorious claims because the criteria "fall harder" on them.

» **Secondary criterion 2: Efficiency.** The amount of cost expended on an option should take account of additional accuracy benefit it confers. Also, the option should avoid unnecessary duplication of effort between companies and the regulator.

In principle, other important criteria are:

- **transparency** – i.e. that the option allows the regulator and companies to scrutinise the analysis to check that it is accurate and fair; and
- **predictability** – i.e. companies understand how the regulator is likely to assess their costs and plan accordingly.

In practice, our view is that these criteria tend to be most relevant to how the cost assessment *process* is run (which is very important), rather than the cost assessment methodological options and so we focus on the accuracy, consistency and efficiency criteria here.

2.3. Applying the criteria in practice

In this section we apply the accuracy, consistency and efficiency criteria to the following three options (i.e. three combinations of the choices set out in Table 1 above) that we think are useful to highlight the key pros and cons in the context of cost assessment in the case of water retail.

» **A pure unit cost approach** – an approach that does not allow for making off-model adjustments (and so does not involve adjustment criteria either).

» **An adjusted unit cost approach** – an approach that involves estimating the average cost to serve and making upward or downward adjustments to take into account industry-wide factors.

» **A pure econometric approach –** an approach that involves incorporating industry-wide factors in-model rather than off-model.

For these purposes, we implicitly assume that the adjustment criteria do not deter meritorious adjustments from being made. We also implicitly assume that the effect of input price pressure is separately quantified and included in the cost allowance, if appropriate.

Our objective is to help illustrate how criteria could be applied in practice to encourage debate – not to reach a definitive conclusion on which of the three options should be adopted in PR19 (as the three options are a subset), but it does provide some guidance.

2.3.1. Option 1: A pure unit cost approach.

As noted above, this involves dividing the cost of a service or activity by a single scale-related cost driver, such as the number of customers or properties. Companies with low unit costs are deemed to be more efficient than companies with high unit costs.

Applying the primary criterion

There are reasons to think that this option would not satisfy the primary criterion of accuracy. The reasons include that the option would not take into account:

- the strong possibility that there are factors, other than scale, that are outside of company control and that would have a bearing on the efficient level of cost – such as the level of deprivation in a local area; and
- the possibility that there may be economies of scale and scope.

Applying the secondary criteria

Because this option does not satisfy the primary criterion, it is not necessary to reach a conclusion on how the method performs against the secondary criteria. (Though we know it will not be efficient, because it does not satisfy the primary regulatory objective).

2.3.2. Option 2 versus Option 3

Applying the primary criterion

Both the adjusted unit cost approach and the econometric approach have, in principle, the potential to yield an accurate estimate of the efficient cost level. This is because both can take into account the factors excluded from the pure unit cost approach outlined above.

The relative accuracy of the two options turns on:

- first, which factors are taken into account in each approach;
- second, how they are taken into account; and
- third, the value or otherwise of evidence from outside of the water sector.

For example, compare the following two adjusted unit cost approaches:

- approach 1 – calculate unit costs and then adjust them based on the results of an econometric model that relates unit costs to all relevant cost drivers; versus
- approach 2 – calculate unit costs and make an assumption-driven adjustment to take account of economies of scope only.

The difference between the approach 1 and a pure econometric approach in terms of accuracy could be trivial, whereas the difference with approach 2 could be significant (especially if factors other than economies of scope matter and/or if the assumption-driven adjustment is wrong).

When an adjusted unit cost approach does not simply boil down to an econometric approach, the two methods have different strengths and weaknesses.

Advantages of an econometric approach

The main advantages of an econometric approach from the perspective of **accuracy** are as follows.

- **First, it can help avoid "double-counting" problems.** It does this by estimating the effects of multiple out of company control factors within the same modelling framework. This is useful when: (a) there are, in fact, multiple factors within the same modelling framework; and (b) those factors could be correlated with one other and so cannot be properly accounted for with separate off-model adjustments.
- **Second, it can be used to test directly whether there are economies of scale and/or scope and estimate their size.**
- **Third, some econometric models can help isolate "data noise" from "inefficiency".** Stochastic Frontier Analysis (SFA) is used for this purpose (though whether it is feasible is data dependent).
- **Fourth, some econometric models can be used to estimate catch-up and frontier shift efficiency separately.** This involves undertaking SFA with panel data.

Advantages of adjusted unit cost approaches

The main advantage of an adjusted unit cost approach from the perspective of **accuracy** is that it allows one to take account of factors that cannot be incorporated into an econometric analysis.

Say, for example, that there is insufficient panel data to estimate the rate of frontier shift – but academic evidence is available on the subject for retailers in other sectors or countries. This evidence cannot be incorporated into a pure econometric approach, but could be into an adjusted unit cost approach.[2]

When an econometric approach is likely to be more accurate than an adjusted unit cost approach

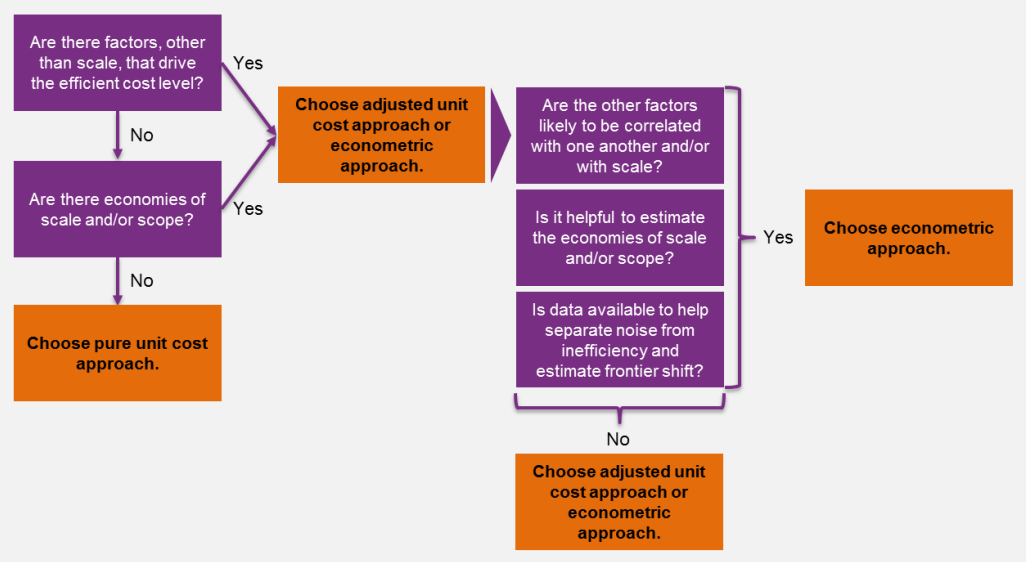
Based on the discussion set out above, the econometric approach is *more likely* to yield accurate results compared to the adjusted unit cost approach when the answers to one or more of the following questions is "yes".

Are there factors, other than scale, that are likely to be out of company control and could affect retail costs? Is it likely that these factors are correlated with each other and/or scale?

Is it possible that there are economies or diseconomies of scale and/or scope?

Is data available to apply techniques to separate noise from inefficiency / estimate frontier shift?

Figure 1: Applying the accuracy criterion



[2] *Equally, it could be applied to the results of an econometric model as part of an "adjusted econometric approach", but this is not the option being considered here.*

Applying the secondary criteria

Again, both the adjusted unit cost approach and the econometric approach could, in principle, perform equally well in terms of their performance against the secondary criteria of **consistency** and **efficiency**. It depends on how each analysis is undertaken in practice.

Consistency

One potential practical difference between an adjusted unit cost approach and an econometric approach is connected to the point raised above: i.e. the fact that the latter estimates the effects of multiple factors out of company control within the same modelling framework, whereas the former does not have to.

This creates the possibility that, under an adjusted unit cost framework, different adjustments are made in different ways for different companies using different data and analyses. These differences do not inevitably give rise to inconsistencies of the type set out in section 2.2.2 above, but the risks would be greater than in an econometric approach, if the process results in a company-by-company assessment of the adjustments without the interrogation of whether one company's adjustments make sense compared to another's.

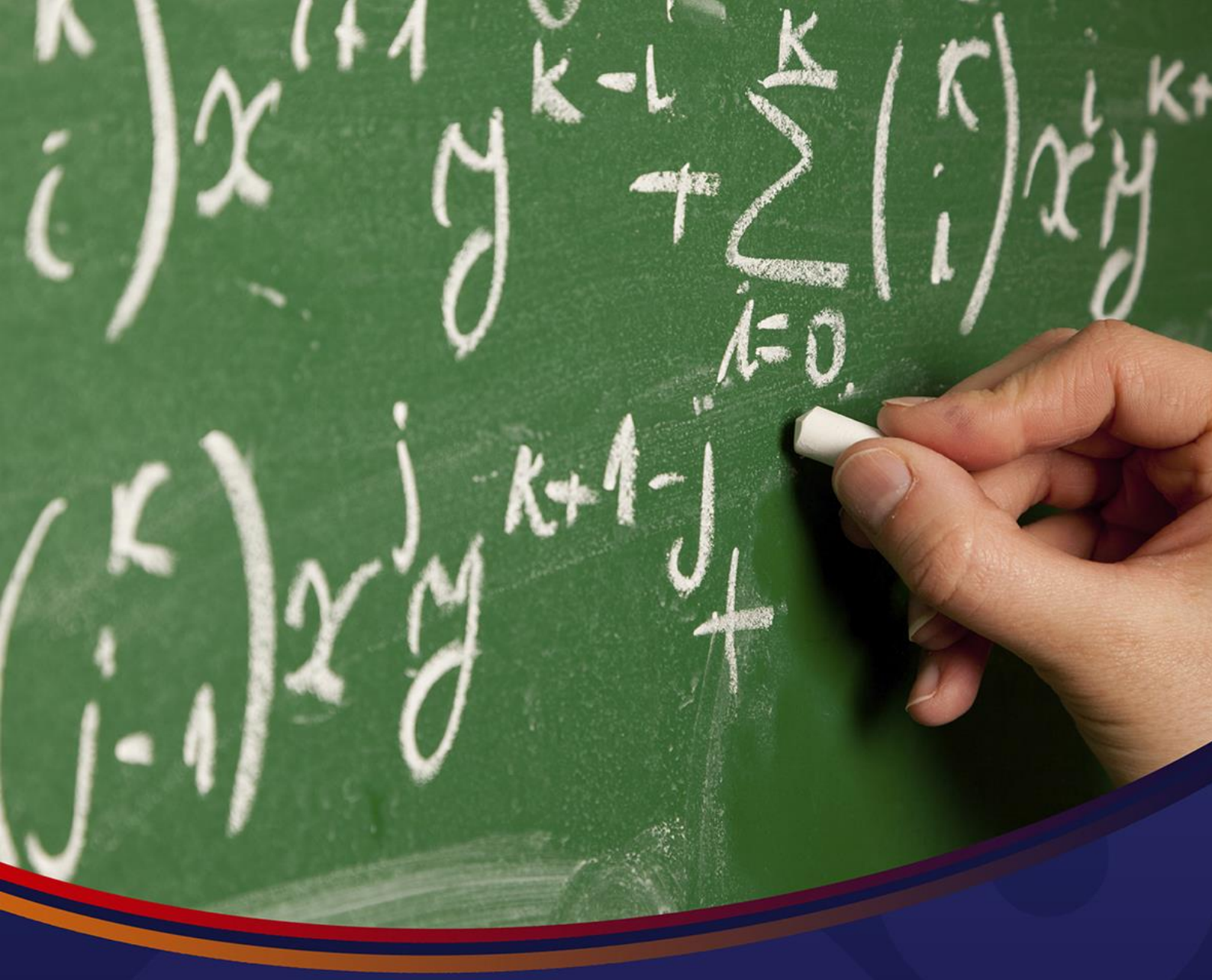
Efficiency

The relative efficiency of the two methods turns on their relative accuracy and their relative cost. For the reasons set out above, there are situations when an econometric approach would be expected to be more accurate than an adjusted unit cost approach, raising a (commonly asked) question: even in those situations, is it too expensive to implement compared to an adjusted unit cost analysis? The experience at PR14 shows that the answer is "not necessarily", since a number of the adjustments to the unit cost analysis at PR14 were made using econometric analysis.

2.4. Conclusion

Based on the arguments set out in this section, we consider that the primary criterion for selecting a cost assessment option should be "accuracy" i.e. its ability to yield an accurate estimate the efficient level of retail cost. Applying this criterion in the context of retail suggests that a pure unit cost approach will not be fit for purpose at PR19, as there are reasons to think that there are factors, other than scale, that are likely to be out of company control and could affect retail costs.

In the next section, we apply the same criteria to determine which retail cost drivers should be included in a retail cost assessment – irrespective of whether an adjusted unit cost approach or an econometric approach or something else is used.



3. Options for modelling retail costs

This section sets out the main methodological choices that need to be made as part of the cost modelling process.

It shows that careful consideration needs to be given to:

(i) the choice of cost drivers to include in the analysis;

(ii) what level of cost aggregation is appropriate;

(iii) whether and how to allow for economies of scale and scope; and

(iv) how to take account of input price inflation.

3.1. The main modelling choices

To implement a cost assessment using any of the analytical methods set out in the previous section of this report – including unit cost or econometric analysis – it is necessary to make at least the following methodological choices.[3]

1. Which costs to assess.
2. Which cost drivers to include in the analysis.
3. What assumptions to make in relation to the "shape" of relationship between costs and their drivers, in particular allowing for economies of scale and scope.
4. Whether costs should be assessed in an aggregated or disaggregated way.
5. How to take account of input price inflation
6. Which time period to include in the analysis.
7. How to distinguish between noise in the data and inefficiency.
8. How to bring together / call between alternative plausible estimates of the efficient level of costs.

All of these choices can have a bearing on the estimate of efficient costs that emerge from the analysis. Northumbrian Water and United Utilities have asked us to focus on the second to fifth choices. In particular, we have been asked to consider what applying the criteria suggested in the last section – especially accuracy – would imply for these choices.

3.2. Choice of cost drivers to include

The table below shows an approximate breakdown of how household retail operating expenditure (excluding third party services and capital maintenance expenditure) is split between the different retail functions.

Table 2: Breakdown of HH retail opex in 15/16

Retail function	% of HH retail opex
Debt management	10%
Doubtful debts	38%
Customer services	28%
Meter reading	5%
Other	19%
Total	100%

The table shows that approximately:

- 48% of retail operating expenditure relates to debt management and doubtful debt costs;
- 28% relates to customer services;
- 5% relates to meter reading costs; and
- 19% relates to other costs.

To determine the choice of cost driver to include in the analysis, depends on:

- which drivers affect these costs;
- which drivers are outside of company control; and
- practically, are there good measures of the drivers of interest?

We consider the answers to each of these questions below. Note that the following discussion assumes that scale-related drivers would be taken account of.

3.2.1. Debt management and bad debt costs

Cost drivers

PR14 generated a substantial body of evidence suggesting that the size of debt management and bad debt costs are driven by:

- the size of wholesale charges; and
- the level of deprivation in the area served.

The size of the **wholesale charges** affects the size of the debt related costs when non-payment occurs. When a customer does not pay their bill, the retailer is responsible for the entire bad debt cost, including the wholesale charge. Therefore, when a customer in an area with a "high" wholesale charge does not pay, the retailer will, other things equal, face a higher bad debt

[3] *By methodological choices we mean those that are made when conducting a given cost assessment analysis, not those choices that are made to: (a) choose which cost assessment analysis to do; or (b) determine the process. Though we recognise that decisions in one areas can affect decisions made in another.*

cost compared to when a customer in area with a "low" wholesale charge does not pay.

The level of **deprivation** in an area affects the likelihood of non-payment occurring. In effect, it is a proxy for the ability and/or willingness of customers in different areas of the country to pay their water bills.

Together, the two drivers affect the effort and costs a company incurs to mitigate the risk of bad debt occurring and the cost of it when it does occur.

Company control

The wholesale charges are largely out of a retailer's control. The wholesale charges are set by regulation to reflect (efficient) wholesale costs. In contrast to some (liberalised) retail markets, there is little opportunity for one water retailer to become more efficient by negotiating a better wholesale deal than another (in terms of price or sharing the risk of non-payment).

Similarly, the level of deprivation in an area is out of a retailer's control. Retailers cannot pick and choose the customers they serve. Retailers can of course take steps to encourage payment, but these steps are likely to be costlier or less effective in areas where ability and/or willingness to pay is more limited.

(For clarity, this does not mean that there are no opportunities for companies to improve their efficiency with respect to debt-related costs, rather that some of the cost difference between companies is likely to be unrelated to their relative efficiency. The same point applies to the other cost categories below.)

Measures of the cost drivers

The size of the wholesale bills is known. Measures of income and other forms of deprivation are publicly available from the Office of National Statistics.

Emerging conclusion

At PR14, adjustments for the drivers of debt management and bad debt cost were not automatically allowed. Companies had to make the case for an adjustment and it was assessed on a case by case basis.

Our emerging conclusion is that the PR19 cost assessment process should automatically take account of the (non-scale) drivers of debt management and bad debt costs in order to meet the accuracy criterion set out above:

- first, there are strong reasons to think that the cost drivers are substantially out of company control;
- second, there is existing evidence to suggest that taking account of them matters on the basis that: (a) debt management and bad debt costs comprise around 50% of retail costs; and (b) there is an established empirical relationship between the cost drivers and costs; and
- third, there is no other mechanism within the existing regulatory framework for taking these differences into account.

3.2.2. Customer service costs

Cost drivers

Customer service costs are driven by:

- the quality of the customer service function offered by a retailer; and
- the underlying demand for – and therefore use of – a retailer's customer service function.

Other things equal, one would expect retailers offering higher customer service quality (e.g. shorter call wait times and more options for engaging with customer services) to have costlier customer service functions than retailers offering lower customer service quality.

Similarly, retailers serving customers with a "high demand" for customer services (i.e. at any given level of customer service quality) would be expected to have higher customer service costs than those retailers serving customers with a "low demand" for customer services. For example, some customers may be inherently more willing to call companies to challenge their bill than others.

Company control

The quality of customer service is clearly in company control. The underlying demand for customer service is not.

Measures of the cost drivers

It is hard to identify good measures of customer service quality. One possibility is the number of customer service staff per customer, though this has obvious weaknesses. It is not obvious how the underlying demand for a retailer's customer service function could be measured accurately (and distinctly from demand being higher due to poor customer service).

Emerging conclusion

At PR14, adjustments for the drivers of customer service costs were not automatically allowed and, as far as are aware, no company made the case for it.

The case for including the *underlying demand for a retailer's customer service* function as a cost driver is

that it is out of company control, but careful thought would need to be given to how such differences would be measured in practice.

The case for including *quality of service* as a cost driver in a cost assessment analysis is that companies supplying higher quality service would be funded to do so. However, this could result in:

- companies putting too much effort into boosting one or two measures of quality that can realistically be included in a cost assessment process;
- companies "gold plating" customer services (i.e. incurring costs that would exceed customer willingness-to-pay for it) in the knowledge they'll be funded for it; and
- overlapping with the existing Service Incentive Mechanism (SIM), which should already give companies financial incentives to provide good service quality.

Therefore, though there is a case for including the (non-scale) drivers of customer service costs in the PR19 cost assessment process, it is arguably less clear cut than that for debt management and bad debt cost drivers.

Perhaps the more fundamental questions relating to this potential cost category are: (a) what level of customer service quality are customers expected to pay for; (b) how well do the existing mechanisms such as SIM work; and (c) to the extent there are deficiencies, is augmenting the retail household cost assessment the right solution?

3.2.3. Meter reading costs

Cost drivers

Meter reading costs are driven by:

- the proportion of a retailer's customers that are metered; and
- how time consuming it is to take meter readings, which depends on both (a) the geographic characteristics of the supply area (i.e. how long it takes to get from one house / flat to another) and (b) the characteristics of where the meters are located (i.e. how long it takes to read a meter at a house / flat).

Company control

Retailers can and do drive some metering activity through the promotion of the Free Meter Option, but other factors, such as the levels of new development in a company's region and its water resources situation, mean that the number of metered customers a retailer has is mostly out of its control.

Measures of the cost drivers

This could be measured by the number or proportion of metered customers.

Emerging conclusions

At PR14, adjustments for the drivers of metering costs were automatically allowed.

Our emerging conclusion is that the PR19 cost assessment process should continue to take account of the (non-scale) related drivers of meter reading costs in order to meet the accuracy criterion set out above.

The adjustment could be made as part an adjusted unit cost analysis (as Ofwat did at PR14) or as part of an econometric analysis, with advantages and disadvantages of both as set out the previous section of this report.

Table 3: Case for including different cost drivers

Cost category	Material % of total costs?	Partially or fully out of company control?	Cost drivers are measurable?
Debt management and bad debt	●	●	●
Customer service	●	●	●
Meter reading	●	●	●

3.3. Choice of cost aggregation

In undertaking a cost assessment exercise, it would be possible to benchmark all retail costs "in one go" or break the costs down into different parts.

The advantages of benchmarking retail costs on an aggregated basis include:

- first, it avoids any potential problems associated with differences between companies in terms of where they allocate their costs; and
- second, it takes account of any "trade-offs" between different cost categories (e.g. low bad debt costs, but high debt management costs) – and in doing so avoids the risk that an unduly low efficient level of cost is set.

The advantages of benchmarking retail costs on a disaggregated basis include:

- first, it may be possible to accurately benchmark some costs but not others – and so separating them out means that inaccurate estimates will not "contaminate" accurate estimates;
- second, it may not be possible or desirable to include all cost drivers in a single aggregated model and separate models may be more feasible or accurate; and
- third, a regulator may legitimately wish to focus company attention on a particular category of costs – because it is large and/or it has some a priori reason to think that it is particularly inefficient – and a separate cost assessment helps achieve this.

In this context, a key issue is whether there should be a separate cost assessment for bad debt and debt management costs (which as noted above account for around 50% of retail costs). Based on the assumptions that there are (i) no trade-offs between these costs and the other 50% of costs and (ii) that companies allocated costs between the two halves in a consistent way, we think that at PR19 Ofwat could either:

- undertake a cost assessment of them separately, but taking care to "add up" the results of the two cost assessments properly; or
- undertake a cost assessment of them in aggregate.

If the assumptions above are correct, there should not be material differences between the estimated efficient cost levels that emerge from the two approaches.

3.4. Allowing for economies of scale and scope

3.4.1. Economies of scale

Economies of scale arise when there are cost indivisibilities caused by the presence of fixed or lumpy costs and/or the ability of firms to adopt different (and less costly on a per customer basis) business models that only make sense once they reach a certain scale.

There are reasons to believe that economies (or diseconomies) of scale might be relatively limited in water retailing compared to other activities. This is because it is a relatively labour intensive activity – and labour tends to be easier to scale up or down with output than capital is.

Nevertheless, whether there are economies or diseconomies of scale is a fundamentally an empirical question. There are numerous well-established ways of testing for the presence of (and sizing) economies of scale in the context of cost assessment – and there would be merit in exploring this issue at PR19.

For example, a simple approach would involve regressing average cost per customer on the number of customers (controlling for any other cost drivers). If the coefficient on the number of customers is statistically insignificant, it would suggest that there are no economies of scale as average costs do not vary with the number of customers.

3.4.2. Economies of scope

In this context, economies of scope arise when the cost of providing a combined water and sewerage retail service is less than 2 x the cost of providing the individual services.

At PR14, Ofwat estimated that a combined water and sewerage retail service cost 1.3 x an individual retail service customer. Ofwat's final methodology states that:

"This assessment is based on determining the proportion of retail costs that are driven by bill size, rather than by customer numbers. Using accounting separation data for 2009-12, we have derived a provisional estimate of the appropriate economy of scope adjustment: our preliminary view is that a dual-service retail customer should be counted as 1.3 customers of individual retail services when determining company costs to serve."

Our understanding is that, in making this adjustment, Ofwat intended to allow companies to recover the additional bad debt related costs associated with

serving a dual service customer, but not any other additional costs – presumably based on a view that other costs are primarily driven by the number of customers a company has, not the number of services it offers.

Another approach for determining the appropriate adjustment would involve regressing total retail costs on the number of single service and the number of dual service customers (again controlling for any other cost drivers). The coefficient on each variable measures the incremental cost of serving each type of customer – and one can therefore infer the size of economies of scope by comparing the two coefficients.

Relatedly, in PR19, it will be important to consider the extent to which joint billing arrangements (such as the arrangement between Wessex and Bristol) can be used by companies to realise economies of scope.

3.5. A note on taking account of input price inflation

The efficient level of cost that emerges from a cost benchmarking process is, at best, based on the latest data included in the benchmarking analysis. Therefore, it does not take account of:

- the downward pressure on cost that arises over the life of the price control due to technological change / frontier shift; or
- the upward or downward pressure on cost that arises over the life control due to input prices (such as wages) changing.

In determining an appropriate *cost allowance*, it is critical to take account of these factors in order to avoid setting an implicit efficiency challenge that is too stringent or too lax. For example, without technological change and with upward input pressure, an efficient firm would struggle to cover its costs if its prices were capped at the cost level implied by the benchmarking analysis.

There are various options for how to take account of input price inflation within the analysis.

- The typical way is to first estimate the efficient level of cost for each company (and therefore challenge) based on data included in the benchmarking analysis – and then adjust it upwards or downwards in each year of the price control using a standard measure of outturn inflation (e.g. CPI). The characteristics of this approach are:
  - customers bear inflation risk; and
  - the allowed level of input price pressure is independent of the specific mix of inputs any individual firm uses.
- Another way is, again, to proceed as above but to adjust the efficient level of cost upwards or downwards in each year of the price control based on *forecast inflation for each company* at the time of setting the control. The characteristics of this approach are:
  - companies bear inflation risk (since their revenue is based on forecast not outturn inflation); and
  - the allowed level of input price pressure depends on the specific mix of inputs any individual firm uses.
- Alongside either of the above approaches, it is also possible to set a rule, which only allows relatively efficient companies to set prices that reflect input price inflation. This, in effect, causes relatively inefficient companies to face a more stringent efficiency challenge than they would have faced if the challenge had been set on the basis of the benchmarking analysis alone.

As noted above, Ofwat set an average cost challenge in conjunction with an input price inflation challenge at PR14. The implication of this is that companies with an above average cost to serve had a catch-up efficiency challenge which both involved cutting costs to reach the average cost to serve and absorbing input price inflation.

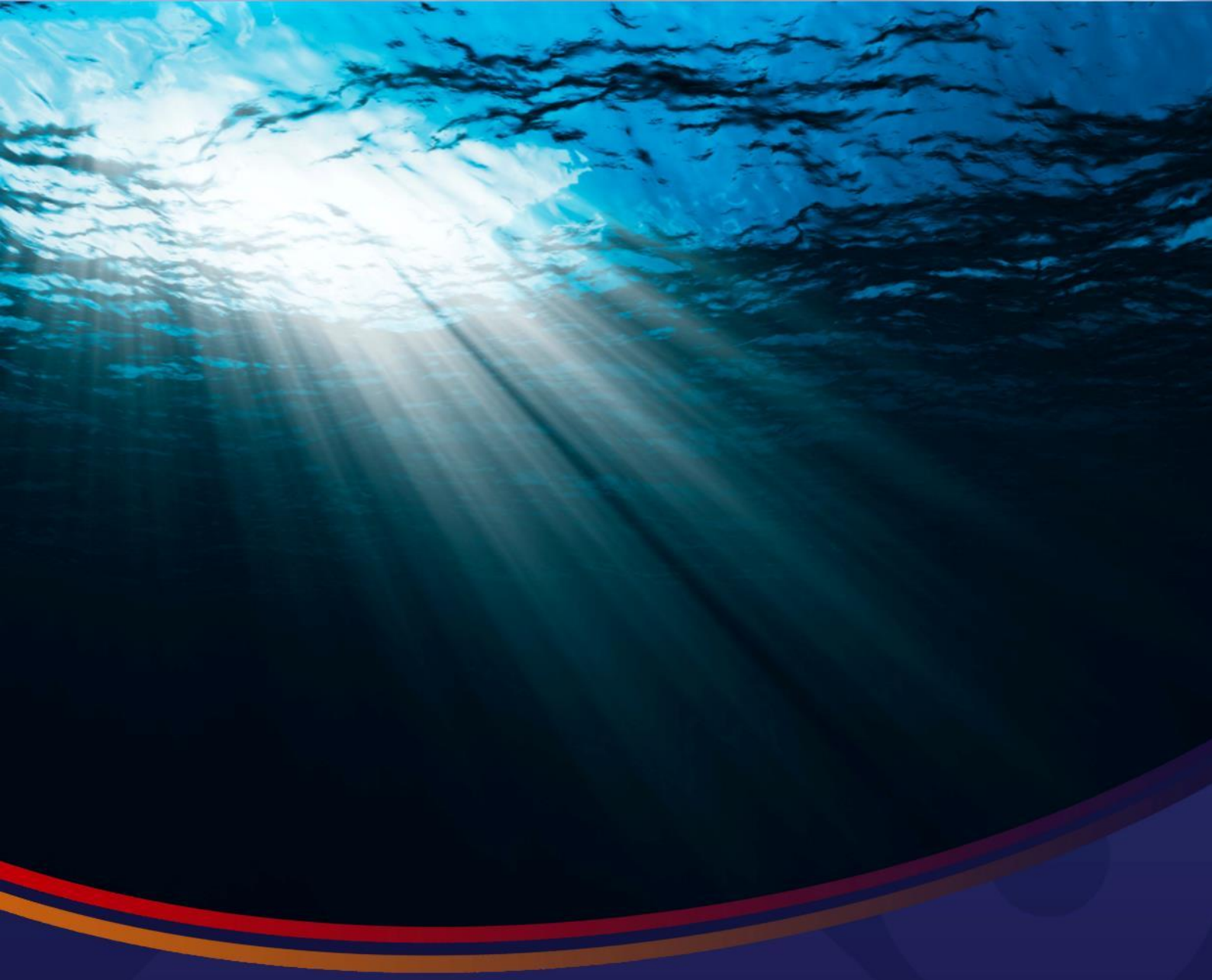
In PR19, there is an opportunity to have an early open discussion about:

- whether companies should face a catch-up challenge that includes input price absorption;
- who should bear inflation risk;
- what inflation measure should be used; and
- whether there should be a "step reduction" in the efficiency challenge faced by upper quartile companies compared to other companies.

Consistency with other parts of the price control would perhaps point to adopting the same CPI-X approach to the retail business as the wholesale businesses.

3.6. A note on capital costs

This section has focused on operating not capital expenditure. This is because capital expenditure accounts for a relatively small proportion of the retail cost base (mainly billing systems). At PR14, Ofwat's allowance for capital expenditure was based on historic costs. At PR19, though capital expenditure is relatively small and assets lives are relatively short, it will be important to ensure that the use of historic costs does not leave companies with insufficient funds to update their billing systems needed to give customers with a good quality and modern customer service. A totex-type approach could be considered.



4. Recommendations

This section sets out our recommendations for household retail cost assessment at PR19.

The purpose of our recommendations is to encourage early and full consideration of the options available for retail household cost assessment at PR19.

Recommendation 1: Early engagement

There is a need, early on, to reach a view on (a) the regulatory objectives of cost assessment and (b) how well different options for cost assessment might meet those objectives. This view could be reached as part of the formal consultation process that is already underway and/or through industry workshops.

Recommendation 2: Active exploration of econometric approaches

As part of the early engagement process or otherwise, we think that active consideration should be given to the use of econometric analysis as an alternative to the adjusted unit cost methodology.

This could involve exploring the feasibility of implementing different types of analysis, including but not limited to whether:

- an aggregate model would help meet the regulatory objectives – such as *Total household retail costs = f(Number of single service customers, number of dual service customers, proportion of metered customers, wholesale bill size, deprivation) + inefficiency + noise; and*
- whether a disaggregated modelling approach, such as a model for bad debt and debt management costs, would help meet the regulatory objectives.

Recommendation 3: Active exploration of approaches to deal with input price pressure

Again, as part of the early engagement process or otherwise, we think that active consideration should be given to:

- whether companies should face a catch-up challenge that includes input price absorption;
- who should bear inflation risk;
- what inflation measure should be used; and
- whether there should be a "step reduction" in the efficiency challenge faced by upper quartile companies compared to other companies.

This should include reconsideration of whether a standard CPI-X-type treatment of inflation could work well.

Recommendation 4: Consideration of the interaction between cost assessment and SIM

Finally, this report highlights that there is a relationship between the cost assessment process and SIM. That is, the ability and incentive for companies to fund increases in customer service quality is jointly determined by their cost allowance and the incentives provided by SIM. It will be important to check that that these two elements of the control "pull in the same direction".

Further Information

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