Anglian Water

10A. RECKON REVIEW OF OFWAT'S TREATMENT OF GROWTH-RELATED EXPENDITURE IN PR19 DRAFT DETERMINATIONS

Draft Determination Representation, August 2019

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28 August 2019

Review of Ofwat's treatment of growth-related expenditure in PR19 draft determinations

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1. Introduction and summary

Background

Ofwat's PR19 draft determinations involved substantial changes to the treatment of growth-related expenditure in its cost assessment. Enhancement expenditure that Ofwat has categorised as growth-related has now been incorporated into Ofwat's base cost models. This raises significant transparency problems for companies: it is difficult to tell how much of the totex allowances from the draft determinations are for growth-related expenditure, and how these allowances fit with their business plans. In addition, the change in approach raises questions about Ofwat's overall remuneration of the efficient costs of growth-related expenditure for water and wastewater services.

Six companies (Anglian Water, Northumbrian Water, Welsh Water, Yorkshire Water, Wessex Water and South East Water) asked us to carry out a short and focused project concerning Ofwat's incorporation of growth-related expenditure into base cost models. The main aims of the project were as follows:

- Develop a methodology for understanding the impact on totex allowances of Ofwat's decision to include growth-related enhancement capex within the base cost modelling, including understanding the sensitivity of the modelled allowances to Ofwat's forecasts for growth.
- Apply that methodology to produce estimates for each of the companies covered by Ofwat's modelling, separately for water and wastewater, based on figures and models from Ofwat's draft determinations.
- Produce a high-level critique of the cost assessment modelling approach taken by Ofwat for draft determinations in relation to the treatment of growth-related expenditure.
- Provide a brief discussion of the interactions between the allowances for growth implied by Ofwat's base cost models and its proposed remuneration of growth through the DSRA mechanism.

This report was prepared by Reckon LLP and solely reflects the views of its authors. Whilst we have benefitted from useful discussion and feedback from the six companies that commissioned this piece of work, they do not necessarily endorse the report's contents or conclusions.

Summary of key points

Ofwat's draft determinations provide no explicit allowances for growth-related expenditure and Ofwat has not provided any reconciliation between the allowances at its draft determinations and the allowances at its IAP.

We have sought to gauge the allowances for growth-related expenditure in Ofwat's draft determinations using two different perspectives:

- In part A of our modelling work, we estimated the element of the base allowances set at draft determinations (DD) that could be considered to be either directly and indirectly attributable to growth. We use a broad concept of growth, which reflects Ofwat's approach at the DD (e.g. wastewater growth expenditure includes expenditure to reduce flooding risk).
- In Part B of our modelling work, we estimated the impact on totex allowances of the changes to Ofwat's approach to the treatment of growth-related expenditure between IAP and DD (seeking to isolate these changes from other impacts between IAP and DD, such as the revisions to historical and forecast data used and other modelling changes). We did this by decomposing the overall movement in allowances from IAP to DD into elements separately attributable to each methodological change between IAP and DD.

In both cases, our estimates are based on analysis of modelled base costs using modified versions of Ofwat's suite of DD base cost econometric models (using Stata and Excel).

Our *estimates* for Part A (across the industry and over the 2020-25 period) are summarised below:

- The base cost allowance that is directly attributable to growth in cost drivers (including connected properties) is £377m for water and £267m for wastewater.
- The base cost allowance that is indirectly attributable to growth is £1,685m for water and £1,915m. This is an "implicit" allowance arising out of the inclusion of historical capital enhancement expenditure relating to growth in the base cost models.

Our *estimates* for Part B (across the industry and over the 2020-25 period) are summarised as follows:

- Compared to the IAP position, the inclusion of historical growth-related capital expenditure has increased modelled base costs by £1,016m for water and £1,566m for wastewater, after controlling for the impact of other identified modelling and data changes between IAP and DD.
- Ofwat's approach at the DD involves the removal of the separate explicit allowances for growth-related capital enhancement expenditure which were £1,168m for water and £2,240 for wastewater at the IAP.

- The net effect of these changes in Ofwat's approach from IAP to DD has reduced allowances attributable to growth by £156m for water and £674m for wastewater.[1]

An important point to note is that our Part B estimates of the impact of inclusion of historical growth-related expenditure in base models are not estimates of what might happen to allowances if that expenditure were to be removed from base models.

These industry-wide estimates mask substantial differences between companies, particularly in the impacts of the change relative to IAP allowances in Part B. The impacts of Ofwat's change from IAP to DD on individual companies (expressed as a percentage of IAP base allowances) range from +3.4% to -8.4% for water and from +1.6% to -12.5% for wastewater. Breakdowns of these impacts by company are provided in Section 2 of this report.

Ofwat has sought to explain its reasons for the change in its approach from IAP to DD. While Ofwat was right to consider changes to its approach in the light of the concerns raised by companies with its IAP approach, we do not consider that Ofwat has followed a reasonable and proportionate process in developing and evaluating alternative approaches. This is particularly so given the quantum of planned expenditure being assessed (around £4.5bn) and the scale of impacts of the change of approach on individual companies' allowances and hence customer bills.

We have identified a number of shortcomings in Ofwat's DD approach relating to growth:

- **Process and transparency considerations**. Ofwat's approach to its base cost models has been developed over a number of years following extensive consultation with companies and other stakeholders. The major change in Ofwat's approach to growth expenditure has not benefitted from a similar process. Furthermore, the lack of transparency in Ofwat's DD documents, and the complexity of the work needed to understand the allowances for growth, hampers companies' ability to properly respond to DD in the time available.
- **Omission of the number of new connections from cost drivers**. Ofwat's DD approach does not take proper account of the number or rate of new connections (or forecasts of these) as a cost driver for growth-related expenditure. Ofwat states that company scale is a good cost driver for growth costs, but this is not the case. Companies with similar scales could have very different connections activity – so models that rely on scale alone are unlikely to capture the relevant differences between companies. We estimate that growth rates across the industry vary from 0.45% to 0.87% in water and 0.33% to 0.85% in wastewater (based on ONS forecasts

[11] The estimated net effect for water of £156m is not the same as the difference between our estimated increase in modelled base costs of £1,016m and the removal of IAP separate growth enhancement allowance of £1,168m (there is a difference of £4m). This reflects differences between the datasets used for IAP and DD in the treatment of Dee Valley Water. We have not sought to fully reconcile these differences for this report.

used by Ofwat in DD). These issues have significant financial effects, as we illustrate later in this report.

- **Omission of other relevant cost drivers**. Ofwat's broad definition of growth-related expenditure (e.g. inclusion of expenditure to reduce flooding risk) means that other important cost drivers may have been omitted, besides those relating to the number of new connections. Ofwat has assumed that the additional categories of expenditure that have now been included within base models are adequately accounted for by company scale variables – but has provided no evidence for this.
- **Risks of worsening accuracy of econometric results and efficiency benchmarks**. The inclusion of significant amounts of capital expenditure, along with the omission of the relevant cost drivers, could adversely affect the accuracy of Ofwat's base models. While Ofwat has said that its models remains "robust" after the change, it does not provide explanation of what analysis it has done to check that its approach has not worsened these models (e.g. the impact of the change on the spread of modelled allowances or on the value of estimated coefficients).

Finally, we considered the interactions between Ofwat's DD approach on growth-related costs and its proposed developer services revenue adjustment (DSRA) mechanism. We have two main findings:

- There are significant inconsistencies between the implied DD marginal allowances per forecast new connection and the proposed DSRA unit rates (the DSRA rate is substantially higher in most cases). Companies would receive the higher DSRA unit rate for connections that exceed forecasts – but would lose revenue at the higher DSRA unit rate for connections that fall short of forecasts. This inconsistency raises serious questions about Ofwat's approach.
- One of Ofwat's reasons for the introduction of the DSRA was to address the perverse incentive for companies to discourage new connections. However, its approach adopts a somewhat narrow view of the source of this concern. In practice, the risks of perverse incentive can arise from a perception that growth-related expenditure is not adequately remunerated under the price control framework. Ofwat's DD approach risks entrenching that perception even further.

Overall, we consider that Ofwat has not followed a reasonable and proportionate process in developing the approach to growth-related expenditure used for its draft determinations, and that the retention of this approach would raise serious questions about whether growth-related expenditure is financeable.

Structure of this paper

The remainder of this paper is organised as follows:

- Section 2: Estimation of Ofwat's DD allowances for growth.

- Section 3: Ofwat's rationale for the new approach to growth.
- Section 4: Potential concerns with the new approach to growth.
- Section 5: Comments on interactions with the DSRA.

Caveat

In this report we have presented a series of estimates and other calculations relating to Ofwat's treatment of growth-related expenditure. These estimates and calculations were produced in a short amount of time relative to the complexity of the task. We have described our approach to these estimates in this report, but this is not necessarily the only approach and our approach may itself have limitations. We consider that our estimates shed considerable light on the treatment of growth-related expenditure in Ofwat's non fast-track draft determinations but should not be relied on exclusively and are not the final word on the matter.

2. Estimation of Ofwat's DD allowances for growth

Introduction

This section summarises our methodology for understanding the impact on totex allowances of the changes in Ofwat's modelling approach from IAP to DD, including the inclusion of growth-related enhancement capex within the base cost modelling, and provides our estimates of the impact of these changes on base cost allowances. According to Ofwat, it has included growth-related activities for which companies have forecast expenditure over £4.5 billion its DD base cost models.[2]

This is important for several reasons. Whilst Ofwat may consider growth-related costs as routine and therefore part of base expenditure, it remains important to companies to understand Ofwat's view of growth expenditure separate from day-to-day costs of operating and maintaining their assets. Also given the emphasis that Ofwat have placed differences between company and Ofwat view of costs and the impact on cost sharing rates, companies will legitimately seek to understand what is driving these differences and the robustness of Ofwat's approaches given the wider policy emphasis on facilitating growth.

We have sought to gauge the allowances for growth-related expenditure in Ofwat's draft determinations using two different perspectives:

- In part A of our modelling work, we estimate the element of the base allowances set at draft determinations (DD) that could be considered to be either directly and indirectly attributable to growth. We use a broad concept of growth, which reflects Ofwat's approach at the DD (e.g. wastewater growth expenditure includes expenditure to reduce flooding risk).
- In Part B of our modelling work, we estimate the impact on totex allowances of the changes to Ofwat's approach to the treatment of growth-related expenditure between IAP and DD (seeking to isolate these changes from other impacts between IAP and DD, such as the revisions to historical and forecast data used and other modelling changes). We did this by decomposing the overall movement in allowances from IAP to DD into elements separately attributable to each methodological change between IAP and DD.

Our approach involves calculating base cost allowances using versions of Ofwat's published DD stata code and Excel models for different combinations of input data and modelling assumptions. This involved running several iterations of a similar set of calculations, each time producing an estimate of base cost allowances for a particular combination of input data and modelling specification.

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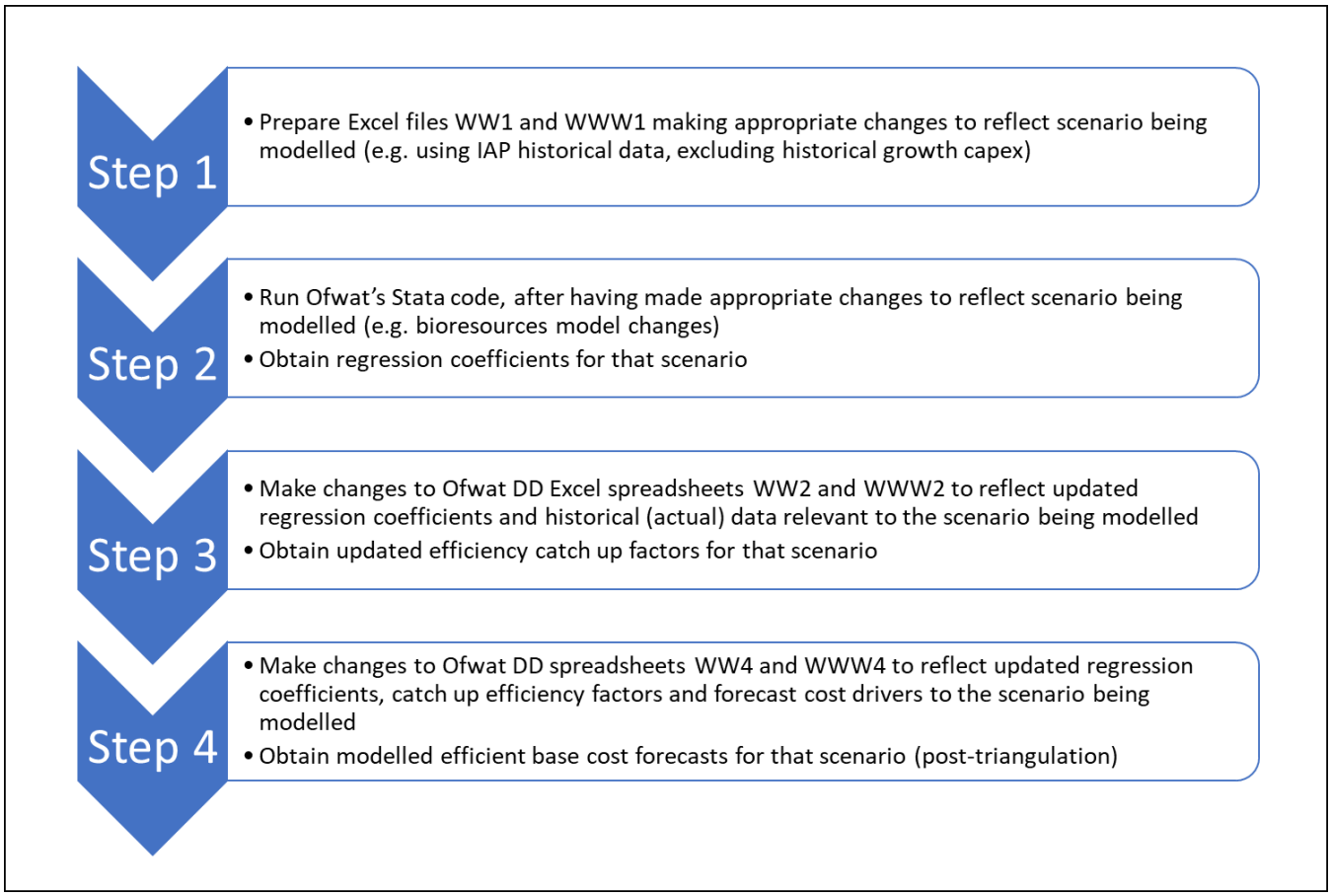
[2] Ofwat (2019) *PR19 draft determinations: Securing cost efficiency technical appendix*, tables 2 and 3, page 16

Figure 1 summarises the steps we took to produce our estimates of base cost allowances under each scenario.

Figure 1 Overview of steps involved in estimating DD base allowances under different scenarios



We corrected a formula error in Ofwat's DD spreadsheet WWW4 for wastewater. This error had the effect of excluding bioresources costs from the calculation of efficient wholesale base cost costs.

Part A: Estimation of DD base allowances directly attributable to growth

This part focuses on producing estimates of the allowances for growth included within base costs under Ofwat's DD approach. For this stage, we have applied a method that we think is intuitive and relatively simple to estimate using available data.

Our method estimates the DD base allowances for growth as the sum of two elements:

1. The allowance that is directly attributable to changes in explanatory variables over the AMP7 period (including growth in connected properties).

2. The allowance for growth included within base costs, which we consider to be indirectly attributable to growth. This is an implicit allowance because it is not explicitly linked to forecast

growth in connected properties or other growth cost drivers. The inclusion of historical capex for growth-related enhancements in the measure of cost used as a dependent variable in Ofwat's base models means that each company will tend to receive a slightly higher base allowance linked to its scale – irrespective of the quantum of forecast growth in connected properties or company scale during the AMP7 period.

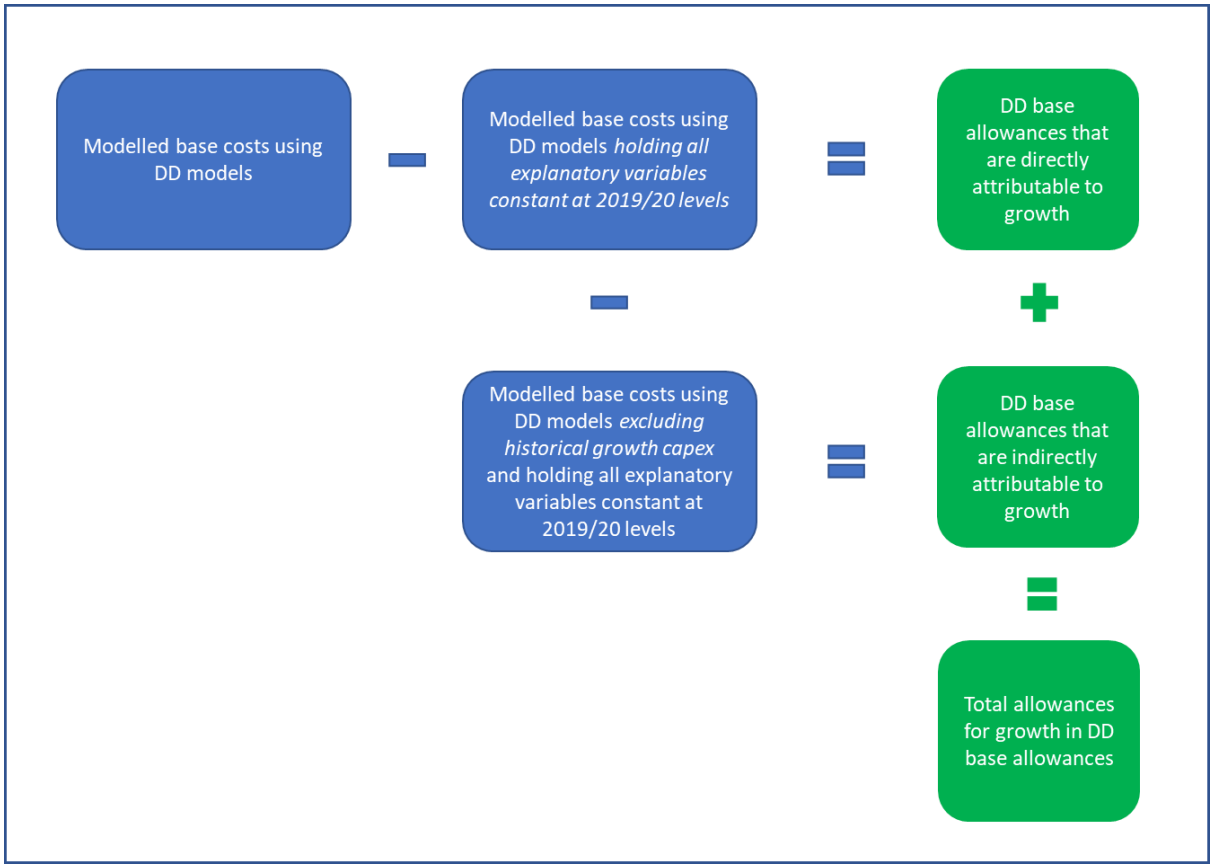
We calculated the first element, the allowance within Ofwat's DD estimate of efficient base costs that is directly attributable to changes in forecast explanatory variables between 2019/20 and 2020/25 by calculating two sets of modelled base costs (using Ofwat's DD spreadsheets), one using Ofwat's forecasts of the changes in explanatory variables and the other holding all explanatory variables constant at 2019/20 levels. The difference between the two sets of modelled base costs is our estimate of the allowance that is directly attributable to growth.

We considered whether some explanatory variables should be deemed unrelated to growth and allowed to grow in line with Ofwat's forecasts. Whether or not a particular cost driver is allowed to vary independently of growth could have a significant impact on our estimates of directly attributable allowances. For instance, allowing the variable "proportion of water treated at water treatment works with complexity levels 3-6" to vary according to Ofwat forecasts has a small but significant impact on estimated base costs, and therefore on our estimates of directly attributable allowances. However, we think that it would be difficult to disentangle the effects of growth from the effects of other factors that might affect changes in these variables (e.g. environmental targets, raw water quality, effluent contents). Given the complexity of the work and tight timelines for this report, we did not seek to pursue this further.

We estimated the second element, the indirect allowance for growth included within the DD base cost allowances by running a version of Ofwat's DD base cost econometric models that excluded historical growth-related enhancement capex, but was otherwise identical, and estimating a new set of regression coefficients. We then applied these new coefficients to the explanatory variables for the 2020-25 (holding them constant at 2019/20 levels to avoid double-counting with the first step above). We compared the modelled base costs from this second step against the modelled base costs produced by applying regression coefficients from the first step outlined above, i.e. the modelled costs based on models that included the historical growth-related enhancement capex, and applied these to explanatory variables that are held constant at 2019/20 levels. The difference between the two sets of costs is our estimate of the allowance that is indirectly attributable to growth included within the DD base costs.

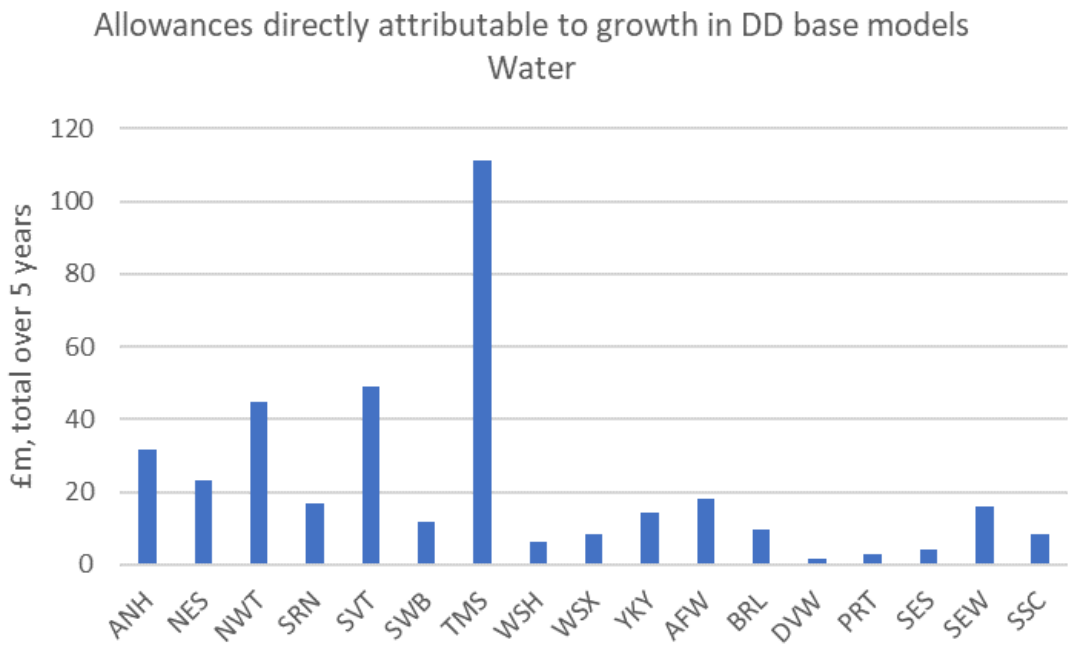
Our approach is summarised in Figure 2 below.

Figure 2 Overview of methodology for estimating growth-related elements of DD base allowances



Across the industry, we estimate that the base cost allowance that is directly attributable to growth in cost drivers (including connected properties) is £377m for water and £267m for wastewater. Our estimates for individual companies are set out in Figure 3 below.

Figure 3 Estimates of allowances directly attributable to growth in explanatory variables



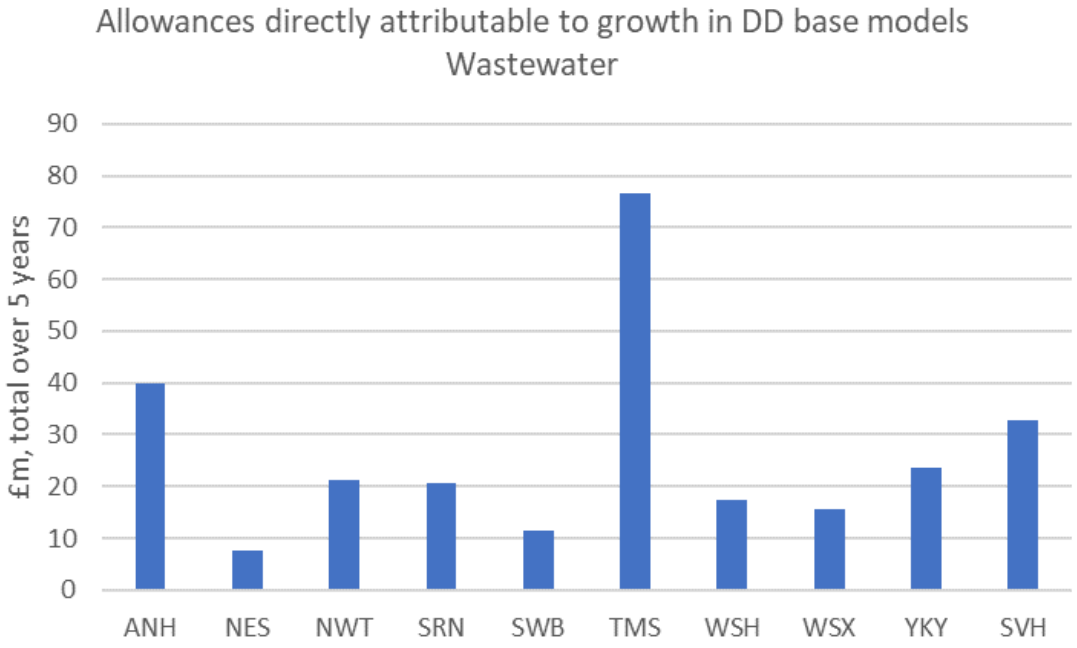
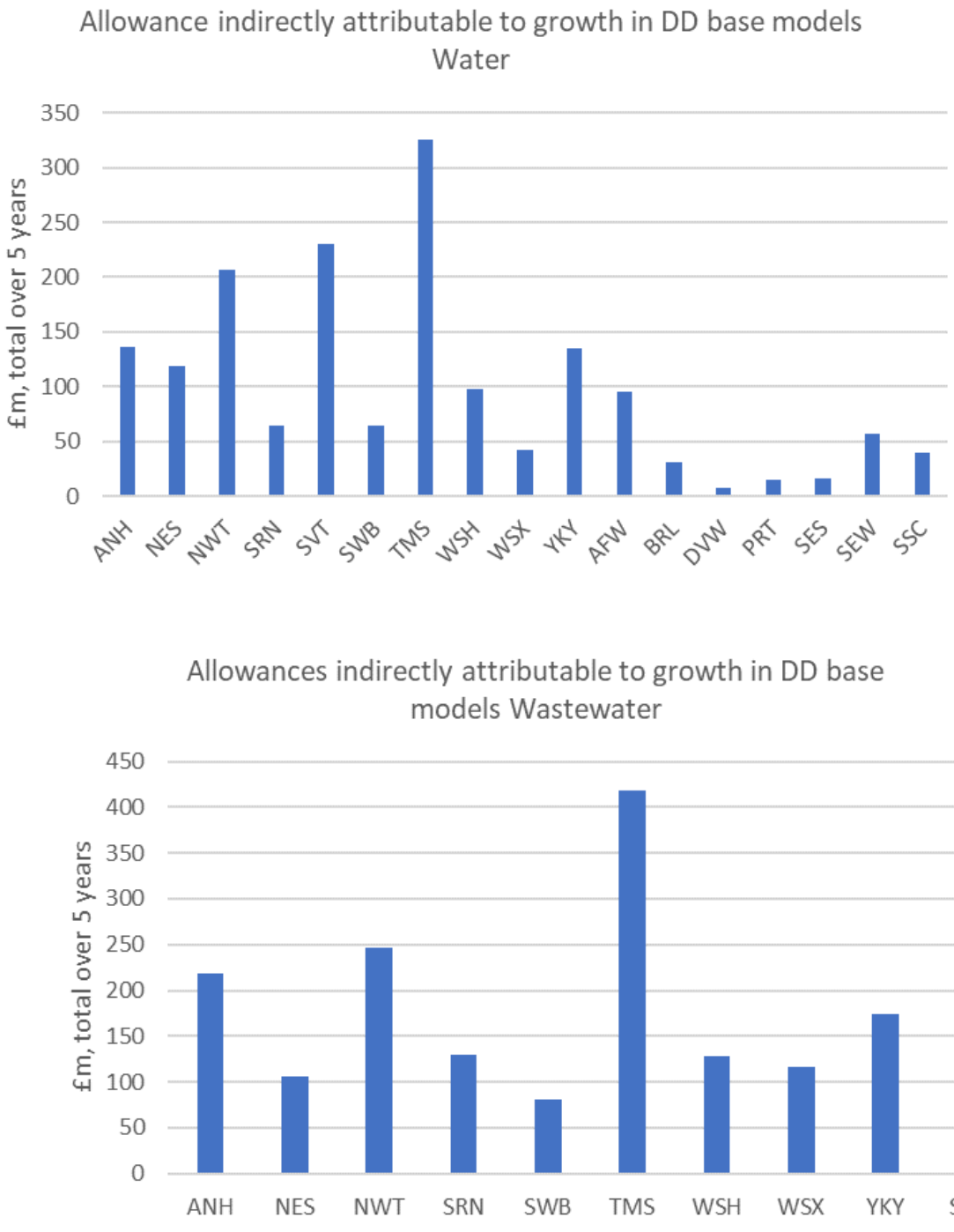


Figure 4 Estimates of allowances indirectly attributable to growth



We estimate the total allowance for growth under Ofwat's DD approach to be the sum of the two elements, the directly attributable element and the indirectly attributable element. Across the industry, we estimate that the total allowance for growth is £2,062m for water and £2,182m for wastewater.

An important point to note is that our estimates of DD allowances for growth cover costs relating to a wider set of activities than capital expenditure required to accommodate new connections. These

include allowances for operating expenditure relating to providing an ongoing service to new customers (e.g. treatment costs, power etc), and potentially an element of capital maintenance relating to new assets built to accommodate new connections. This means that our estimates of total DD growth allowances are not directly comparable to the separate and explicit IAP allowances for growth-related capital enhancement expenditure.

Part B: Estimation of impact of change in approach to growth at DD

In part B, we turn to our estimates of the impact on overall base cost allowances of the changes to Ofwat's treatment of growth from IAP and DD (seeking to isolate these changes from impacts of other changes between IAP and DD, such as RPEs and the data used).

As part of this work, we have also estimated the impact of each of the changes separately.

Our approach has three main stages:

- In Stage B1, we estimate the changes in Ofwat's base cost allowances from IAP to DD that are attributable to *other factors* besides the changes in the treatment of historical growth-related expenditure (e.g. changes in historical and forecast cost driver data, the allowances for RPEs etc).
- In Stage B2, we estimate the changes in base cost allowances that are attributable solely to changes in the treatment of growth-related expenditure in DD versus IAP (e.g. having sought to isolate the effects of other factors such as RPEs).
- In Stage B3, we take the additional base cost allowances that are attributable solely to changes in the treatment of growth-related expenditure in DD and deduct from this the separate growth-related capital enhancement expenditure allowances from IAP.

We treat the difference calculated in Stage B3 as an estimate of the net effect of the changes to Ofwat's cost approach to the treatment of growth from IAP and DD. It is an estimate only and may reflect the effects of other differences between IAP and DD that we have not identified and stripped out. The water companies contributing to this project did not suggest any further differences beyond those we have sought to control for.

Stage B1: Impact on allowances from other changes in approach from IAP to DD

This stage of the work focuses on producing estimates of the changes in Ofwat's base cost allowances that are directly attributable to changes in Ofwat's approach from IAP to DD, besides the impact of the inclusion of historical growth-related capital expenditure in base cost models.

We considered the following changes as part of this work:

1. Inclusion of allowances for real price effects (RPEs) for labour costs.
2. Changes to forecast cost drivers.
3. Changes to historical data used in base models.
4. Changes to the specification of a bioresources model (wastewater only).
5. The combination of all changes listed above.

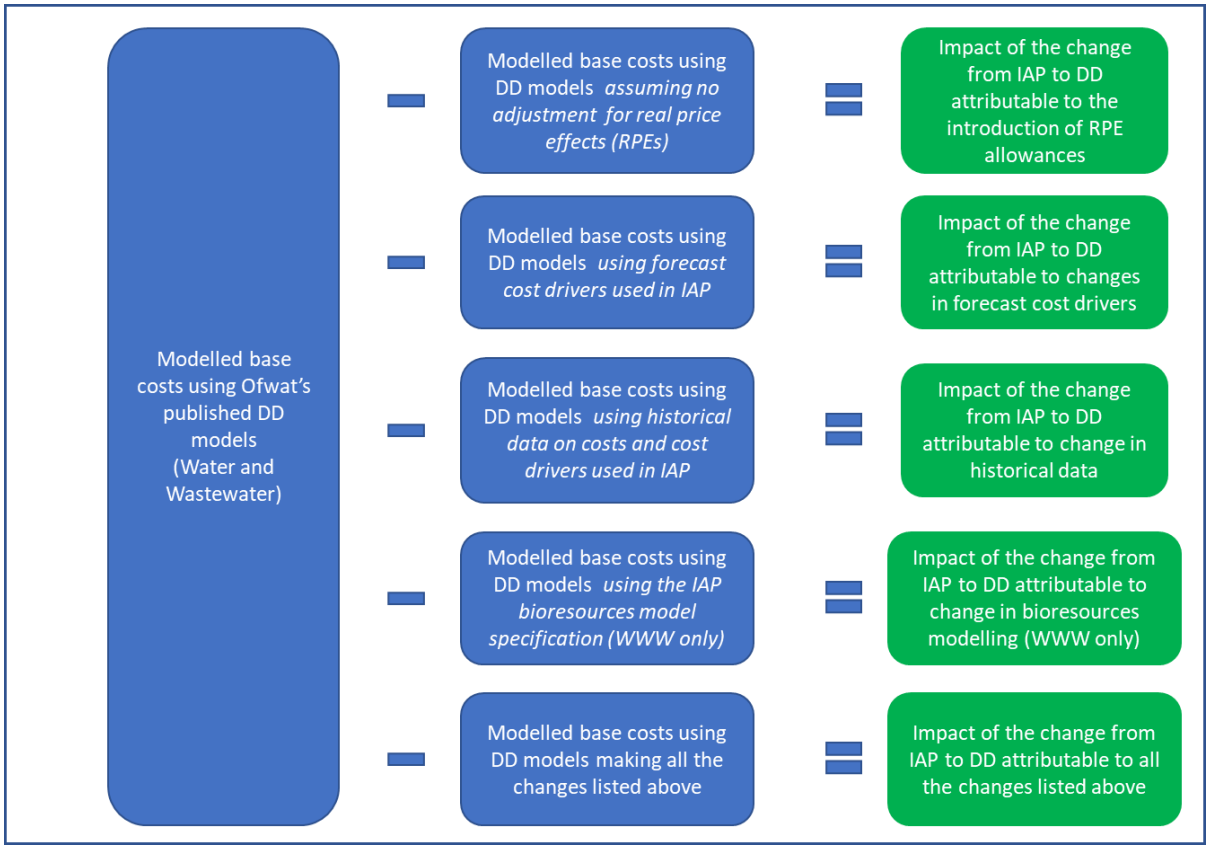
In each case, we estimated the impact of the change on Ofwat's estimates of efficient base costs by comparing the efficient base cost estimates from two versions of Ofwat's DD base cost econometric models:

a) The efficient base cost estimates from Ofwat's DD models.

b) The efficient base cost estimates from a version of Ofwat's DD model that reverted the specific change being assessed to the IAP position, holding all other elements identical to the DD model.

The difference between the two sets of efficient base cost estimates is our estimate of the impact of the specific change being modelled. Our approach is summarised in Figure 5.

Figure 5 Overview of our approach to estimating the impact of modelling changes



A key issue is that the cumulative effect of individual changes may be different to the sum of the estimated changes taken individually. We see this in the results. This difference arises from interactions between different changes, which are not properly accounted for when they are estimated individually. We consider the estimates for the combination of all changes to be a more reliable guide to the cumulative effect than the aggregation of the individual impacts.

In the case of water models, we were able to isolate and attribute the overall movement from IAP to DD base cost allowances to each change listed above. However, for wastewater there is a residual element that we have not yet explained. The unexplained difference is relatively small (around 1.5% total base costs for Northumbrian Water and 0.6% or less for other companies).

The changes to historical data cover a number of changes to the dataset used by Ofwat in its base models. Apart from changes that were explicitly recognised in Ofwat's DD documents, these include other data changes, including to historical botex (partly through the inclusion of income as negative expenditure) and corrections to errors in the data processing in IAP (e.g. correcting historical street works costs). We have not attempted to isolate the impact of individual data changes for this report.

Stage B2: Estimate of the element of base cost allowances that is attributable to the inclusion of historical capital expenditure in base cost models

In this stage of work, we estimate the impact on base cost allowances of Ofwat's decision to include historical growth-related capital expenditure in its base models for DD, having first stripped out the impacts of the other modelling changes made by Ofwat in Stage 2.

We do this by comparing the efficient base cost estimates from two versions of Ofwat's DD base cost econometric models:

a) The efficient base cost estimates from Ofwat's DD models that reverts all changes identified in Stage 2 to the IAP position.

b) The efficient base cost estimates from the model in (a), excluding historical growth-related capital expenditure.

The difference from (a) minus (b) is our estimate of the impact of the inclusion of historical capital expenditure, having stripped out the effects of all other modelling changes identified.

Table 1 and Table 2 below set out our preliminary estimates of the impacts of estimated in stages B1 and B2 across all companies for water and wastewater.

Table 1 Water: Analysis of the impact of modelling changes on base cost allowances (£m)

Company	Impact of RPEs	Impact of forecast cost drivers	Impact of historical data	Joint impact of changes to RPEs, forecast and historical data	Impact of including historical growth capex in base models
ANH	17	16	25	58	93
NES	15	3	-5	14	76
NWT	25	38	-18	57	131
SRN	9	44	-43	33	38
SVT	29	29	-65	-0	136
SWB	8	8	-16	3	39
TMS	41	33	-64	13	204
WSH	13	-12	-23	-27	50
WSX	6	16	-20	7	22
YKY	17	-2	-27	-14	77
AFW	13	55	-56	30	52
BRL	4	7	-23	-9	14
DVW	1	2	-3	2	4
PRT	2	17	-16	11	10
SES	2	1	-6	-3	9
SEW	8	-1	-13	9	36
SSC	5	39	-26	34	25

Table 2 Wastewater: Analysis of the impact of modelling changes on base cost allowances (£m)

Company	Impact of RPEs	Impact of forecast cost drivers	Impact of historical data	Impact of changes to bioresources model	Joint impact of changes to RPEs, forecast and historical data, and bioresources model	Impact of including historical growth capex in base models
ANH	27	13	127	12	177	172
NES	11	155	-34	-3	47	110
NWT	28	5	-13	0	22	204
SRN	20	-17	116	-1	116	90
SWB	10	-4	5	5	14	58
TMS	51	-50	6	17	31	347
WSH	15	-30	23	3	11	102
WSX	12	1	-20	1	-4	94
YKY	21	-83	-4	-2	-63	145
SVH	34	5	47	9	95	244

Stage B3: Estimated impact of change in approach to growth from IAP to DD

In this stage, we estimate the impact of the inclusion of historical growth-related capital expenditure in base cost models and the removal of the separate growth-related capital enhancement expenditure allowance from IAP. We do this by taking the additional base cost allowances that are attributable to the inclusion of growth-related expenditure in DD base models and deducting from this the separate IAP growth-related enhancement allowances.

Table 3 and Table 4 below show the impact of the change in approach to growth from IAP to DD. These figures show a wide range of impacts across companies.

Table 3 Water: Impacts of the change in approach to growth from IAP to DD (£m)

Company	IAP separate allowance for growth enhancement capex	Impact of including historical growth capex in base models	Estimated impact on allowances from change in approach to growth	Impact as % of IAP base allowance
ANH	186	93	-94	-8.4%
NES	89	76	-13	-1.3%
NWT	141	131	-9	-0.6%
SRN	66	38	-28	-4.8%
SVT	134	136	2	0.1%
SWB	47	39	-8	-1.4%
TMS	218	204	-14	-0.5%
WSH	46	50	4	0.4%
WSX	17	22	5	1.2%
YKY	41	77	36	2.9%
AFW	54	52	-2	-0.2%
BRL	27	14	-12	-3.8%
PRT	5	10	5	3.4%
SES	9	9	0	0.0%
SEW	47	36	-11	-2.0%
SSC	42	25	-17	-5.1%

Table 4 Wastewater: Impacts of the change in approach to growth from IAP to DD (£m)

Company	IAP separate allowance for growth enhancement capex	Impact of including historical growth capex in base models	Estimated impact on allowances from change in approach to growth	Impact as % of IAP base allowance
ANH	382	172	-210	-12.5%
NES	99	110	11	1.6%
NWT	203	204	1	0.0%
SRN	206	90	-115	-8.8%
SWB	75	58	-17	-2.7%
TMS	585	347	-238	-6.9%
WSH	91	102	11	1.1%
WSX	121	94	-27	-3.2%
YKY	187	145	-42	-2.8%
SVH	291	244	-47	-2.1%

3. Ofwat's rationale for the new approach to growth costs

Introduction

In this section we briefly summarise Ofwat's rationale for its approach of including growth-related capital enhancement expenditure in its base cost models. We then provide a review of this rationale, with a focus on the process used, commenting first on the options considered and then the assessment of these options. We turn to some of the specific concerns with the new approach in Section 4.

The concerns identified by Ofwat as a rationale for the new approach

In its cost efficiency technical appendix to its slow-track draft determination, Ofwat explains that its rationale for including growth-related enhancement capex in base models was to address a series of concerns identified with its approach at IAP:[3]

1. The assessment of growth costs, as part of the IAP cost assessment for enhancements, was focused on enhancement capital expenditure.
2. The models of growth unit costs (cost per new connection) showed a relatively wide range of unit costs across companies. Some companies had argued that the range was too wide to provide reliable evidence of efficiency, with companies highlighting explanatory factors missing from the models and differences in reporting between companies.
3. In relation to the water growth model, a number of companies argued that Ofwat did not consider differences in self-lay penetration.
4. In relation to wastewater growth models, a number of companies highlighted the sensitivity of Ofwat's stand-alone model results to the inclusion of Hafren Dyfrdwy, which is significantly smaller than all other wastewater companies.
5. In relation to wastewater growth models, a number of companies suggested that risk of sewer flooding' should be assessed separately from the other costs that Ofwat had treated as growth-related at the IAP, because of different cost drivers.

While we have not sought to review these concerns in any detail in this report, each of them seems a reasonable point to raise with the IAP approach, which merited further consideration by Ofwat. However, we do not consider that Ofwat's draft determinations are based on a reasonable process for the development and review of options to tackle these concerns.

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[3] Ofwat (2019) *PR19 draft determinations: Securing cost efficiency technical appendix*, pages 14-18.

The options considered by Ofwat

Ofwat's technical appendix reports that it considered two main alternatives to address the concerns it had identified with the IAP approach (it does not disclose other options): *(a)* test similar models to those at the initial assessment of plans, but on a totex basis; and *(b)* incorporate growth-related enhancement expenditure into the base cost models.

We have a number of comments on this aspect of Ofwat's process.

- Ofwat should have considered more than two options. This is especially so given the importance of the approach to growth expenditure within Ofwat's overall cost assessment. On Ofwat's figures, companies' business plan requests for growth-related expenditure was around £4.5 billion.[4] The options considered are not the only way to tackle the concerns identified.
- The limitations from only having two options is exacerbated because first option is quite a bad option. This option is heavily focused on tackling concern (1) above without seeking to address the concerns at points (2) and (5). Ofwat's approach to totex modelling of enhancements from other parts of the draft determinations involves adding operating expenditure into its enhancement models alongside capital expenditure, without an allowance for the differences between the two types of expenditure. We have considered this type of approach in separate work for a group of water companies,[5] and do not consider it a sensible approach.
- Ofwat's options should have been more tailored to each of specific concerns it had identified. The very specific point about Hafren Dyfrdwy can be tackled by changing the way that data for Hafren Dyfrdwy is used in the modelling and is irrelevant to the question of whether to include growth-related capital enhancement expenditure in the base models. For each of the other four concerns that Ofwat identified, there would be alternative options besides the two that Ofwat discusses. Ofwat's evaluation of its options does not give enough attention to the potential drawbacks of these and how these drawbacks might be mitigated though development of further options to consider.

Ofwat's assessment of options

Ofwat's assessment of its two options for addressing the concerns from its IAP suffers from a major limitation: it does not show any proper consideration of the potential downsides of these options.

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[4] Calculation based on figures from Ofwat (2019) *PR19 draft determinations: Securing cost efficiency technical appendix*, page 15.

[5] Reckon (2019) *Note on totex benchmarking of enhancements in Ofwat's PR19 IAP*, https://www.water.org.uk/wp-content/uploads/2019/06/reckon-enhancement-totex-benchmarking-note-19jun2019.pdf

Ofwat presents a table which shows some form of comparative assessment of its two options.[6] This does not include the IAP approach as a "do nothing" option. It identifies no concerns or downsides at all from its preferred approach. Indeed, no potential downsides from its preferred approach are mentioned in the five pages discussing this aspect of its draft determinations.

Ofwat says that growth-related enhancement expenditure can be included in models of base costs because "they share similar characteristics". According to Ofwat:

- growth-related expenditure is routine. These costs have been incurred in the past and will be incurred in the future.
- growth-related costs can be explained with similar cost drivers (company scale) as the rest of base costs; and
- Ofwat does not expect "to see a significant step change" in the drivers of growth-related expenditure.

This reasoning rests on the key premise that company scale is a good "proxy" cost driver for growth-related expenditure. There is simply no basis for that premise, especially given the amount of money at stake. For instance, our analysis shows that, under Ofwat's own assumptions on forecast growth for the AMP7 period, growth rates relative to number of connected properties range from 0.45% to 0.87% in water and from 0.33% to 0.85% in wastewater.

In section 4 we discuss this issue further and some of the other potential concerns with the inclusion of growth-related enhancement expenditure in the base cost models. Ofwat's assessment does not show any recognition of these issues.

Conclusion

Ofwat rationale for incorporating growth-related capital enhancement expenditure in its base cost models seems weak and there is no evidence that a robust evaluation has been carried out. Its disclosed process shows major limitations in the scope of options considered and the assessment of those options.

It does not seem reasonable or proportionate for Ofwat to have followed such a process in making major decisions affecting the treatment of over £4.5 billion of proposed expenditure.

Ofwat rightly expects water companies to carry out suitable optioneering exercises when they are planning major solutions to improve customer and environmental outcomes. Similarly, companies and stakeholders should expect more from Ofwat's optioneering on the treatment of growth-related

[6] Ofwat (2019) *PR19 draft determinations: Securing cost efficiency technical appendix*, table 4, page 18.

enhancement expenditure, especially in light of the wider policy interest in water companies facilitating growth and helping to reduce flooding risks.

4. Potential concerns with the new approach to growth

Introduction

We discuss in this section a number of potential concerns with Ofwat's incorporation of capex enhancement expenditure in its base cost models. These concerns are not recognised in Ofwat's assessment of options supporting its decision.

We take the following in turn:

- Process and transparency considerations.
- Omission of the number of new connections from cost drivers.
- Scale of the modelling error from omission of new connections driver.
- Omission of cost drivers relating to reduced flooding risk and low pressure.
- Risks of worsening accuracy of econometric results and efficiency benchmarks.

Process and transparency considerations

A preliminary point concerns the process Ofwat has followed. Ofwat's modelling approach for PR19 has been developed over a number of years, including through the cost assessment working group, consultation on econometric models in (March 2018) and the IAP (January 2019).

Through this process Ofwat gave particular emphasis to its base cost models, making considerable changes compared to its PR14 approach. As far as we are aware, there was no stage at which Ofwat indicated it would adopt the approach now used for DD, in which the historical capex for growth-related expenditure is included in the base cost modelling without including explanatory variables that take account of the drivers of this expenditure.

The issues arising from the change in approach are complex. We have concerns whether due appreciation of the issues arising has been given in the short period from IAP to DD, and whether Ofwat's process from DD to FD allows opportunity for them to be considered properly.

The impact of the change in approach on different aspects of companies' wholesale expenditure allowances is far from transparent and Ofwat has not shown or explained the impacts in its DD publications.

Water companies told us that it has been a challenge to understand and reconcile the changes that Ofwat has made to its treatment of growth between IAP and DD. We found this task to be complex and time-consuming.

The new approach has significant implications for the types of costs adjustment claims and wider representations that companies might need to make.

Omission of the number of new connections from cost drivers

The number of new connections to water and wastewater systems is clearly an important driver of water companies' growth expenditure. A water company's growth expenditure will be affected by both:

- the number of new connections that are actually made (e.g. which may drive connections work and potentially site-specific work); and
- the company's internal forecasts of new connections (e.g. which may drive network reinforcement expenditure carried out on an anticipatory basis, to enable the system to accommodate new customers without service quality problems).

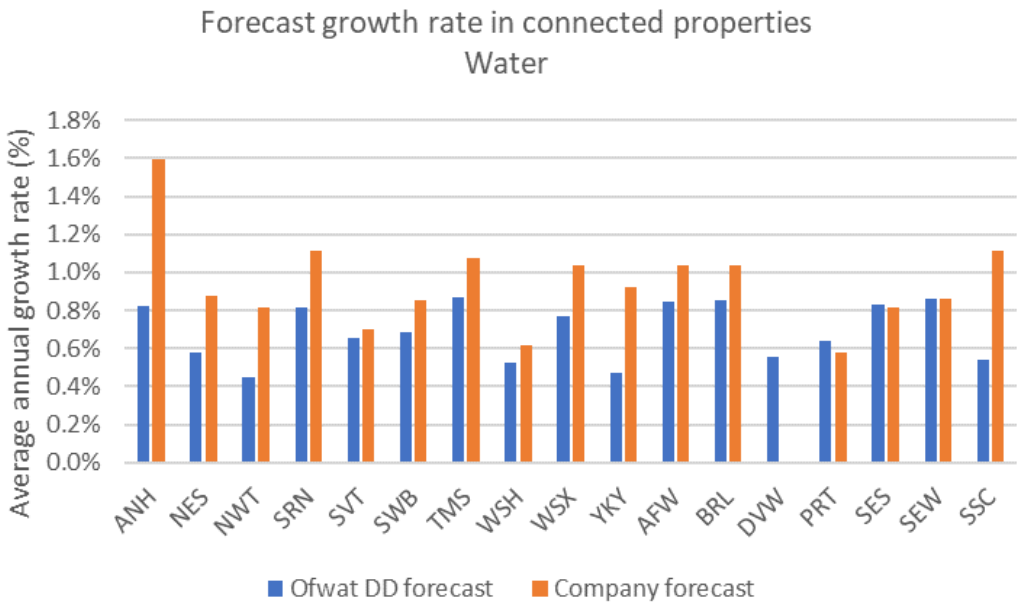
These cost drivers do not feature at all in the set of explanatory variables included within Ofwat's econometric models of base costs.

Some of the explanatory variables within the base models will be correlated with the number of new connections. In particular, this applies to the various measures of the scale of companies which are used in the econometric models of base costs (e.g. the number of connected properties, the length of main, the sewage load and sewer length) and potentially also some of the density measures (which incorporate measures of scale). The number of new connections is likely to be correlated with measures of company size: for instance, we expect a higher number of new connections for Severn Trent Water than for SES Water.

However, while there is some correlation between the number of new connections and explanatory variables capturing company scale, we do not consider that scale is a good proxy for the number of new connections.

This point is illustrated by Figure 6 below which compares connection rates across companies. We calculated these connection rates as the average rate of forecast growth in the number of properties over the 2020-25 period (using Ofwat's DD forecast growth which may be quite different to company forecasts).

Figure 6 Comparison of forecast new connection rates across companies



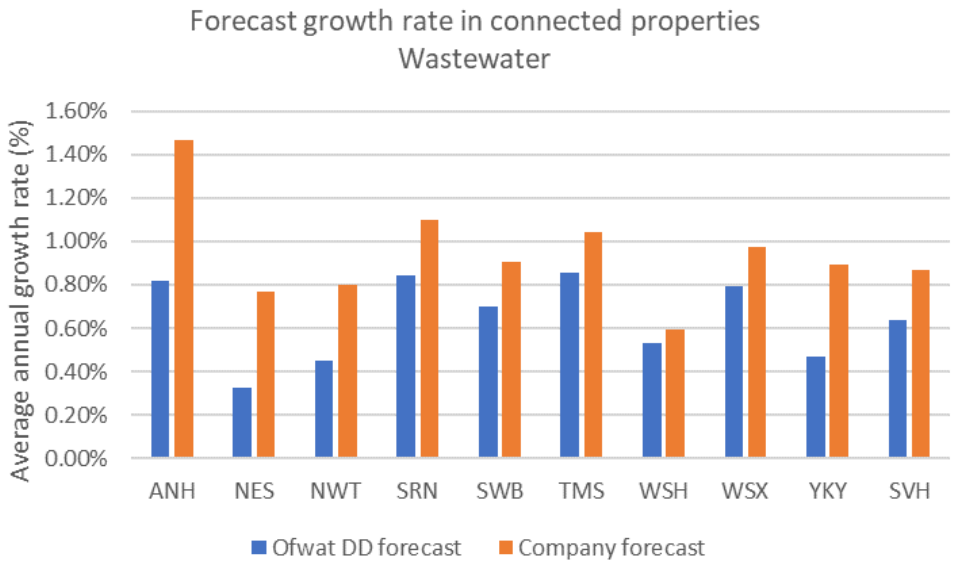
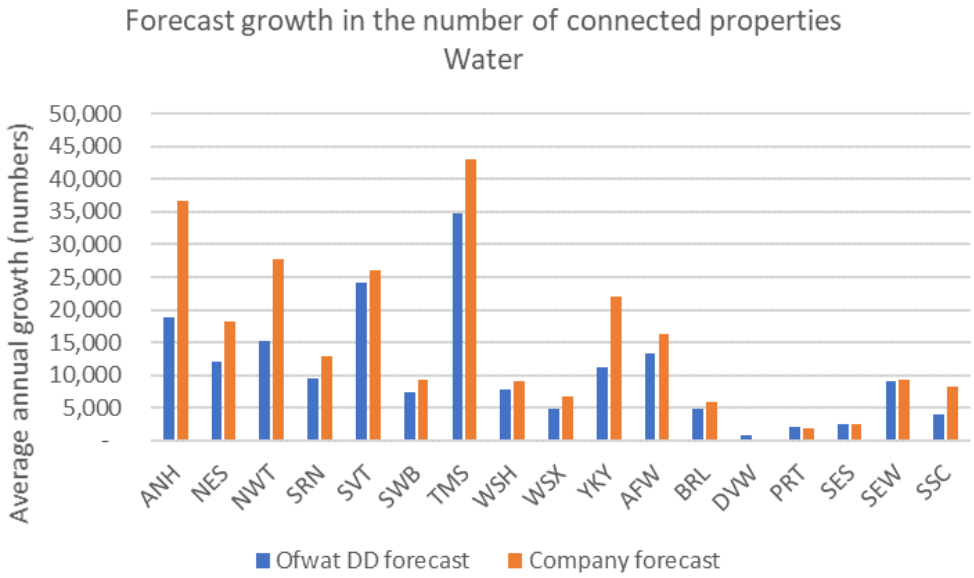
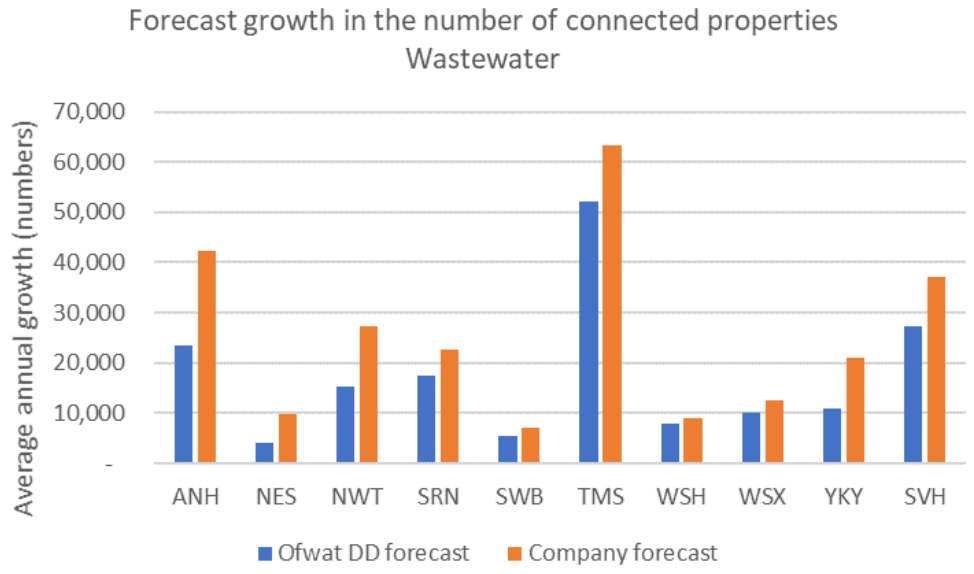


Figure 7 below shows a comparison between average annual growth (in numbers) implied by Ofwat's DD forecasts and companies' own forecasts of the number of new connections during the AMP7 period.

Figure 7 Comparison of forecast new connection rates across companies





These differences mean that the base cost benchmarking models are unable to estimate – or take account of – how differences in the number of newly connected properties *relative to company scale* affects companies' expenditure. For instance, the models take no account of how the rate of new connections, expressed as the number of new connections divided by the number of existing connections, may affect companies' expenditure requirements.

Crucially, Ofwat's DD models take limited account of forecast growth during the AMP7 period other than through its impact on company scale. Taking an extreme example, a company that grows its

connected property base from 900,000 to 1,100,000 over the AMP7 period (i.e. 200,000 new connections) will receive very similar base cost allowances to a company that started AMP7 with 1,000,000 properties and had zero growth during the period (all else being the same). This issue is particularly problematic given that the "cost" allowances under Ofwat's price control framework are intended to be totex allowances, covering the full cash costs of investment.

Econometric models used for benchmarking water company costs will inevitably be imperfect – capturing, at best, approximations of the underlying cost drivers. It is not realistic to expect the models estimated using a small data sample to capture all costs drivers in a way that reflects the underlying economic and engineering relationships. But given the scale of growth-related expenditure, it seems important to consider the scale of the modelling error or limitation arising from the omission of the number of new connections from the cost assessment models used for growth-related expenditure. We turn to this in the next section.

We doubt that the problems above can be addressed by including explanatory variables for connection growth rates in the econometric models of base costs. There are limitations to what the econometric models can be expected to do given the small sample size and complexity of water companies' activities. And we would have expected Ofwat to have tried this as part of its work on incorporation of growth enhancement capex in the base cost modelling.

Scale of the modelling error from omission of new connections driver

We now consider how material this modelling limitation is, in approximate terms. We are interested in gauging the materiality or significance of this issue, not precise estimation.

In section 2 we examined how variations in the forecast number of new connections during the 2020-25 period affect companies' allowed totex under the approach from the draft determinations. We now consider this further.

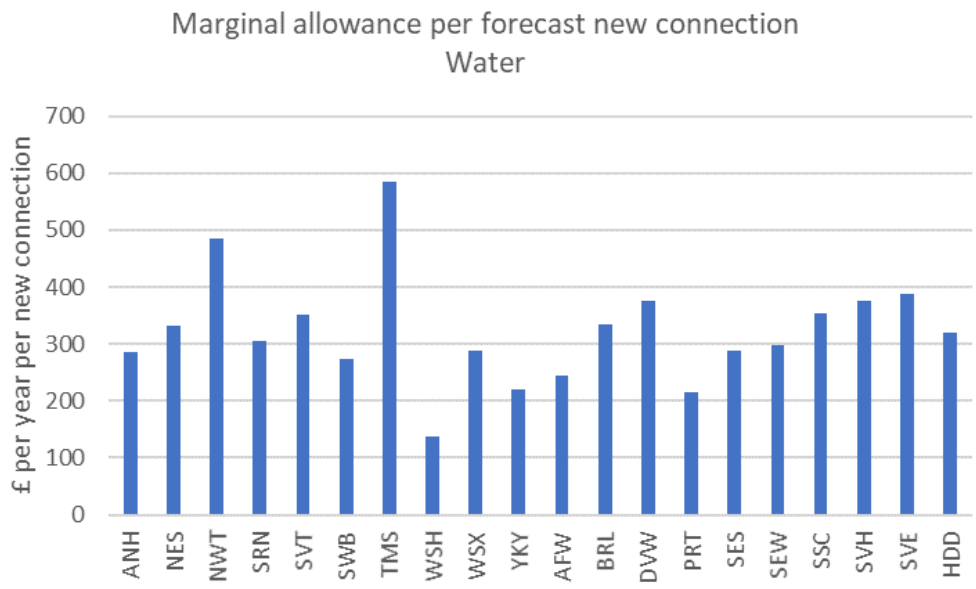
It is not the purpose of this paper to estimate the impact of new connections on companies' totex. But for the purposes of understanding the limitations of Ofwat's approach, we can make use of the estimates from Ofwat's initial assessment of business plans, which produced allowances for enhancement capex relating to growth based on models that took account of the number of new connections as a cost driver, even if other concerns with them remained. A comparison of these allowances is provided in Table 5 and Figure 8 below. Table 5 includes, as a further benchmark, the industry-average growth-related enhancement capex per new connection, calculated over the historical data period used for the base cost models.

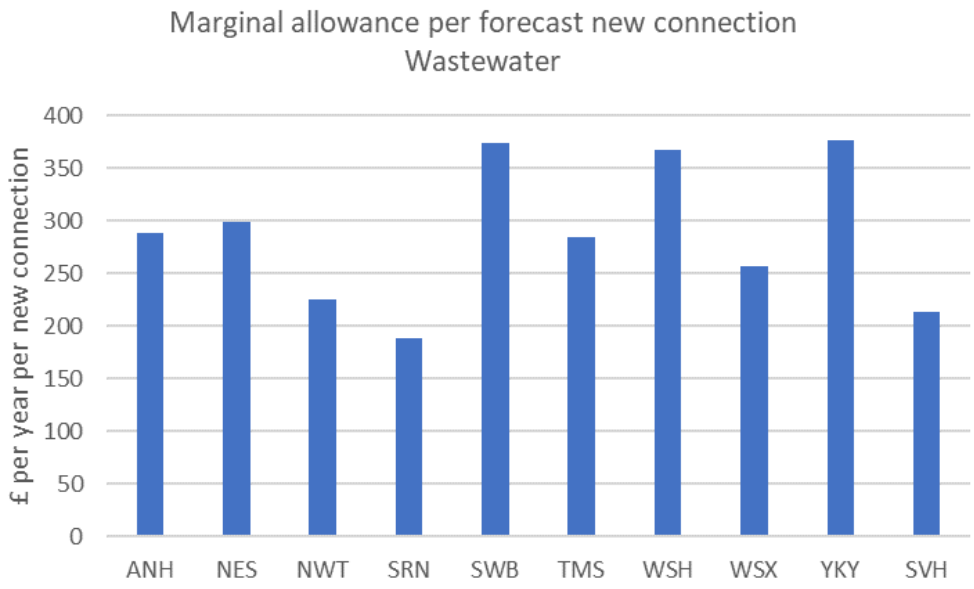
Table 5 Comparison of marginal allowances for forecast connections against other metrics

All companies	Marginal allowances for forecast new connections under DD approach (for a connection at the midpoint of the AMP7 period)	Marginal allowances for new connections enhancement capex using IAP figures	Historical industry-average growth-related enhancement capex per new connection (2012-13 to 2017-18)
Water	£139-£584	£1,126	£1,128
Wastewater	£189-£376	£1,644*-£2,026*	£1,939

*Ofwat chose the lower of the company business plan forecast and modelled costs, so marginal impact is not relevant if BP forecast is lower than modelled costs (it is for 7 companies in water and for 3 companies in wastewater)

Figure 8 Estimates of marginal allowances per forecast new connection (assumed to connect mid-period)





The marginal allowance from base models that we calculated is based on an annual allowance (so the aggregate amount per connection varies with when the connection is forecast to be made during the period). To allow the marginal allowance to be compared to the IAP allowances and historical costs, we have expressed the marginal allowance as the allowance for a property that connects at the midpoint of the AMP7 period (that is, 2.5 years from the start). And the figures used for comparison do not include any enhancement operating expenditure, which means that the scale of difference against the marginal allowances under the DD approach could be under-stated. But overall, the DD marginal allowances per forecast new connection seem smaller, and potentially far smaller, than both the IAP allowances and the historical industry-average growth-related enhancement capex per new connection.

The scale (and direction) of the modelling limitation or error will vary between companies, according to factors such as the forecast number of new connections and the unit costs of growth-related enhancement expenditure per new connection (which vary due to factors such as density and rurality).

Omission of cost drivers relating to reduced flooding risk and low pressure

Besides the number of new connections, there are other cost drivers that may have a significant impact on the growth-related expenditure that Ofwat has incorporated into the base cost models, and which are not captured by the explanatory variables.

For the purposes of this paper, we have not sought to provide a comprehensive review of potential omissions, but identify two examples and consider that the more general point applies.

Ofwat's definition of growth-related expenditure is quite broad, and includes the following categories of enhancement spend:[7]

- Expenditure for enhancing the sewerage system to reduce the risk to properties and external areas of flooding from sewers.
- Expenditure to reduce the number of properties with low pressure.

We would expect expenditure in these categories to be driven by factors besides those in Ofwat's econometric models of base costs.

The base cost allowances from the draft determinations approach are likely to include some implicit allowance for expenditure to reduce flooding risk and addressing low pressure. But these are likely to reflect the amount of expenditure across the industry as a whole and incurred during the historical data period, and would tend not to take full account of companies' individual circumstances or changes over time. Allowances may be too low for some companies and too high for others.

On expenditure relating to flooding risk Ofwat said that "investment is reasonably driven by population growth and the size of the company".[8] However, Ofwat did not provide evidence for this. Companies have suggested other factors, such as climate change, urban creep and changes in customer behaviour (e.g. paving over gardens, sewer misuse).

There may be merit in work to assess materiality of the modelling limitation that arises from Ofwat's crude approach to the treatment of flooding risk.

We do wonder how well Ofwat's approach to the price control funding of flooding risks fits with its broader regulatory policy towards the importance of tackling flooding risk, and with wider government policy in this area.

Potential worsening accuracy of econometric results and efficiency benchmarks

Besides consideration of cost drivers that may be overlooked, as discussed in previous sub-sections, a proper assessment of the case for including growth-related capital enhancement expenditure in the base cost models would involve a review of whether the modelling results indicate worsening of the accuracy of the base cost models. These models were developed through a process that excluded growth-related capital enhancement expenditure from the base models.

The issues with omitted cost drivers above would point to a significant worsening of the accuracy of the models that include growth-related capital enhancement expenditure. This may be offset, to some degree, by reductions to the sensitivity of modelling results to cost allocation between growth-

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[7] Ofwat (2019) *PR19 draft determinations: Securing cost efficiency technical appendix*, page 15.

[8] Ofwat (2019) *PR19 draft determinations: Securing cost efficiency technical appendix*, page 17.

related enhancement capital expenditure and capital maintenance expenditure, which may be interpreted and reported differently across companies.

Ofwat's technical appendix reports that its base cost models "remain robust" after including growth-related capital enhancement expenditure in its base cost models. But it does not explain this any further. A fuller analysis would cover a number of aspects such as:

- Any significant impacts on the spread of modelling results across companies (both for individual econometric models and the overall results post triangulation).
- Any significant impacts on the upper quartile efficiency adjustment, and the factors contributing to this.
- Any significant changes in estimated coefficients from the change in approach, and whether the estimated coefficients make sense from an economic and engineering basis.

This analysis should be on a like-for-like basis, focusing on the impact of including growth-related capital enhancement expenditure in the models' dependent variable while holding the rest of the data and model specifications the same. We have not sought to cover this analysis for this report.

5. Comments on interactions with the DSRA

Introduction

We comment in this section on two issues concerning the interactions between the DSRA and the approach to the allowances for growth-related totex in Ofwat's slow-track DD:

- Internal inconsistency between marginal allowances for new connections.
- Conflict with policy objectives for developer services.

We take these points in turn.

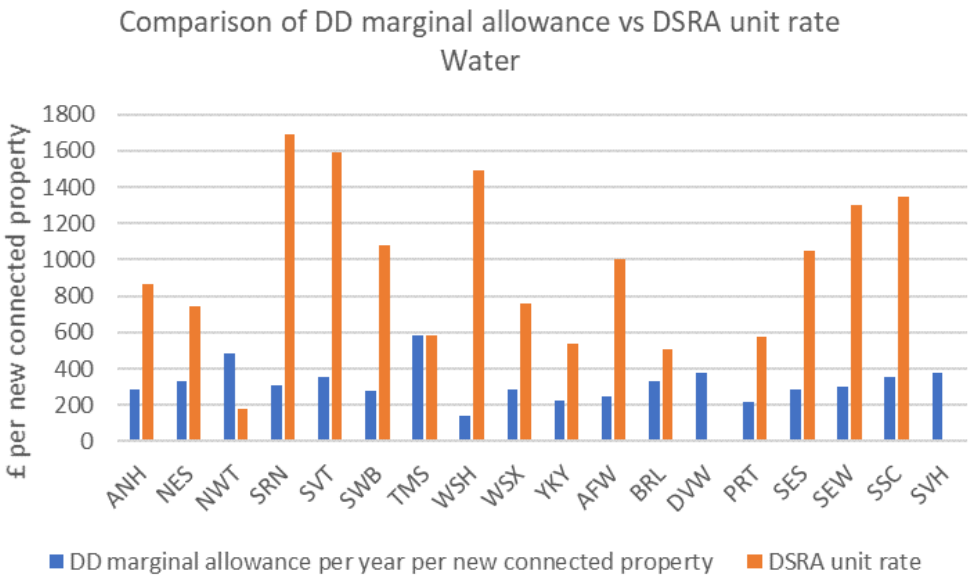
Internal inconsistency between marginal allowances for new connections

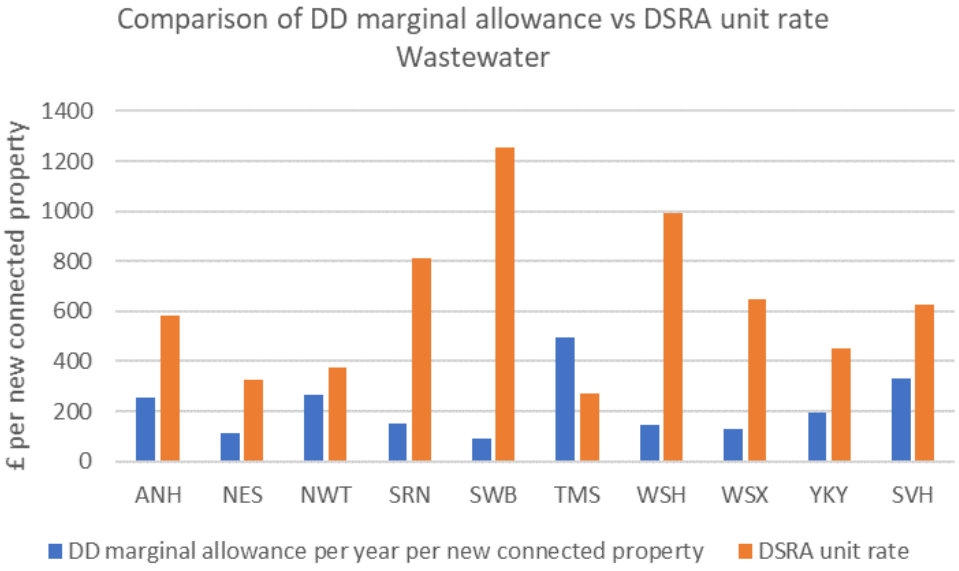
In section 2, we produced estimates of the marginal allowance, from Ofwat's base cost models, for each new connection that Ofwat forecasts over the 2020-25 period. This marginal allowance varies by company. We have compared this to the DSRA unit rates from Ofwat's DD (updated in a supplementary information note circulated to companies). If the total number of new connections over the 2020-25 is greater than assumed by Ofwat for the purposes of setting its FD allowances, the company would get an increase in allowed revenue based on the DSRA unit rate multiplied by the difference between forecast and outturn connections. We show the comparison in Figure 9.

The figures are not perfectly comparable because the marginal allowance from base models that we calculated is based on an annual allowance (so aggregate amount per connection varies with when the connection is forecast to be made during the period). But even allowing for this, the proposed adjustments under the DSRA are generally higher than the allowance per forecast new connection from the base cost models.

For new connections that are in excess of the forecasts made at the time of the price control determination, the revenue allowance per new connection would generally be far higher than for those new connections forecast at the time of the determination, especially for water. A water company may be much better off financially if Ofwat under-estimates its number of new connections in the base cost model explanatory variables, because it will get much higher revenue per new connection through the DSRA adjustment. Conversely, if out-turn numbers of new connections are lower than forecast, the much higher DSRA rate would be used to remove revenue allowances. It would not take a large shortfall to completely wipe out the DD allowance that is directly attributable to growth. This seems to reflect an internal inconsistency in Ofwat's DD approach.

Figure 9 Comparison of base cost marginal allowance per forecast connection vs DSRA unit rates (updated)





Conflict with policy objectives for developer services

We have also given some consideration to the interactions between Ofwat's new approach to growth expenditure in the DD and its broader policies on developer services.

Ofwat's policy on developer services for PR19 has reflected concerns that the design of its price control framework may mean that companies face perverse incentives to minimise the volume of new connections and which discourage companies from serving developers efficiently. Ofwat has

not provided a detailed explanation of the source of these perverse incentives, although it has cited the single till approach.[9]

Our impression is that, if companies were face perverse financial incentives to minimise the growth in new connections, this would arise because companies consider that, under the price control framework, the additional income from new connections is not sufficient to cover the additional costs from new connections. The additional costs would include infrastructure and other capital costs, operating costs and the costs of additional financing required to serve a large customer base. The additional income would include income from developer services and from wholesale tariffs (but recognising that a single till price control may mean that increases to one of these act to reduce the other). What would matter in terms of companies' financial incentives would be companies' expectations over the long-term, not the incomes and costs in a single price control period. And companies would take account of regulatory uncertainty about the recovery of costs in future price control periods.

So far in PR19, Ofwat has sought to tackle its concerns about perverse incentives in quite a narrow way, through a DSRA adjustment mechanism that is related to the income companies receive from developer services.

Ofwat's approach has not shown broader consideration of how the price control framework may lead to perceptions of shortfalls between the income and costs (including financing costs) associated with customer growth, over a long-term time horizon. Companies' expectations of the approach to cost assessment at PR24 and beyond will be influenced by Ofwat's approach at PR19.

Drawing on the concerns raised in section 4, the type of approach to cost assessment used for the draft determinations gives companies little confidence that the costs from growth in the number of customers supplied will be adequately remunerated over time.

Overall, there seems a conflict between Ofwat's policy for companies to have good financial incentives in relation to developer services and growth, and its draft determinations costs assessment which treats variations in growth rates, over time and across companies, as a rounding error.

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[9] Ofwat (2017) *Delivering Water 2020: Our methodology for the 2019 price review Appendix 7: Wholesale revenue incentives*, pages 18-21.