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# Template and guidance for the submission of base econometric cost models ahead of the spring 2023 consultation

Ofwat

# About this document

This document sets out the template companies should use to submit proposed base (that is, wholesale base and residential retail) econometric cost models to us as part of the modelling consultation process for PR24. The template builds on the PR19 template used for the March 2018 econometric cost modelling consultation. The models received as part of this submission will be considered for inclusion in the base cost modelling consultation scheduled for spring 2023. They will help inform a robust set of cost models that can be used to set efficient wholesale base and residential retail expenditure allowances at PR24.

We also include guidance to support companies in the model development process and when completing the template.

Companies should submit their proposed econometric cost models to us by no later than **Thursday 12 January 2023** to allow us enough time to consider for inclusion in the spring 2023 modelling consultation.

## Responding to the model submission

We invite companies to submit their proposed wholesale base and residential retail econometric cost models to us by no later than **Thursday 12 January 2023.**

Please email your submission to CostAssessment@ofwat.gov.uk.

If you wish to discuss any aspect of this submission, please contact Daniel Mitchell by email at CostAssessment@ofwat.gov.uk.

We intend to publish the submissions received on our website at www.ofwat.gov.uk. Subject to the following, by providing a submission you are deemed to consent to its publication.

If you think that any of the information in your response should not be disclosed (for example, because you consider it to be commercially sensitive), an automatic or generalised confidentiality disclaimer will not, of itself, be regarded as sufficient. You should identify specific information and explain in each case why it should not be disclosed (and provide a redacted version of your response), which we will consider when deciding what information to publish. At a minimum, we would expect to publish the name of all organisations that provide a written response, even where there are legitimate reasons why the contents of those written responses remain confidential.

In relation to personal data, you have the right to object to our publication of the personal information that you disclose to us in submitting your response (for example, your name or contact details). If you do not want us to publish specific personal information that would enable you to be identified, our privacy policy explains the basis on which you can object to its processing and provides further information on how we process personal data.

In addition to our ability to disclose information pursuant to the Water Industry Act 1991, information provided in response to this submission, including personal data, may be published or disclosed in accordance with legislation on access to information – primarily the Freedom of Information Act 2000 (FoIA), the Environmental Information Regulations 2004 (EIR) and applicable data protection laws.

Please be aware that, under the FoIA and the EIR, there are statutory Codes of Practice which deal, among other things, with obligations of confidence. If we receive a request for disclosure of information which you have asked us not to disclose, we will take full account of your explanation, but we cannot give an assurance that we can maintain confidentiality in all circumstances.

# Contents

# 1. Introduction

This document sets out the template, and accompanying guidance, that companies should use to submit proposed base (that is, wholesale base and residential retail) econometric cost models to us as part of the modelling consultation process for PR24.

We use econometric benchmarking models to set efficient expenditure allowances for wholesale base and residential retail costs. Econometric cost models allow us to compare costs between companies on a like-for-like basis by accounting for multiple factors that drive differences in costs between companies (such as company size, population density, etc.) and over time.

We have confidence in our PR19 econometric cost models, developed through an extensive consultation process, which began in 2016. We had extensive input from the sector and the models are consistent with engineering insight. We are keen to build on our PR19 approach and, where appropriate, will make improvements for PR24.

As set out in our PR24 draft methodology,[1] as part of the next phase of work we invite companies to submit any new or refined econometric cost models to us for consideration by no later than **Thursday 12 January 2023**.

To support the model development process, **we have published updated datasets on our website for wholesale water, wastewater and residential retail, and the relevant Stata do-files** which build the panel dataset and replicate the PR19 econometric model specifications. The datasets and Stata do-files can be found at the following link: PR24 – Cost assessment datasets – Ofwat.

We expect companies to submit a **refined selection of econometric cost models**. We expect all models submitted to meet our PR24 base cost assessment principles set out in our PR24 draft methodology:[2] [3]

1. **Data used is good quality**
2. **Consistent with engineering, operational and economic rationale**
3. **Sensibly simple and transparent**
4. **Focus on exogenous cost drivers**
5. **Robust econometric cost models**
6. **Set a stretching but achievable cost efficiency challenge**

[1] Ofwat, 'Creating tomorrow, together: consulting on our methodology for PR24. Appendix 9 – Setting expenditure allowances', July 2022, p. 21.
[2] Ofwat, 'Creating tomorrow, together: consulting on our methodology for PR24. Appendix 9 – Setting expenditure allowances', July 2022, p. 12, Figure 2.1.
[3] We note that principles 6 and 7 are less relevant for the purpose of econometric cost modelling, but form part of our overall approach to base cost assessment.

## 7. A coherent cost assessment approach that drives the right incentives

A more detailed description of our PR24 base cost assessment principles can be found in our December 2021 base cost consultation and Section 2.1.1 in Appendix 9 of our draft methodology.[4] [5]

We also expect each model to be assessed against the model robustness tests set out in the template in Section 2 and described in more detail in Section 4.

**We ask companies to submit the following material** to allow us to compare and replicate model results as easily as possible given the tight timelines we are working to:

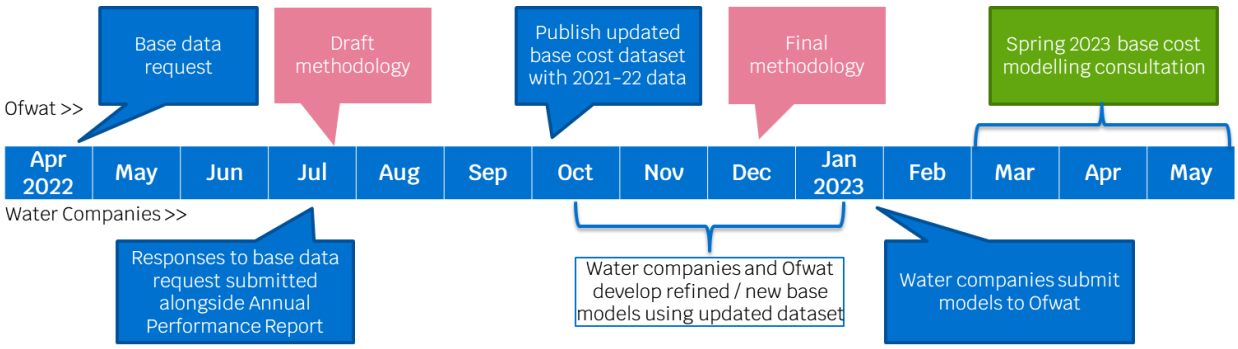
- the **completed model submission template**, completed with information on each econometric cost model proposed. The template is presented below and includes guidance on how to complete it. Please complete the template separately for wholesale water, wholesale wastewater and residential retail models;
- the **dataset** underlying the proposed econometric cost models;
- the **Stata do-file** used to run the proposed econometric cost models;
- the **Stata regression output** displaying the coefficients of each cost model, the p-values, and the statistical diagnostics; and
- a workbook displaying the **calculation of the distribution of efficiency scores** for each proposed cost model (ie the calculation behind the chart / table to be included in the model submission template).

The models received as part of this submission will be considered for inclusion in the base cost modelling consultation scheduled for spring 2023. The models received, alongside our own independently developed models, will help inform a robust set of cost models that can be used to set efficient wholesale base and residential retail expenditure allowances at PR24. We note that the inability to replicate model results submitted by companies could lead to the modelling consultation being delayed, and may lead to those models not being considered for inclusion in the spring 2023 modelling consultation.

The figure below presents econometric cost modelling timeline up until spring 2023.

[4] Ofwat, '[Assessing base costs at PR24]', December 2021.
[5] Ofwat, '[Creating tomorrow, together: consulting on our methodology for PR24. Appendix 9 – Setting expenditure allowances]', July 2022, Section 2.1.1.

## Figure 1.1: PR24 econometric cost modelling timeline until spring 2023




Source: Ofwat PR24 draft methodology

The remainder of this document is structured as follows:

- section 2 presents the template for submission of econometric models for consideration ahead of the spring 2023 modelling consultation;
- section 3 discusses some of the key econometric input assumptions; and
- section 4 discusses the assessment of model robustness.

# 2. Template for submission of econometric models for consultation

## Econometric model formula:

1. Eg PR19 model WW1: $\ln(\text{WW botex plus growth}_{it}) = \alpha + \beta_1 \ln(\text{properties}_{it}) + \beta_2$ (% water treated at levels $3\text{-}6_{it}$) $+ \beta_3 \ln(\text{weighted average density LAD}_{it}) + \beta_3 (\ln(\text{weighted average density LAD}_{it}))^2 + \beta_4 \ln(\text{booster pumping stations per length of mains}_{it}) + \varepsilon_{it}$

2. …

3. …

## Description of the dependent variable

Please include a description of the dependent variable used for each model (including the relevant identifier / Bon code where available), and indicate where the variable used departs from the dependent variables reported in the published PR24 datasets.

Eg Wholesale water botex including network reinforcement (code: Botex+NR_WW in Interface_real), as reported in the published PR24 wholesale dataset.

## Description of the explanatory variables

Please include a brief description of the independent variables used in each model (including the relevant identifier / Bon code where available), particularly any new variables not included in the published PR24 datasets.

Eg Total properties (code: properties), as reported in the published wholesale dataset.

## Brief comment on the models

Please include any relevant comments on the proposed models. This should include:

- the number of years covered in the sample, and any differences in the panel structure that deviate from the published do-file;
- comments on the relative performance of the models across levels of aggregation; and
- any other relevant factor such as correlation between the explanatory variables.

Guidance on how to complete the table below is included in section 4 of this document. The first column in the table has been filled in with an illustrative example. Numbers are fictional.

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| **Dependent variable** | Botex including network reinforcement | | | | |
| **Explanatory var 1** | Estimated coefficient (p value) | | | | |
| **Explanatory var 2** | 1.068*** (0.000) | | | | |
| **Explanatory var 3** | 0.006*** (0.000) | | | | |
| **…** | | | | | |
| **Constant** | -1.378* (0.074) | | | | |
| **Estimation method (OLS or RE)** | RE | | | | |
| **N (sample size)** | 187 | | | | |
| **Model robustness tests** | | | | | |
| **R2 adjusted** | 0.969 | | | | |
| **RESET test** | 0.568 | | | | |
| **VIF (max)** | 3.504 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Pooling / Chow test** | 0.977 | | | | |
| **Normality of model residuals** | 0.274 | | | | |
| **Heteroskedasticity of model residuals** | 0.246 | | | | |
| **Test of pooled OLS versus Random Effects (LM test)** | 0 | | | | |
| **Efficiency score distribution (min and max)** | Min: 0.82<br>Max: 1.31 | | | | |
| **Sensitivity of estimated coefficients to removal of most and least efficient company** | A | | | | |
| **Sensitivity of estimated coefficients to removal of first and last year of the sample** | G | | | | |

## Efficiency scores distribution

Please include a chart / table showing the distribution of efficiency scores from smallest to largest for each proposed model (including labels with the company names). Efficiency scores are calculated as:

$$\text{Efficiency scores} = \frac{\text{(Company's outturn cost in the last 5 years of the sample)}}{\text{(Company's predicted cost in the last 5 years of the sample)}}$$

The Stata code to calculate efficiency scores for each model has been included in the published do-file.

Please include the data behind the chart / table in a separate workbook, as indicated in the guidance.

## Comments

- Please indicate the units of the explanatory variable, and whether it was expressed in logs.
- Use asterisks to denote significance level: *** (1%), ** (5%) and * (10%)
- P values should be based on cluster robust standard errors
- In the case of random effects please report Stata's output "R2 overall"
- Please use the following naming convention to assign a name to each model: company acronym, level of aggregation, model number (eg for Anglian Water's wholesale water model number 1: ANHWW1). Please refer to the table below for company acronyms and level of aggregation acronyms.

| Company acronyms | Level of aggregation acronyms |
|---|---|
| Anglian Water: ANH<br>Hafren Dyfrdwy: HDD<br>Northumbrian Water: NES<br>Southern Water: SRN<br>Severn Trent England: SVE<br>South West Water: SWB<br>Thames Water: TMS<br>United Utilities: UUW<br>Dŵr Cymru: WSH<br>Wessex Water: WSX<br>Yorkshire Water: YKY<br>Affinity Water: AFW<br>Bristol Water: BRL<br>Portsmouth Water: PRT<br>SES Water: SES<br>South East Water: SEW<br>South Staffs Water: SSC | **Wholesale water**<br>Treated water distribution: TWD<br>Water resources plus: WRP<br>Water network plus: WWNP<br>Wholesale water: WW<br><br>**Wholesale wastewater**<br>Sewage collection: SWC<br>Sewage treatment: STW<br>Bioresources: BR<br>Wastewater network plus: WWWNP<br>Bioresources plus: BRP<br><br>**Residential retail**<br>Bad debt related costs: RDC<br>Other costs: ROC<br>Total costs: RTC |

# 3. Key econometric model input assumptions

This section provides guidance on key input assumptions we suggest companies use when developing econometric models for consideration as part of the spring 2023 consultation. This will facilitate a like-for-like comparison between econometric models submitted by different companies. We expect companies to clearly describe and explain any deviations from the assumptions set out in this section.

## 3.1 Data used

We invite companies to use the datasets and accompanying Stata do files published here: PR24 - Cost assessment datasets - Ofwat. There are three master datasets published: wholesale water, wholesale wastewater, and residential retail. There is also an accompanying 'large STWs dataset' to facilitate testing of alternative explanatory variables to capture economies of scale at sewage treatment works.

## 3.2 Levels of aggregation adopted

We invite econometric cost models on the following areas:

- wholesale water base costs;
- wholesale wastewater base costs; and
- residential retail costs.

We invite companies to develop cost models at different levels of aggregation.

Table 3.1 below includes an indication of the levels of aggregation we invite companies to submit cost models on. For residential retail, we welcome econometric cost models at both the bottom-up levels of aggregations (for example, bad debt related costs and other costs) and at the top-down level (total costs).[6]

[6] On residential retail, we expect the focus to be on improving the PR19 approach. However, we are also open to suggestions in relation to different cut offs of the dependent variable (ie bottom up models at different levels of aggregations), should companies have any reasonable suggestions in this space that improve our modelling approach from PR19. This is particularly in consequence of the impact of Covid-19 on bad debt provisions.

### Table 3.1: Levels of aggregation for the development of econometric cost models

| | Wholesale water base costs | Wholesale wastewater base costs | Residential retail |
|---|---|---|---|
| **Levels of aggregation** | • Water resources plus (ie water resources plus raw water distribution plus water treatment)<br>• Treated water distribution<br>• Wholesale water | • Sewage collection<br>• Sewage treatment<br>• Wastewater network plus (ie sewage collection plus treatment)<br>• Bioresources<br>• Bioresources plus (ie sewage treatment plus bioresources)[7] | • Bad debt related costs<br>• Other costs<br>• Total costs |

## 3.3 Panel structure and sample period

We invite companies to adopt the same panel structure set out in the published Stata do-files. This will enable like-for-like comparison of the econometric models we receive from companies.

Regarding the treatment of company mergers:

- Wholesale water and residential retail:
  - South West Bournemouth (SWB) is used from 2011-12 onwards, instead of South West Water (SWT) and Bournemouth Water (BWH) separately. This allows additional explanatory variables to be tested within the econometric models (where data is not available for SWT and BWH separately).
  - Severn Trent Water (SVT) and Dee Valley (DVW) are used up to 2017-18. Severn Trent England (SVE) and Hafren Dyfrdwy (HDD) are used from 2018-19 onwards.
- Wholesale wastewater:
  - The combined entity of Severn Trent England (SVE) and Hafren Dyfrdwy (HDD) is used for the entire sample period (2011-12 onwards).

For the sample period, the Stata do file follows the proposal set out in our draft methodology, which sets out our intention to use the full historical data series available to develop base cost models at PR24.[8] For wholesale water and wastewater, our sample includes years from 2011-12 to 2021-22 (11 years), while for residential retail our sample includes years from 2013-14 to 2021-22 (9 years).

[7] We expect the focus to be on the development of separate bioresources and wastewater network plus models, but bioresources plus models can be developed as a cross check.
[8] Ofwat, 'Creating tomorrow, together: consulting on our methodology for PR24. Appendix 9 – Setting expenditure allowances', July 2022, pp. 18-19.

## 3.4 Dependent variable adopted

The published datasets and accompanying Stata do files include a range of calculated dependent cost variables:

- wholesale water: (i) botex, and (ii) botex plus network reinforcement expenditure;
- wholesale wastewater: (i) botex, and (ii) botex plus network reinforcement and reducing risk of sewer flooding enhancement expenditure;
- bioresources: (i) botex; (ii) botex plus sludge growth enhancement expenditure; and (iii) opex plus depreciation plus financing costs; and
- residential retail: (i) costs using companies' original doubtful debt data, and (ii) costs using companies' resubmitted smoothed doubtful debt data.

We invite companies to use the following definitions of the dependent variables as a starting point for model development to facilitate like-for-like comparison between models proposed by different companies:

- wholesale water: (ii) botex plus network reinforcement expenditure; and
- wholesale wastewater: (ii) botex plus network reinforcement and reducing risk of sewer flooding enhancement expenditure.

For residential retail, we invite companies to assess both the dependent variable including original doubtful debt data and the dependent variable including smoothed doubtful debt data as part of their modelling.

For bioresources, we invite companies to develop models under all three definitions of the dependent variable defined above, which reflects options set out in Appendix 4 of our draft methodology.[9]

Other definitions of the dependent variable can be used as part of model robustness testing.

## 3.5 Model estimation method

Our published Stata do-files calculate regression outputs under both pooled ordinary least squares (OLS) and random effects (RE).

As a starting point, we invite companies to use random effects to estimate their econometric cost models, as set out in our draft methodology.[10] The Stata do file includes the Breusch-

[9] Ofwat, 'Creating tomorrow, together: consulting on our methodology for PR24. Appendix 4 - Bioresources', July 2022.
[10] Ofwat, 'Creating tomorrow, together: consulting on our methodology for PR24. Appendix 9 - Setting expenditure allowances', July 2022, pp. 19-20.

Pagan LM test as a sense check, which can be used to test whether pooled OLS or random effects is the most efficient estimator.

We note that several of the statistical diagnostic tests require the use of OLS, hence why the Stata do files allow the models to be estimated using both pooled OLS and random effects.

# 4. Assessing model robustness

We expect all models submitted to us for consideration ahead of the spring 2023 modelling consultation to meet our base cost assessment principles set out in our PR24 draft methodology. 'Robust econometric cost models' is one of the principles. This means the econometric cost models should accurately predict and forecast efficient costs and be robust to scrutiny.

Econometric cost models should be underpinned by **clear engineering, operational and economic logic**. This is a necessary but not sufficient condition when assessing model robustness. It is also necessary to:

- ensure the estimated coefficients are of the **right sign and of plausible magnitude**;
- assess the **predictive power** of the model (eg R-squared; can the econometric cost models accurately forecast the efficient expenditure of companies going forward);
- evaluate the **statistical validity** of the model across a range of statistical diagnostic tests (eg statistical significance of individual parameters, RESET test for omitted non-linearities, multicollinearity test, etc.); and
- assess if the estimated model results are **stable / robust to changes in the underlying assumptions and data** (eg different sample period; alternative model specification).

Table 4.1 below includes a range of model robustness tests that should be used to assess each econometric cost model, each with its relative degree of importance. The key for the level of importance assigned to each test is as follows:

- high – failure of these tests and criteria would raise serious concerns about using the model;
- medium – failure of these tests and criteria would raise concerns about using the model, but the model could still be used with caution if it passes other tests; and
- low – failure of these tests and criteria would raise relatively limited concerns about using the model.

It is important to **consider the relevant importance of each test result when developing and selecting econometric models**, and none of these robustness tests should be interpreted as a mechanistic rule for the rejection or acceptance of the models. **Statistical diagnostics and robustness tests can provide useful guidance as we develop models, but they should not alone drive our model selection.** For example, it may be appropriate to include variables that are marginally statistically significant if they produce intuitive results that reflect engineering, operational and/or economic logic. It is also important to make sure that explanatory variables that are statistically significant are underpinned by clear engineering, operational and/or economic logic.

We recognise that any one econometric model may not pass all model robustness tests and setting such a high standard may make it impossible to develop any econometric cost models for PR24. This would not be a desirable outcome given the importance of econometric cost models in reducing information asymmetry between ourselves and water companies.

We expect judgement to be exercised in the assessment against model robustness tests, and the econometric cost models submitted to us for consideration ahead of the spring 2023 consultation to be **robust in the round**.

Unless otherwise specified, the p-values we use as reference for the statistical tests in the table below are:

- 0.01 or 1% significance level, indicated by three asterisks (***) in the Stata regression output;
- 0.05 or 5% significance level, indicated by two asterisks (**) in the Stata regression output; and
- 0.1 or 10% significance level, indicated by one asterisk (*) in the Stata regression output.

### Table 4.1: Assessing model robustness

| Test | Importance | Explanation and comments |
|---|---|---|
| **Engineering, operational and economic rationale** | | |
| Consistency with prior expectations of sign and magnitude of estimated coefficients | High | The estimated model coefficients must be consistent with engineering, operational and economic logic. Assessing the estimated coefficients against a-priori expectations is an important check to ensure that we do not include variables that appear statistically related but where there is no clear rationale for their inclusion. |
| **Predictive and forecasting power of models** | | |
| Goodness of fit (adjusted $R^2$) | High | The adjusted R-squared measures how accurately the model fits the data. It measures the proportion of variation in the dependent variables (in our case, variation in costs) that can be explained by the model.<br>The statistic ranges from 0 to 1. **The higher the value the better the model fits.**<br>Importantly, R2 measures should only be used to compare models with the same dependent variable.<br>If a model failed to explain a significant share of the costs of the industry, it would be inappropriate to use it for the estimation of costs. But equally, a strategy of searching for a model with a high R-squared has the risk of finding a model that fits the data well but is in fact incorrect. Because rather than reflecting the true underlying relationship, the model could be capturing accidental features of the data at hand. Like all the statistical diagnostics included in this table, the R-squared should not be used mechanistically. |
| Efficiency score distribution | Medium | Efficiency scores can be calculated for any given model as the ratio between a company's outturn costs and predicted modelled costs in the last 5 years of the sample. We expect efficiency scores to be in a sensible range. A large range of efficiency scores could indicate the presence of issues in the underlying model, such as the presence of omitted variables. |

| | | |
|---|---|---|
| | | The distribution of efficiency scores can help inform decisions on model selection across models at the same level of cost aggregation. |
| **Statistical diagnostic tests** | | |
| Statistical significance of individual parameters (t-test) | High | The p-value of the t test gives the probability of observing the estimated coefficient (or one more extreme) if the true value was in fact zero. A lower value indicates a lower probability of observing the estimated coefficient if the true value was zero, and can thus be interpreted as giving a higher degree of confidence that the true value is not zero – ie that there is a relationship between the dependent and explanatory variables. In practice, the p-value indicates our confidence in the estimated coefficient. **The lower the p-value, the more confident we are in the value of the estimated coefficient.**<br>Coefficients could fail this test due to absence of a relationship between the cost driver and the dependent variable, but also due to limitations in the data or multicollinearity.<br>A higher p-value indicates a lower level of statistical significance (ie there is less confidence in the value of the estimated coefficient). However, there is a wide range of confidence levels in this category. Statistical significance of 80% and even 70% may be deemed valid in practical work. |
| RESET test | Medium | This is a test to detect an inadequate functional form. For example, missing non-linear terms (eg quadratic).<br>However, failure of this test does not automatically mean that the linear relationship is wrong, but that other options should be explored. If alternative specifications using non-linear terms in the models do not lead to successful results, then failure of the RESET test on its own may not be a valid justification to dismiss a model. This is particularly the case if it is considered that the model offers useful information from an economic or engineering perspective.<br>**The higher the p-value, the more confident we are that the functional form is adequate.** |
| Variance Inflation Factor (VIF) | Medium | This test is used to detect multicollinearity. High collinearity means that we cannot estimate the coefficients with confidence – their variance is high and statistical significance low. As a consequence, the individual coefficient estimates are not precise and unstable. **As a rule of thumb, a VIF >4 indicates medium risk and VIF >10 indicates harmful collinearity.**<br>**An exception to this rule is when the model includes a variable and its quadratic term.** In such cases the VIF becomes high due to the correlation between these two related terms. But while the high collinearity may impair our ability to accurately estimate the impact of the individual terms on the dependent variable, it should not impair our ability to accurately estimate their collective impact. Since these two terms always move together, the collective impact is what is important. |
| Pooling/Chow test | Medium | This is a test to determine the appropriateness of using a panel dataset structure. When using a panel data estimation method, we assume that the estimated coefficients in the model are stable over time – ie the null hypothesis of this test is that the slope of the estimated relationship is stable over time. If the null hypothesis is rejected, it would imply that each individual cross-section has its own slope, and the panel data analysis may not be appropriate.<br>**The higher the p-value, the more confident we are that panel data analysis is appropriate.** |

| | | |
|---|---|---|
| Normality test | Low | Obtaining the best estimates using OLS requires the model residuals to be normally distributed with an average of zero and a constant variance. If this assumption is violated, the model estimation results are still unbiased and consistent. Hence, a low level of importance is attached to these test results. **Both tests are failed for lower p-values.**<br>If the normality test fails, it would suggest that the model residuals are not normally distributed.<br>If the heteroskedasticity test fails, it means that the variance of the model residuals is not constant across observations. If the test fails, different measures could be introduced to address the issue (eg use cluster standard errors). |
| Heteroskedasticity test | Low | |
| Breusch-Pagan LM test | Low | This is a test for pooled OLS versus random effects. **This test is failed for lower p-values.** Failure of this test would indicate that the random effects estimation method is preferred over the pooled OLS estimation. |
| **Sensitivity of model estimation results to changes in the underlying sample** | | |
| Sensitivity of estimated coefficients to removal of most and least efficient company | Medium | This is a test to assess robustness of the model to changes in the underlying assumptions. Robustness under the first test should be assessed by removing the most efficient company, and separately the least efficiency company from the sample. Robustness under the second test should be assessed by removing the first year of the sample, and separately the last year of the sample.<br>Results of the test should be reported **using the following RAG rating (the lower the rating, the less confident we are in model stability)**:<br>• Red (R): the estimated coefficients present changes in both significance and sign;<br>• Amber (A): the estimated coefficients present some changes in significance but not in sign; and<br>• Green (G): the estimated coefficients do not present changes in significance or sign. |
| Sensitivity of estimated coefficients to removal of first and last year of the sample period | Medium | |

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Ofwat
Centre City Tower
7 Hill Street
Birmingham B5 4UA
Phone: 0121 644 7500



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Any enquiries regarding this publication should be sent to mailbox@ofwat.gov.uk.

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