Europe Economics

Response to New Points on Frontier Shift and Real Price Effects (RPEs) made by Companies and their Consultants following CMA's Provisional Findings

5 November 2020

Contents

Executive Summary

This note responds to the new points made by companies and their consultants in their response to the CMA's provisional findings.

The table below summarises this note. The first column sets out the new points to which we are responding, and the second column summarises our response.

Summary of our response to new points made by companies and their consultants

New point made by companies / their consultants	Our response
Northumbrian Water proposes a 0.4 per cent reduction to the 2020/21 frontier shift estimate to account for the productivity impacts and cost changes associated with the COVID-19 crisis.	The COVID-19 pandemic has led to cost increases as well as cost savings for water companies. Northumbrian's proposed adjustment appears only to take account of negative cost impacts and to ignore areas where the COVID-19 crisis has led to reductions in costs.
Northumbrian Water states that four of the six comparator sectors identified by Europe Economics have seen a decrease in labour productivity as a result of the COVID-19 crisis.	ONS data show that labour productivity in the water sector has actually increased since the start of the COVID-19 crisis, suggesting that the water sector has not been affected by the pandemic in the same way as comparator sectors.
Oxera (on behalf of Yorkshire Water and the Energy Networks Association) claims that "Professional, scientific, technical, administrative and support service activities" is less relevant as a comparator for wholesale activities.	The sector in question meets both criteria used to identify relevant wholesale comparators: first, it is a competitive sector; and second, it captures a range of activities which share similarities with the nature of tasks undertaken by the wholesale water sector. Finally, there is regulatory precedent for using the sector as a comparator for the water sector.
Oxera (on behalf of Yorkshire Water and the Energy Networks Association) argues that an adjustment for embodied technical change requires an offsetting quality adjustment to outputs.	It is conceptually wrong to offset an adjustment for embodied technical shift by stripping out the quality adjustments that have been made to outputs, since efficiency improvements can take the form of either more output or higher quality output.
Oxera (on behalf of Yorkshire Water and the Energy Networks Association) states that the impact of embodied technical change is both negative and insignificant.	Oxera's argument is based on a report by Economics Insight which produced results that are not credible due to a methodological flaw. In particular, Economic Insights' econometric equations appear to be mis-specified and it was using data that was already adjusted for embodied technical change (leaving no residual effect in its data for it to identify).
The Energy Network Association claims that an uplift for embodied technical change implicitly assumes that the water sector invests more than other sectors in innovation, and can thus outperform productivity growth in relevant benchmark sectors.	TFP estimates in any sector would need to be uplifted for embodied technical change to give an estimate of total technical change. Hence, the uplift for embodied technical shift does not assume that the water sector can outperform comparator sectors or that it invests more than other sectors in innovation.
The Energy Network Association states that value-added TFP estimates can only be applied to costs excluding intermediate inputs.	Our previous report showed that even accounting for this issue, value-added TFP estimates continue to suggest a higher frontier shift assumption than gross output TFP estimates.

Anglian Water referred to the frontier shift set by the Utility Regulator in Northern Ireland at PC 21 to argue that the frontier shift figure set by the CMA is very challenging.	The Utility Regulator's draft frontier shift decision for Northern Ireland Water is not a useful precedent as it uses an inappropriate comparator sector and fails to consider embodied technical change.
Northumbrian Water argues that the Average Weekly Earnings (AWE) electricity, gas and water supply index should be used for the wage true-up mechanism in place of the Annual Survey of Hours and Earnings (ASHE) manufacturing index proposed by Ofwat.	The index proposed by Northumbrian Water is not suitable for use in the true-up mechanism, as it includes furloughed workers, is affected by changes in hours worked, is subject to higher sampling variability and is not independent of water companies' own pay awards.
Northumbrian Water argues in favour of an energy RPE with an end of period reconciliation based on a forecast of its electricity costs over AMP7 produced by Cornwall Insight.	The projections of future power prices used by Cornwall Insight are too high since the impact of RIIO-2 price controls does not appear to have been taken into account.

Section 1 of this paper provides our full response to new points on frontier shift, and Section 2 provides our full response to a new point on real price effects (RPEs).

1 Response to New Points on Frontier Shift

This note responds to points made by Northumbrian Water, Anglian Water, the Energy Networks Association and Oxera (on behalf of Yorkshire Water and the Energy Networks Association) on the following issues:

- whether the COVID-19 crisis necessitates a reduction to the frontier shift assumption for 2020/21;
- whether "Professional, scientific technical, administrative and support service activities" is a relevant comparator for wholesale water activities;
- whether an uplift for embodied technical change is appropriate;
- the application of value-added TFP estimates; and
- whether a recent regulatory precedent by the Utility Regulator suggests that a frontier shift challenge of 1 per cent is "very challenging".

We consider each of these issues in turn below. In each case, we summarise the point made by the company or their consultant and then provide our response.

The COVID-19 crisis has led to cost savings for water companies as well as cost increases

Northumbrian Water argues that an adjustment to the 2020/21 frontier shift assumption is required given the exceptional circumstances associated with the COVID-19 pandemic and its impact on productivity. The company provides examples of some ways in which the pandemic has affected its operations (e.g. changes in operating procedures due to additional safety and welfare requirements, changes in working procedures to comply with social distancing requirements, or supply chain disruptions) and argues that this has increased the costs of its capital programme. In light of these considerations, it proposes that the 1 per cent frontier shift assumption should be reduced by 0.4 per cent[1] for 2020/21.[2]

The Energy Networks Association also argued that effect of the COVID-19 crisis on frontier shift must be considered.[3]

The information asymmetry that exists between the CMA and the regulated companies means that companies face an incentive to provide high cost estimates to the CMA in order to try to influence the CMA to set allowed revenues at a higher level.

Given this informational asymmetry, water companies (including Northumbrian Water) have an incentive to report cost areas where their costs have increased as result of the pandemic (e.g. due to increased health and safety measures and social distancing requirements), while keeping silent about areas where their costs have decreased.

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[1] Northumbrian Water notes that the reduction equals to the 0.8% impact on costs identified by the company multiplied by the capex share of totex based on the Total PAYG rate.

[2] Northumbrian Water (October 2020): "NWL PR19 CMA Redetermination – Response to Provisional Findings", p.15-16, available at: https://assets.publishing.service.gov.uk/media/5f97f52dd3bf7f35ea0aedcc/NWL_Response_to_PFs_26.10.20_---.pdf

[3] Energy Networks Association, "Ofwat Price Determinations: Response to the CMA's Provisional Findings by Energy Networks Association", p.32-33, available at: https://assets.publishing.service.gov.uk/media/5f9bf463e90e0704207029f3/Energy_Networks_Association.pdf

By way of example, areas where water company costs are likely to have decreased as a result of the COVID-19 crisis include:

- Travel and discretionary expenses, due to the significant reduction in travel since the start of the pandemic. This impact is expected to persist at least for some time in the future.
- Developer services costs, which are likely to have fallen due to these services being (temporarily) reduced or stopped following the introduction of lockdowns and social distancing measures.

Further, companies have also seen some delays and re-prioritisation in their capital programmes, although any mitigation measures and the net effect of these impacts remains unknown.

Hence, we disagree with Northumbrian Water's proposed adjustment to frontier shift in 2020/21 to take account of the COVID-19 crisis, as the adjustment appears only to take account of negative cost impacts and to ignore the areas in which the COVID-19 crisis has led to reductions in water company costs.

ONS data show that the COVID-19 crisis has increased labour productivity in the water sector

To support its argument relating to the impact of the COVID-19 crisis on productivity, Northumbrian Water argues that four of the six comparator sectors identified by Europe Economics have seen a decrease in labour productivity as a result of the pandemic. Further, it claims that the two comparator sectors that saw an increase in labour productivity (other manufacturing, and chemical & pharmaceutical products) are likely to have been positively affected by the pandemic, whereby increased demand for such products has increased labour productivity through higher capital utilisation.[4]

In arguing that the effect of the COVID-19 crisis on frontier shift must be considered, the Energy Networks Association also refers to ONS productivity data. It states that even though productivity may have increased in some sectors due to the pandemic, most sectors of the economy have seen a significant fall in labour productivity.[5]

However, analysis of the ONS labour productivity statistics[6] cited by Northumbrian Water and the Energy Networks Association reveals that labour productivity (measured by output per hour) has actually increased by 14 per cent between Q1 and Q2 2020 in the water sector itself. This is shown in the final column of the table below.

Further, data on gross value added (GVA) suggest that the decrease in GVA in most of the comparator sectors is primarily driven by the reduction in hours worked rather than a decrease in labour productivity (as measured by output per hour). In the water sector itself, only a small reduction in GVA of six per cent was observed, which is several orders of magnitude lower than the reduction in GVA reported for comparator sectors.[7] Further, this small GVA reduction in the water sector was entirely driven by reduced hours and not at all by labour productivity (since labour productivity actually increased in the water sector).

[4] Northumbrian Water (October 2020): "NWL PR19 CMA Redetermination – Response to Provisional Findings", p.15.

[5] Energy Networks Association, "Ofwat Price Determinations: Response to the CMA's Provisional Findings by Energy Networks Association", p.33.

[6] ONS (August 2020): "Flash productivity by section" dataset, available at: https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/datasets/flashproductivitybysection

[7] The exception is the chemicals & pharmaceutical products sector where output as increased between Q1 and Q2 2020, where the increase is likely to be associated with increased demand for such products due to the pandemic.

Table 1.1: ONS labour productivity (output per hour) for selected industries

% change Q1 to Q2 2020	Other manufacturing	Chemical & pharmaceutical products	Other machinery and equipment	Construction	Transport and storage	Professional, scientific and technical activities	Water supply
GVA	-24%	2%	-29%	-35%	-30%	-20%	-6%
Hours worked	-25%	-2%	-24%	-27%	-22%	-12%	-17%
Output per hour	2%	3%	-7%	-11%	-11%	-10%	14%

Source: Europe Economics analysis of ONS data.

Hence, analysis of labour productivity data suggests that the water sector has not been affected by the pandemic in the same way as comparator sectors have, and that the COVID-19 crisis has actually led to increased labour productivity[8] in the water sector.

"Professional, scientific technical, administrative and support service activities" is a relevant comparator for wholesale water activities

Oxera (on behalf of Yorkshire Water[9] and the Energy Networks Association[10]) argues that "Professional, scientific, technical, administrative and support service activities" is less relevant as a comparator for wholesale activities and more relevant for retail activities.

We disagree with Oxera, Yorkshire Water and the Energy Networks Association's argument that this sector is not a relevant comparator for wholesale activities.

As our final report explained, our selection of comparators was guided by two principal criteria: (i) whether the sector is competitive; and (ii) whether the sector is similar to the water sector in terms of the nature of activities undertaken.

As a predominantly private, non-price regulated sector, the "Professional, scientific, technical, administrative and support service activities" sector clearly meets the first criterion guiding the selection of relevant comparators for the wholesale water industry.

Turning to the second criterion regarding the nature of activities undertaken, inspection of NACE-2 documentation[11] reveals that the category in question ("Professional, scientific, technical, administrative and support service activities") captures a range of activities which share similarities with the wholesale water sector. For example, sub-categories such as "legal and accounting activities" and "activities of head offices" reflect tasks that are routinely performed by the wholesale water sector. Moreover, the sub-categories of "architectural and engineering activities; technical testing and analysis" and "scientific research and development" include relevant activities such as water management projects and research and development on natural sciences, engineering and technology (e.g. relating to infrastructure), respectively. Finally, the "other professional, scientific and technical activities" sub-category covers environmental consulting and

[8] We note that the productivity measure used by Northumbrian Water (output per hour) is different from productivity measure used in our final report to inform frontier shift over AMP7 (TFP). We also note that the latest available multi-factor productivity (MFP) dataset was published by the ONS in January 2020, and hence post-COVID MFP estimates are not yet available. For further information, please see: https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/multifactorproductivityestimates/julytoseptember2019

[9] Oxera, "Responding to the CMA's provisional findings on costs, Prepared for Yorkshire Water Services Ltd", 26 October 2020, p.20.

[10] Oxera, "A review of the CMA's approach to assessing frontier shift in its provisional findings, Prepared for Energy Networks Association", 25 October 2020, p.6.

[11] Eurostat (2008): "NACE Rev. 2 Statistical classification of economic activities in the European Community" p. 265-273, available at: https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

other technical consulting which again are of a similar nature to tasks typically performed by the wholesale water sector.

Moreover, there is regulatory precedent for using "Professional, scientific technical, administrative and support service activities" as a comparator sector for the water sector. In particular, the Utility Regulator used this sector as a comparator in its final determination for NI Water at PC15[12] and in its draft determinations at PC21.[13]

Hence, there is a strong basis for using "Professional, scientific technical, administrative and support service activities" as a comparator sector for wholesale water activities.

Oxera is conceptually wrong in arguing that an adjustment for embodied technical change requires an offsetting quality adjustment to outputs

Oxera argues that to isolate the potential effects of embodied technical change, quality effects should be considered on both the input and output side. It argues that if this is done consistently, the effect of embodied technical change will be moderated / offset by changes in the quality-adjusted output growth rate.[14,15]

This argument is conceptually wrong. EU KLEMS already incorporates quality-related adjustments for both inputs and outputs. It is appropriate for outputs to be quality adjusted, since efficiency improvements can take the form of either more output or higher quality output. However, for the purpose of setting a frontier shift number, it is a problem that inputs are quality adjusted, since this means that the TFP residual excludes embodied technical shift, even though this is a potentially important source of cost savings for water companies.

In the light of the above, it would be theoretically incorrect to offset an adjustment for embodied technical shift by stripping out the quality adjustments that have been made to outputs in the EU KLEMS dataset.

Economic Insights' analysis of embodied technical change (cited by Oxera) produced results that are not credible due to a methodological flaw

In its reports for Yorkshire Water[16] and the Energy Networks Association,[17] Oxera cites a recent report by Economics Insights for the Dutch Authority for Consumers and Markets (ACM) to argue that the impact of embodied technical change is negative and insignificant. The Economic Insights study uses EU KLEMS data for 11 sectors over the period 1995 to 2017 to estimate a production function econometrically, in order to estimate both embodied and disembodied technical shift.[18] The analysis found that capital-embodied technical change was -0.14 per cent per year.

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[12] Utility Regulator (December 2014): "Water & Sewerage Services Price Control 2015-21 Final Determination -Annex S Opex Frontier Shift Report", available at: https://www.uregni.gov.uk/sites/uregni.gov.uk/files/media-files/UR_PC15_FD_Annex_S_-_Opex_Frontier_Shift_0200.pdf

[13] Utility Regulator (September 2020): "Water & Sewerage Services Price Control 2021-27 Draft determination -Annex K Opex and Capex Frontier Shift", available at: https://www.uregni.gov.uk/sites/uregni/files/media-files/UR%20PC21%20DD%20Annex%20K%20-%20Opex%20and%20Capex%20Frontier%20Shift%2001.00%20Published.pdf

[14] Oxera, "Responding to the CMA's provisional findings on costs, Prepared for Yorkshire Water Services Ltd", 26 October 2020, p.32

[15] Oxera, "A review of the CMA's approach to assessing frontier shift in its provisional findings, Prepared for Energy Networks Association", 25 October 2020, p.9

[16] Oxera, "Responding to the CMA's provisional findings on costs, Prepared for Yorkshire Water Services Ltd", 26 October 2020, p.22-23,31

[17] Oxera, "A review of the CMA's approach to assessing frontier shift in its provisional findings, Prepared for Energy Networks Association", 25 October 2020, p.9

[18] Economic Insights, "Frontier Shift for Dutch Gas and Electricity TSOs; Report prepared for Netherlands Authority for Consumers and Markets", 1 May 2020, p.vi-vii,71-77, available at: https://www.acm.nl/sites/default/files/documents/2020-06/reg2022-elfde-klankbordgroepbijeenkomst-rapport-economic-insights-frontier-shift.pdf

However, Economics Insights' estimates of embodied technical change are not credible. Economic Insights itself states that the negative sign for its estimated rate of capital-embodied technical change is "problematic".[19] Even if its estimate is interpreted as meaning that embodied technical change is zero, it is not credible to suggest that there have been no improvements in the quality of capital inputs between 1995 and 2017. There have been significant advances in Informational and Communications Technologies (ICT) as well as other technologies over this period. The implausibility of these results strongly suggests that there is a methodological flaw in Economic Insights' work.

A closer inspection of Economic Insights' analysis shows that its econometric equations appear to be mis-specified and therefore useless. In particular, Economic Insights carry out a test for the validity of a constraint which, according to economic theory, should be imposed, because it is a property of the technology that Economic Insights considers. Economic Insights incorrectly state that "the constraint is valid because the p-value is less than 0.05". In fact, the opposite is true — a p-value of less than 0.05 requires us to reject of the null hypothesis, which in this case means rejecting the hypothesis that the constraint is valid. The fact that the constraint holds true in economic theory but is not supported by Economic Insights' data suggests that its econometric equations are mis-specified in some way. This could be because the econometric techniques that Economic Insights uses implicitly assume that the variables on the right-hand side of its equations 7.3 and 7.4 are exogenous, whereas in practice they are likely to be endogenous. For example, the real wage appears on the right-hand side of equation 7.3, but it is likely to be endogenous since it will depend on labour productivity (which is the variable on the left-hand side of the equation).

A further flaw in Economic Insights' analysis is that the data that it is using has already been adjusted for embodied technical shift, and hence there is no "residual" embodied technical shift left in the data for Economic Insights to identify in its econometric analysis. More specifically, Economic Insights is using EU KLEMS data, and the data for capital in EU KLEMS has already been adjusted for quality. Consequently, it is not a surprise that Economic Insights fails to identify any embodied technical change in its analysis.

Indeed, if the econometric equations were not mis-specified and therefore useless, the results of Economic Insights' work would actually imply that the uplift for embodied technical shift should be higher than we have previously estimated. This is because our existing range estimate for the appropriate uplift of 60 per cent[20] to 140 per cent[21] is based on the assumption that 20 per cent of TFP growth represents a part of embodied technical shift that has "leaked" into the TFP growth measure (which is only meant to measure disembodied technical shift) due to inadequate adjustment of capital inputs for quality. However, Economic Insights' results imply that EU KLEMS data on capital has been successfully fully adjusted for embodied technical shift, such that there is no "residual" embodied technical shift in the data which can leak into TFP estimates. Further, the academic literature suggests that embodied technical shift is (at the low end) approximately the same order of magnitude as disembodied technical shift[22] or (at the high end) twice as high as disembodied technical

[19] Economic Insights, "Frontier Shift for Dutch Gas and Electricity TSOs; Report prepared for Netherlands Authority for Consumers and Markets", 1 May 2020, p.vii, available at: https://www.acm.nl/sites/default/files/documents/2020-06/reg2022-elfde-klankbordgroepbijeenkomst-rapport-economic-insights-frontier-shift.pdf

[20] The derivation of our original estimate of the uplift for embodied technical change of 60 per cent can be found on p.66-68 of Europe Economics, "Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations", 7 December 2019, available at: https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Europe-Economics-%E2%80%93-Real-Price-Effects-and-Frontier-Shift-%E2%80%93-Final-Assessment-and-Response-to-Company-Representations.pdf

[21] The derivation of our upper bound estimate of 140 per cent can be found on p.26-28 of Europe Economics, "Additional Evidence on Some Points Relating to Frontier Shift", 22 October 2020, available at: https://www.ofwat.gov.uk/wp-content/uploads/2020/10/Europe-Economics-Additional-evidence-relating-to-frontier-shift.pdf

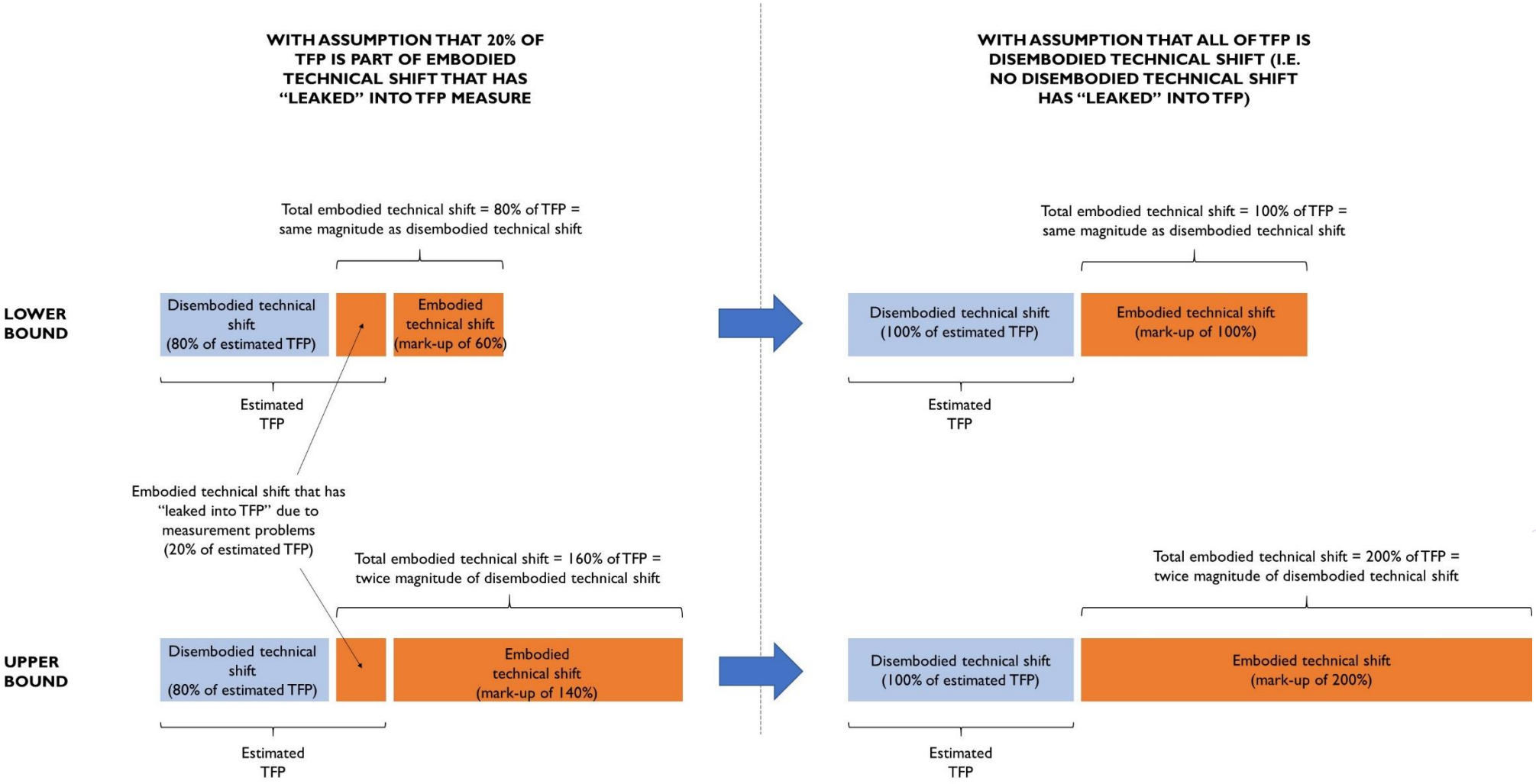
[22] See discussion of Uri (1983) on p.67 of Europe Economics, "Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations", 7 December 2019, available at:

shift.[23] Without an assumption that 20 per cent of TFP growth represents a part of embodied technical that has "leaked" into TFP, these academic results would imply that TFP growth estimates would need to be doubled or tripled (i.e. an uplift of 100 to 200 per cent) to account for embodied technical shift. This is shown in the diagram on the next page.

https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Europe-Economics-%E2%80%93-Real-Price-Effects-and-Frontier-Shift-%E2%80%93-Final-Assessment-and-Response-to-Company-Representations.pdf

[23] See discussion of Sakellaris and Wilson (2004) and Hobijn (2000) on p.26 of Europe Economics, "Additional Evidence on Some Points Relating to Frontier Shift", 22 October 2020, available at: https://www.ofwat.gov.uk/wp-content/uploads/2020/10/Europe-Economics-Additional-evidence-relating-to-frontier-shift.pdf

Why uplift for embodied technical shift should be higher if EU KLEMS data has fully adjusted for quality of capital inputs



An uplift for embodied technical shift does not assume that the water sector invests more in innovation than other sectors or that it outperforms comparator sectors

The Energy Networks Association states that an uplift for embodied technical change implicitly assumes that the relevant water companies invest more than other sectors in innovation and can thus outperform productivity growth in relevant benchmark sectors.[24] It argues that such assumptions are not supported by any evidence.

In fact, the Energy Networks Association is mistaken in thinking that an uplift for embodied technical change is based on such assumptions. TFP estimates for any sector are intended to capture only disembodied technical shift, and therefore in any sector a TFP estimate would need to be uplifted for embodied technical change in order to give an estimate of total technical change. Hence, applying an uplift for embodied technical change does not imply that the water sector can outperform comparator sectors, since embodied technical change will be taking place in comparator sectors as well. Indeed, the academic studies that we used for our illustrative calculations of the potential magnitude of embodied technical change were based on data from comparator sectors. Consequently, an uplift for embodied technical shift does not implicitly assume that the water sector invests more than other sectors in innovation.

Value-added TFP estimates continue to justify aiming up, even if they are applied only to costs excluding intermediates

The Energy Networks Association states that value-added TFP estimates can only be applied to costs excluding intermediate inputs.[25] It argues that that once value added TFP estimates are scaled back to take account of the difference in cost base, it would not be possible to justify the CMA's 0.3 per cent uplift by placing some weight on value-added TFP estimates.

Europe Economics has previously addressed this argument in Section 3 of our report entitled "Additional Evidence on Some Points Relating to Frontier Shift" dated 22 October 2020, and hence we would refer the CMA back to this previous response.[26] We showed that even accounting for this issue, value-added TFP estimates continue to suggest a higher frontier shift assumption than gross output TFP estimates.

The Utility Regulator's draft frontier shift decision for Northern Ireland Water (NIW) is not a useful precedent as it uses an inappropriate comparator sector and fails to consider embodied technical change

While accepting the CMA's 1 per cent frontier shift figure, Anglian Water referred to the frontier shift set by the Utility Regulator in Northern Ireland at PC 21[27] (0.8 per cent for opex, 0.6 per cent for capex) to argue that the frontier shift figure set by the CMA is very challenging.[28]

We disagree with Anglian Water's view that the 1 per cent frontier shift figure set by the CMA in its provisional findings is "very challenging" in light of the Utility Regulator's recent draft determinations for NI Water, for at least two important reasons:

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[24] Energy Networks Association, "Ofwat Price Determinations: Response to the CMA's Provisional Findings by Energy Networks Association", p.29, available at: https://assets.publishing.service.gov.uk/media/5f9bf463e90e0704207029f3/Energy_Networks_Association.pdf

[25] Energy Networks Association, "Ofwat Price Determinations: Response to the CMA's Provisional Findings by Energy Networks Association", p.29-30, available at: https://assets.publishing.service.gov.uk/media/5f9bf463e90e0704207029f3/Energy_Networks_Association.pdf

[26] Europe Economics, "Additional Evidence on Some Points Relating to Frontier Shift", 22 October 2020, p.21-25, available at: https://www.ofwat.gov.uk/wp-content/uploads/2020/10/Europe-Economics-Additional-evidence-relating-to-frontier-shift.pdf

[27] PC21 is the price control for NI Water over a five year period from 2021.

[28] Anglian Water (October 2020): "PR19 CMA Redetermination, Response to Provisional Findings", p.23.

- First, the Utility Regulator uses the "Electricity, gas and water supply" sector as a comparator for opex activities. In our view, this sector is not suitable for the purposes of determining frontier shift given that the sector is regulated rather than competitive, and we are seeking to set a frontier shift challenge that reflects what could be achieved in a competitive sector. Further, as discussed in our final PR19 report, TFP estimates in the water sector are biased downwards due to problems with the way output in the water sector is being measured.[29] Eliminating the "Electricity, gas and water supply" sector as a comparator would increase the resulting opex frontier shift estimate, given the negative (-1.53 per cent) annual productivity growth reported for the sector for the time period considered.
- Second, in its draft determinations the Utility Regulator has crucially failed to consider and subsequently make adjustments to its frontier shift estimates to account for embodied technical shift. As we have previously shown, academic evidence suggests that embodied technical change is at least as large as the disembodied technical change that TFP growth estimates seek to measure,[30] and could even be twice as large.[31] Hence, failure to consider embodied technical change is a serious omission.

[29] Europe Economics, "Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations", 7 December 2019, p.64-66, available at: https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Europe-Economics-%E2%80%93-Real-Price-Effects-and-Frontier-Shift-%E2%80%93-Final-Assessment-and-Response-to-Company-Representations.pdf

[30] Europe Economics, "Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations", 7 December 2019, p.66-68. available at: https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Europe-Economics-%E2%80%93-Real-Price-Effects-and-Frontier-Shift-%E2%80%93-Final-Assessment-and-Response-to-Company-Representations.pdf

[31] Europe Economics, "Additional Evidence on Some Points Relating to Frontier Shift", 22 October 2020, p.26-28, available at: https://www.ofwat.gov.uk/wp-content/uploads/2020/10/Europe-Economics-Additional-evidence-relating-to-frontier-shift.pdf

2 Response to New Point on Real Price Effects (RPEs)

This section responds to the following two points made by Northumbrian Water:

- whether energy prices for Northumbrian Water are likely to increase over AMP7; and
- whether the AWE Electricity, gas and water supply index should be used for the wage true-up mechanism, in place of the ASHE Manufacturing index proposed by Ofwat.

Cornwall Insight's projections of future power prices do not appear to take account of Ofgem's RIIO-2 price controls

Northumbrian Water has submitted a forecast of its electricity costs over AMP7 produced by Cornwall Insight,[32] which it uses to argue in favour of an energy RPE with an end of period reconciliation.[33] Cornwall Insight is projecting a real increase in electricity prices averaging approximately 3 per cent per year over the period (from a 2019/20 base year).

We note that the Cornwall Insight report lacks transparency, in that it does not provide a full breakdown of its estimates of Third Party Charges, despite the fact that these are a major driver of its projected increase in electricity prices. For example, Cornwall Insight does not provide the figures it is using for projected Transmission Network Use of System (TNUoS) tariffs or Distribution Use of System (DUoS) tariffs.[34] This means that its projections cannot be fully reviewed and evaluated.

Moreover, as discussed below, the statements that Cornwall Insight makes about its methodology suggest that the likely effects of Ofgem's RIIO-2 price controls on transmission and distribution charges have not been taken into account.

Cornwall Insight's projected TNUoS charges are based on indicative tariffs from National Grid's Five-Year View,[35] and these do not take account of Ofgem's RIIO-2 draft determinations for electricity transmission companies. In particular, National Grid explains that its TNUoS revenue forecasts are based on figures submitted by onshore and offshore transmissions operators in February 2020,[36] whereas the RIIO-2 draft determinations were only published by Ofgem in July 2020.[37] National Grid also states that the "forecasts were based on RIIO-1 parameters including rate of return and inflation index".[38] Since the allowed rate of return proposed by Ofgem in its RIIO-2 draft determinations is substantially lower than allowed rate of

[32] Cornwall Insight, "Northumbrian Water Group; Forecast of GB electricity costs: 2020-21 to 2024-24 (CI Code 20-4107)", October 2020

[33] Northumbrian Water (October 2020): "NWL PR19 CMA Redetermination – Response to Provisional Findings", p.21, available at: https://assets.publishing.service.gov.uk/media/5f97f52dd3bf7f35ea0aedcc/NWL_Response_to_PFs_26.10.20_---.pdf

[34] Cornwall Insight, "Northumbrian Water Group; Forecast of GB electricity costs: 2020-21 to 2024-24 (CI Code 20-4107)", October 2020, p.12-16

[35] National Grid Electricity System Operator (August 2020): "Five-Year View of TNUoS Tariffs for 2021/22 to 2025/26", available at: https://www.nationalgrideso.com/document/175786/download

[36] National Grid Electricity System Operator (August 2020): "Five-Year View of TNUoS Tariffs for 2021/22 to 2025/26", p.88-89

[37] Ofgem (July 2020): "RIIO-2 Draft Determinations for Transmission, Gas Distribution and Electricity System Operator", available at: https://www.ofgem.gov.uk/publications-and-updates/riio-2-draft-determinations-transmission-gas-distribution-and-electricity-system-operator

[38] National Grid Electricity System Operator (August 2020): "Five-Year View of TNUoS Tariffs for 2021/22 to 2025/26", p.36

return in RIIO-1 price controls,[39] the TNUoS revenue figures used by Cornwall Insight in its projections will be too high.

Cornwall Insight states that its projected DUoS charges are based on company cost projections.[40] Given the RIIO-ED2 draft determinations are not expected to be published until summer 2022,[41] it again seems likely that the DUoS figures do not take account of the probable scaling back of company cost projections by Ofgem.

Hence, there are strong reasons for believing that the projections of future power prices produced by Cornwall Insight are too high, since the impact of RIIO-2 price controls does not appear to have been taken into account.

The AWE electricity, gas and water supply index is not suitable for use in the wage true-up mechanism

Northumbrian Water argues that the Average Weekly Earnings (AWE) electricity, gas and water supply index should be used for the wage true-up mechanism in place of the Annual Survey of Hours and Earnings (ASHE) manufacturing index proposed by Ofwat. It argues that the manufacturing sector is not a good proxy for the water sector, particularly in the context of the COVID-19 crisis and Brexit, and that ASHE manufacturing index will have a downward bias in 2020 due to manufacturing staff on furlough.[42]

We disagree with Northumbrian Water's position for a number of reasons.

First, to the extent that the water sector is hiring staff (e.g. engineers) from the same labour market as the manufacturing sector, any impact that the COVID-19 crisis and Brexit have on the manufacturing sector will indirectly affect water sector wages. For example, reduced demand for engineers across the economy due to reductions in manufacturing output may allow water companies to hire engineers at lower wage rates.

Second, the AWE index proposed by Northumbrian Water includes furloughed workers.[43] By contrast, we understand from Ofwat that its enquiries to the ONS have established that the ONS is still considering how to treat furloughed workers in producing the ASHE index.

Third, the COVID-19 crisis has led to significant changes to hours worked in some sectors, and the AWE index (based on weekly earnings) will be affected by this. By contrast, the ASHE index proposed by Ofwat is based on hourly pay, thus removing the effect of changes in hours worked on total earnings. We note that Northumbrian Water's analysis is based on the assumption that the ASHE manufacturing index (not yet published post-COVID) will be affected in the same way by the COVID-19 crisis as the AWE manufacturing

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[39] The RIIO-2 draft determinations propose a baseline allowed return on capital of 2.47 per cent for SHET and 2.63 per cent for the remainder of the network companies. At the RIIO-T1 final determinations the implied vanilla WACC was 4.55 per cent for SHET and 4.4 per cent for NGGT. Ofgem (2020): "RIIO-2 Draft Determinations – Finance Annex", p.92, available at: https://www.ofgem.gov.uk/system/files/docs/2020/07/draft_determinations_-_finance.pdf and Ofgem (2012): "RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas", p.11 available at: https://www.ofgem.gov.uk/ofgem-publications/53602/4riiot1fpfinancedec12.pdf

[40] Cornwall Insight, "Northumbrian Water Group; Forecast of GB electricity costs: 2020-21 to 2024-24 (CI Code 20-4107)", October 2020, p.15-16

[41] Ofgem: "Consultations and decisions (RIIO-ED2) - RIIO-ED2 price review timeline", available at: https://www.ofgem.gov.uk/regulating-energy-networks/2023-price-control-review-riio-ed2/consultations-and-decisions-riio-ed2

[42] Northumbrian Water (October 2020): "NWL PR19 CMA Redetermination – Response to Provisional Findings", p.22-26, available at: https://assets.publishing.service.gov.uk/media/5f97f52dd3bf7f35ea0aedcc/NWL_Response_to_PFs_26.10.20_---.pdf

[43] The ONS states the following with regard to its AWE data: "Note that pay estimates are based on all employees on company payrolls, including those who have been furloughed under the Coronavirus Job Retention Scheme (CJRS)." https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/averageweeklyearningsingreatbritain/october2020

index. However, this assumption seems unlikely to hold true, given that the ASHE hourly pay index will not be affected by changes in hours worked in the same way that the AWE index has been.

Fourth, the sampling variability of the AWE electricity, gas and water supply index is likely to be higher, given that there are likely to be fewer datapoints for this specific sector than for a wider sector such as manufacturing. This is likely to lead to volatility in the index which is driven by sampling variability rather than underlying changes in wages. Indeed, this is illustrated by Figure 4 on page 24 of Northumbrian Water's submission, where the value of its preferred index changes from -1.9 per cent in June 2020 to +4.5 per cent a month later in July 2020 — a sudden and significant change which seems unlikely to be reflective of underlying movements in wages.[44]

Fifth, the use of the AWE electricity gas and water supply index would mean that the water sector's pay awards would feed into the index that is used for the true-up mechanism. This would harm incentives for the water sector to control pay awards. Indeed, Northumbrian Water itself emphasises the need for any index to be exogenous of companies' own actions, stating:

> … with an … ex post RPE true-up that is defined in advance with reference to an exogenous index, the expenditure allowance is determined independently of the companies' actions; this independence between the expenditure allowance and the company's actions … creates the incentive to manage costs efficiently.

Hence, Northumbrian Water's proposed index does not meet a criterion (i.e. independence from the companies' actions) which the company itself has stated is necessary to maintain cost efficiency incentives.

[44] Northumbrian Water (October 2020): "NWL PR19 CMA Redetermination – Response to Provisional Findings", p.24, available at: https://assets.publishing.service.gov.uk/media/5f97f52dd3bf7f35ea0aedcc/NWL_Response_to_PFs_26.10.20_---.pdf