PJM economics

Collaborative ODI Research: Segmentation Analysis of United Utilities Results

Final report

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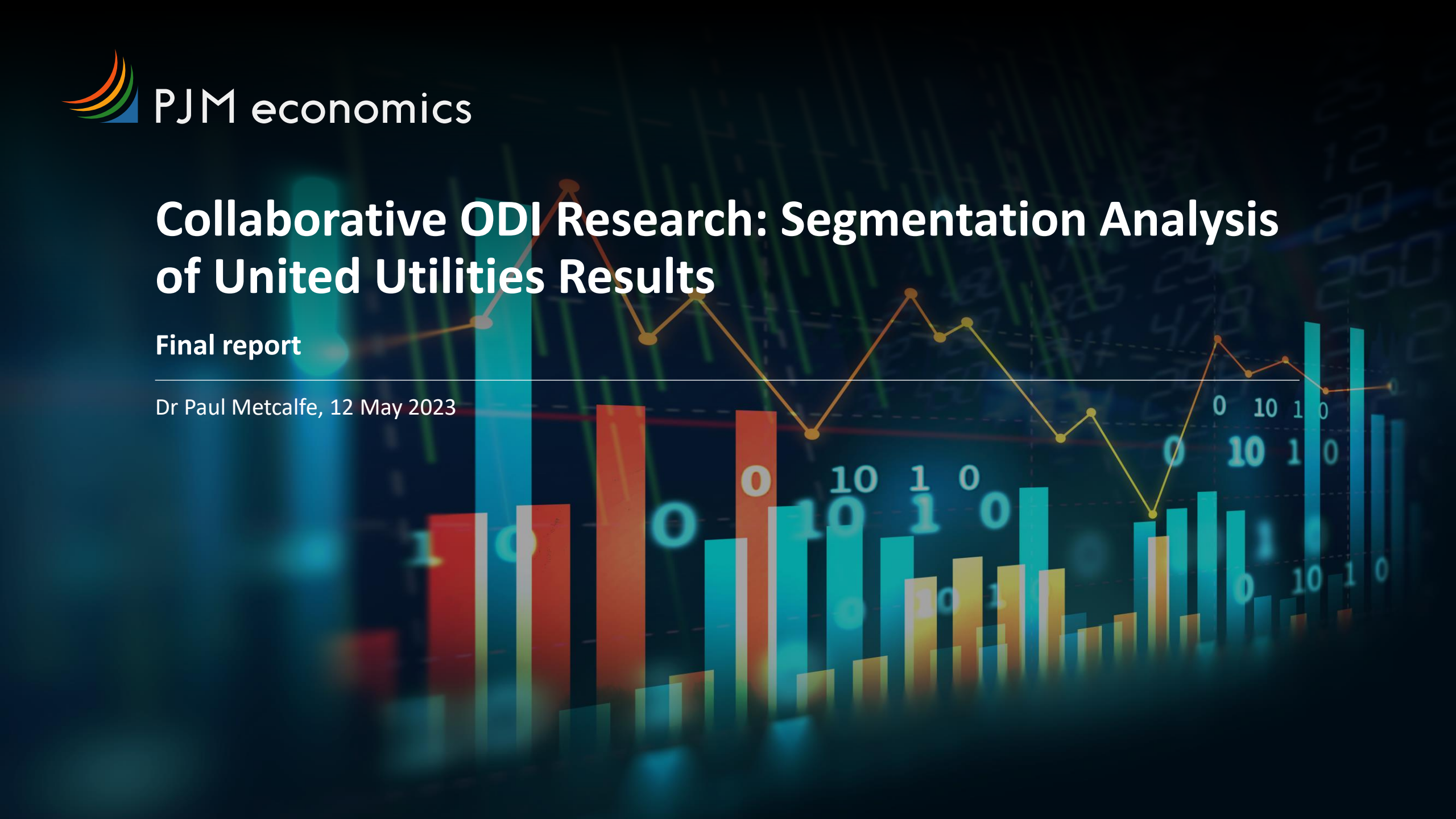


Context and objectives

- Customer valuation research plays a key role at price reviews: within cost-benefit analysis (CBA) and outcome delivery incentives (ODI).
- Previously, companies conducted their own customer valuation research, but this resulted in very wide variances across companies.
- The national Collaborative ODI research study was instigated by Ofwat and CCW to obtain customer values based on a common design and survey methodology.
- Main survey valuation results for all companies were delivered through the Collaborative ODI Research study.
- The purpose of the present research was to extend this analysis to examine further segmentations of United Utilities customer values.

Design overview: Compensation-based values, linked to impact

SP1: Impact exercise

Which of these would have the most impact on your household?

Option A	Option B
PLANNED water supply interruption (6 hours) ▶ Your water company sends you a notice in the post that in 2 days' time your water supply will stop for 6 hours, affecting all taps, toilets, dishwasher, etc ▶ This is due to planned maintenance in your local area ▶ As planned, it then stops between 12:00 and 18:00 on a Wednesday afternoon 	**Water taste and smell (6 hours)** ▶ Your tap water starts tasting or smelling different, without warning ▶ This is due to chlorine, and the taste and smell is like a swimming pool ▶ The water is safe to drink, and for use in the dishwasher or washing machine ▶ This happens for 6 hours, between 12:00 and 18:00 on a Wednesday afternoon 
○	○

- A measure of relative impact (impact scores) for 26 scenarios was constructed by varying the pairs of service issues shown across 10 questions for each participant.

SP2: Compensation exercise

Which option would you prefer?

Option A	Option B
PLANNED water supply interruption (6 hours) ▶ Your water company sends you a notice in the post that in 2 days' time your water supply will stop for 6 hours, affecting all taps, toilets, dishwasher, etc ▶ This is due to planned maintenance in your local area ▶ As planned, it then stops between 12:00 and 18:00 on a Wednesday afternoon  Compensation paid: £25*	**No service issue** ▶ There would be no issue affecting the water service at your property

* Compensation would be paid automatically, and within 7 days, by crediting your bank account, if you have a direct debit set up, or by sending you a cheque otherwise

- The compensation amounts varied across participants and were doubled/halved in a follow-up question. Two service issues were used as 'pivots', or 'anchors', resulting in two sets of estimates.

United Utilities sample sizes, by segment

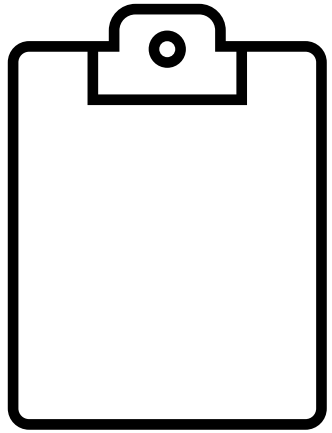
Households: demographic segment	Sample size
All United Utilities	2,028
Cumbria[a]	144
Lancashire[a]	436
GManchester[a] (Greater Manchester)	730
Merseyside[a]	414
Cheshire[a]	250
Age18_29 (ages 18-29)	176
Age30_64 (ages 30-64)	1,281
Age65plus (ages 65+)	554
Male	940
Female	1,087
SEG_AB	499
SEG_C	632
SEG_DE	260
Vuln_Med (Medical)	366
Vuln_Com (Communications)	271
Vuln_Life (Life stage)	270
Vuln_Fin (Financial)	100
Vuln_Any (Any vulnerability)	768
Vuln_None (No vulnerability)	1,260
Urban (PAF sample only)	935
Rural (PAF sample only)	100

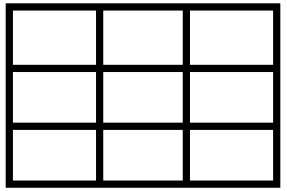
Households: experience of service issues	Sample size
Unexpected water supply interruption	379
Planned water supply interruption (ExpPlannedInt)	597
Unexpected low pressure	500
Boil water notice (ExpBoil)	160
Do not drink notice	97
Discolouration of water coming out of your tap	569
A change to the taste and/or smell of your tap water	301
Sewer flooding: outside your property[b]	123
Hosepipe ban	599
Emergency drought restrictions	41
Pollution in a river	100
Pollution in the sea near a beach	94

Non-household segment	Sample size
All United Utilities	277
NrEmp_0_3 (0-3 employees)	100
NrEmp_4_49 (4-49 employees)	112
NrEmp_50plus (50+ employees)	55
SingleSite	183
MultiSite	86
DomesticOnly	136
OtherUse	129

(a) County coded based on ONS tables of postcodes and counties (NSPL21_AUG_2022_UK). Postcode area & district only were available following anonymisation of the ODI research data. Any given postcode area & district straddling county boundaries was assigned to the county in which most of the postcodes of that area & district were located.

(b) The number of those who experienced internal sewer flooding was too small (n=22) for this segment to be included in the analysis.





Segmentation analysis overview

SP1 – Impact choice modelling	- The same approach was used as for the sub-population analysis in the Collaborative ODI research, ie conditional logit models, focussed on the United Utilities sample only. One model was estimated for each segment allowing each coefficient to differ between any segment and the complement segment (eg SEG A&B vs SEG C&D&E combined).
	- For segmentations by experience of service issues, only the relevant interaction terms were included, eg, 'Has had/has not had a planned supply interruption' × 'Planned water supply interruption (6h)', only.
	- The delta method was used to test for significant differences in (the log of the) impact scores between any segment and the complement segment for each of the 26 service issue impact scores.
	- **HOUSEHOLDS: SEVERAL SIGNIFICANT DIFFERENCES FOUND – SEE NEXT SLIDE (SP1)**
	- **NON-HOUSEHOLDS: TWO SIGNIFICANT DIFFERENCES ONLY IN THE TOP HALF OF THE RANKING:**
	  - **'Unexpected water supply interruption (24h)' had a lower impact on sole traders (6.9) than on small and larger organisations combined**
	  - **'Unexpected water supply interruption (24h)' had a higher impact on larger organisations (21.8) than on sole traders and small organisations combined**

SP2 – Compensation choice modelling	- The same model type was used as in the Collaborative ODI research (panel interval model), but new models were estimated for the present analysis focussed on the United Utilities sample only. - Separate models were estimated for each segment, allowing valuations to be derived for that segment and its complement. T-tests were carried out to test for significant differences in valuations between each segment and its complement for each of the two pivot service issues: Boil water notice (48h) and Planned supply interruption (6h). - **RESULTS: SEVERAL SIGNIFICANT DIFFERENCES FOUND – SEE SP2 RESULTS SLIDES**

Results: SP1 Significant impact score differences for households

Top half of the overall impact score ranking

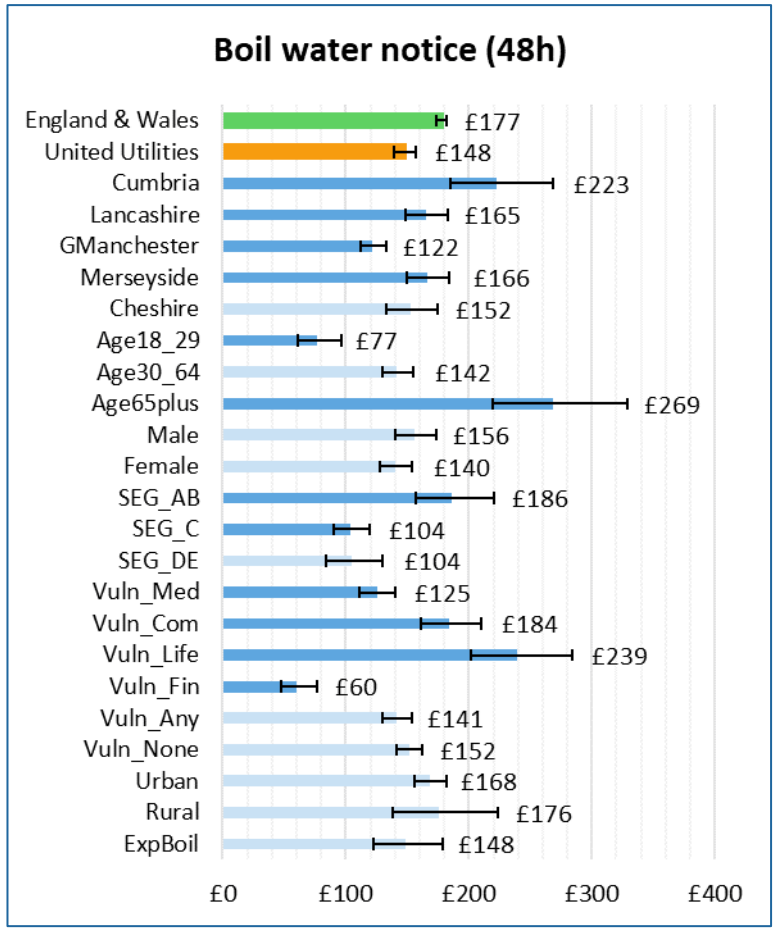
Scenario	Segment	Segments included in the complement
Sewer flooding: outside your property (1 week)	Cumbria (6.6)	Lancashire (15.7), GManchester(13.2), Merseyside (13.0), Cheshire (14.5)
Boil water notice (48h)	Age65plus (5.5)	Age18_29 (3.9), Age30_64 (4.0)
Unexpected water supply interruption (6h)	GManchester (4.9)	Cumbria (3.3), Lancashire (4.0), Merseyside (2.4), Cheshire (3.2)
Unexpected water supply interruption (6h)	Merseyside (2.4)	Cumbria (3.3), Lancashire (4.0), Gmanchester (4.9), Cheshire (3.2)
Significant pollution incident nearby (4 weeks)	Cumbria (5.7)	Lancashire (2.7), Gmanchester (2.8), Merseyside (3.3), Cheshire (2.9)
Significant pollution incident nearby (4 weeks)	Age18_29 (2.1)	Age30_64 (3.3), Age65plus (4.0)
Significant pollution incident nearby (4 weeks)	Age65plus (4.0)	Age18_29 (2.1), Age30_64 (3.3)
Discoloured water (24h)	GManchester (3.3)	Cumbria (1.9), Lancashire (2.4), Merseyside (2.4), Cheshire (1.5)
Discoloured water (24h)	Cheshire (1.5)	Cumbria (1.9), Lancashire (2.4), GManchester (3.3), Merseyside (2.4)
Discoloured water (24h)	SEG_DE (3.9)	SEG_AB (2.2), SEG_C (2.4)
Significant pollution incident elsewhere (4 weeks)	Cumbria (1.3)	Lancashire (2.5), GManchester(2.5), Merseyside (2.5), Cheshire (2.2)
Planned water supply interruption (6h)	SEG_DE (3.6)	SEG_AB (1.8), SEG_C (1.9)

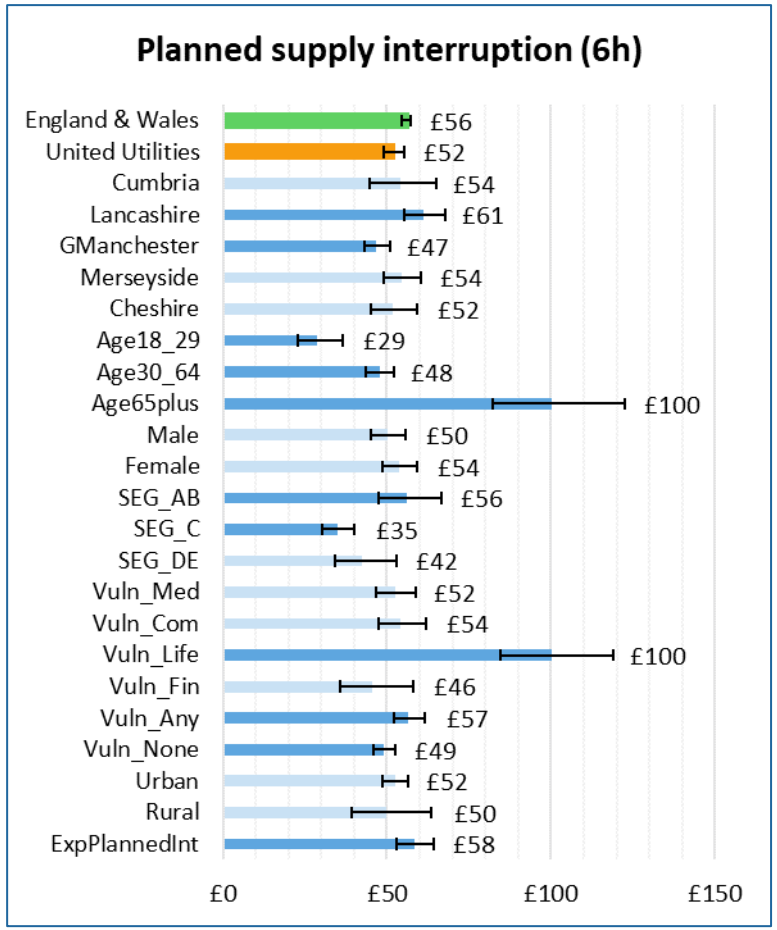
Segment impact scores shown in parentheses (scale: 0-100)

Green (red) cells indicate a statistically higher (lower) impact score for any given segment (at the 5% level) compared to the complement segments (combined for testing purposes)

- No statistically significant differences were found by gender, vulnerability status, and urban/rural location in the top half of the overall impact score ranking.
- Experience of service issues did not lead to statistically higher (or lower) impact scores of the relevant scenarios, except for 'Hosepipe ban' having a marginally higher impact among those who had experienced a ban. This suggests that, overall, participants' choices were based on assessed impacts as opposed to being driven by past experiences.

Results: SP2 Compensation values – household segment differences





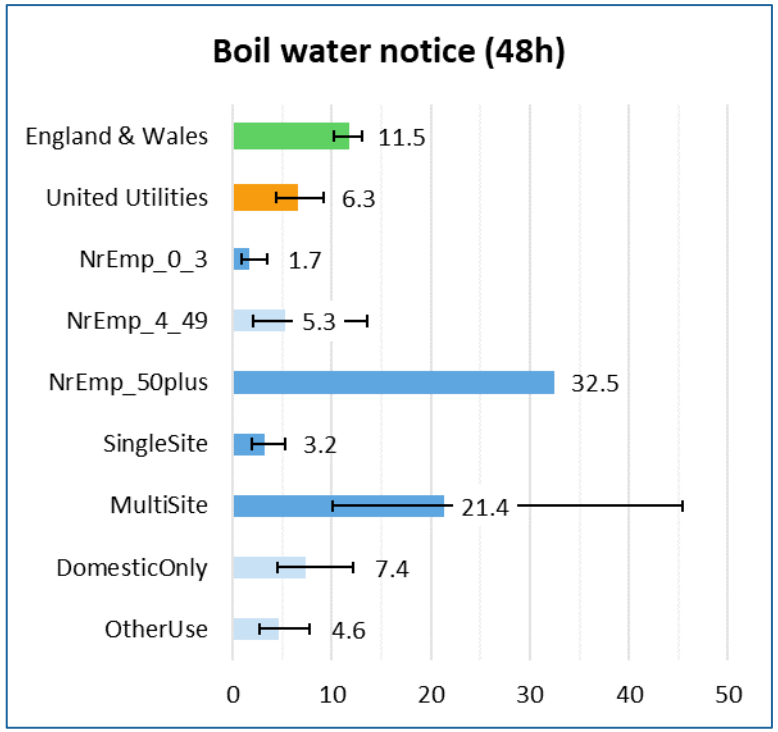
Median willingness-to-accept (WTA) compensation in the event of an incident (£/incident)

Half the customers in each segment require a lower compensation than the amount shown, while the other half requires a higher compensation

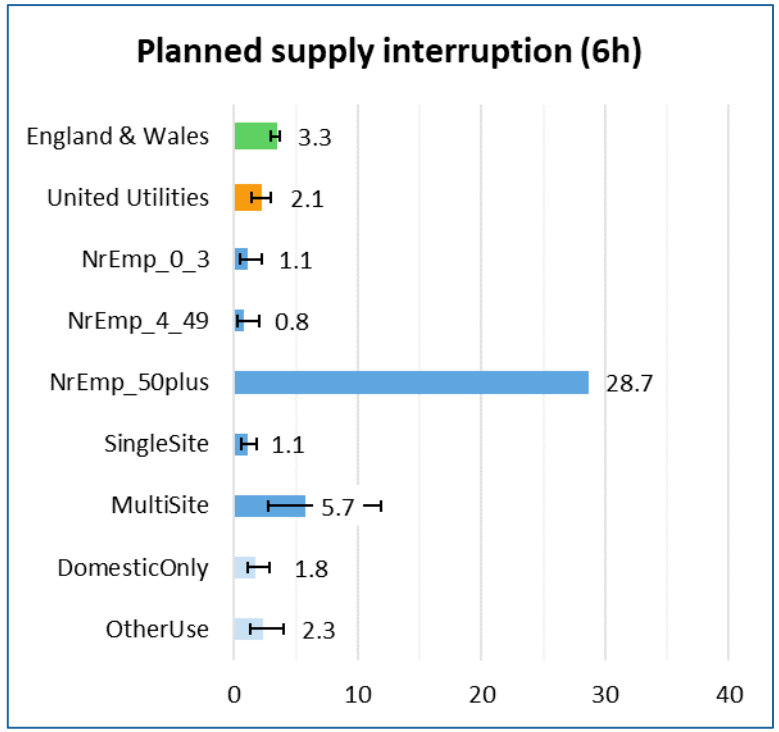
Dark bars for any segment indicate that the value for that segment statistically differs at the 5% level from the value for the complement, eg SEG A&B have statistically higher values than SEG C&D&E combined

The lower value for 'Boil water notice' among medically vulnerable customers when compared to medically non-vulnerable ones may be linked to the higher proportions of financially vulnerable and lower social grades among the medically vulnerable

Results: SP2 Compensation values – non-household segment differences



Not shown: confidence intervals for *NrEmp_50plus* (10.7, 99.1)



Not shown: confidence interval for *NrEmp_50plus* (9.3, 88.1)
NB Organisations with 4-49 employees had a statistically lower value than smaller and larger organisations combined

Median willingness-to-accept (WTA) compensation in the event of an incident (multiple of annual water and wastewater bill/incident)

Half the customers in each segment require a lower compensation than the amount shown, while the other half requires a higher compensation

Dark bars for any segment indicate that the value for that segment statistically differs at the 5% level from the value for the complement, eg multi-site organisations had statistically higher values than single-site ones, for both scenarios

The relatively wide confidence intervals indicate that the estimates are not precise and should be interpreted with caution, particularly for larger organisations (50+ employees/multi-site) given the relatively small sample sizes for these organisations

Key findings

- Several significant differences were found across household segments (mainly across counties) in terms of the impacts of the service issue scenarios ranked in the top half of the overall ranking **(SP1 impact exercise)**
- Only two significant difference in impact scores were found among non-household segments in the top half of the ranking ('Unexpected water supply interruption (24h)' having a lower (higher) impact on sole traders (medium-sized/large organisations)
- Several significant differences were found across segments in the compensations required for the 'pivot' scenarios 'Boil water notice (48h)' and 'Planned supply interruption (6h)' **(SP2 compensation exercise)**
    - Household customers in the 'Greater Manchester' area required lower compensations for both 'Boil water notice' and 'Planned supply interruption' than customers living elsewhere
    - Customers aged 65 and above had higher WTA values for both scenarios when compared to younger customers, in line with findings from the Collaborative ODI research
    - SEG AB had higher valuations and SEG C1C2 had lower valuations for both scenarios than the respective complement segments
    - Life-stage vulnerability was associated with higher values for both 'Boil water notice' and 'Planned supply interruption'
    - Larger organisations (in terms of employees and number of sites) had higher values (as a proportion of the bill), broadly in line with findings from the Collaborative ODI research (Caveat: segment sizes are relatively small)