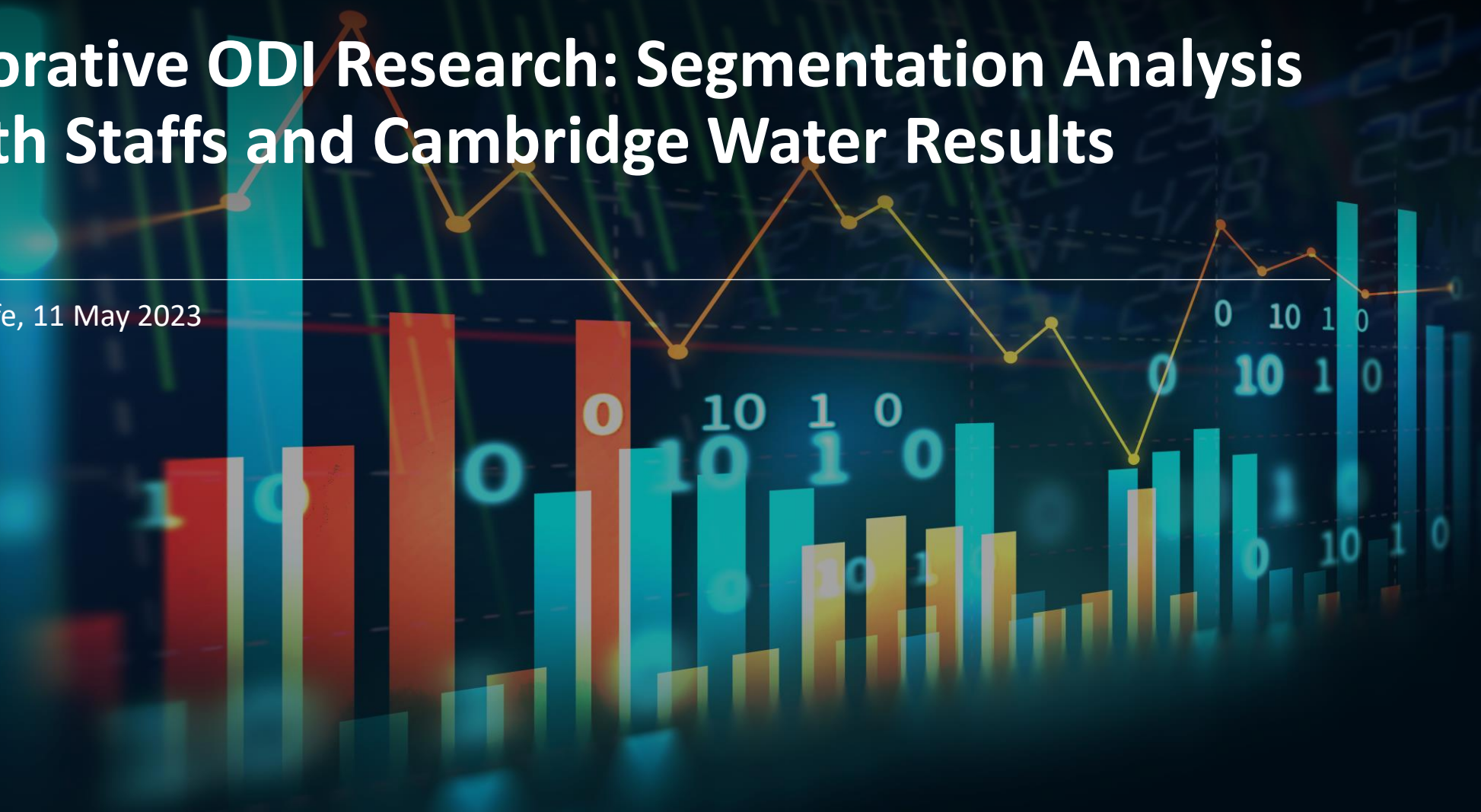


Collaborative ODI Research: Segmentation Analysis of South Staffs and Cambridge Water Results

Final report

Dr Paul Metcalfe, 11 May 2023



Context and objectives





- Customer valuation research plays a key role at price reviews: within CBA and ODI rates.
- 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 South Staffs and Cambridge Water 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
<p>PLANNED water supply interruption (6 hours)</p> <ul style="list-style-type: none"> 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   <p>Planned, 6 hours</p>	<p>Water taste and smell (6 hours)</p> <ul style="list-style-type: none"> 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   <p>6 hours</p>
<input type="radio"/>	<input type="radio"/>

- Varying combinations of 26 service issues shown, leading to 'impact scores' a measure of relative impact

SP2: Compensation exercise

Which option would you prefer?

Option A	Option B
<p>PLANNED water supply interruption (6 hours)</p> <ul style="list-style-type: none"> 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   <p>Planned, 6 hours</p>	<p>No service issue</p> <ul style="list-style-type: none"> There would be no issue affecting the water service at your property
<input type="radio"/>	<input type="radio"/>

Compensation paid: £25*

* 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

- Two service issues used as 'pivots', or 'anchors', and varying compensation amounts, resulting in two sets of estimates.

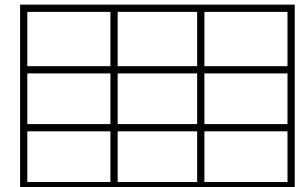
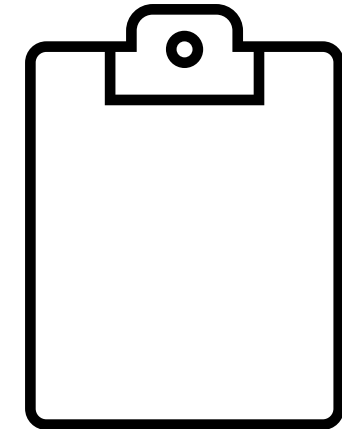
South Staffs and Cambridge Water sample sizes, by segment

Households

Household segment	Sample size
All SSC	609
South Staffs	404
Cambridge	205
Age18_29	53
Age30_64	385
Age65plus	169
Male	274
Female	335
SEG_AB	178
SEG_C1C2	161
SEG_DE	82
Medical vulnerability	109
Communications vulnerability	90
Life-stage vulnerability	89
Financial vulnerability	27

Non-households

Non-household segment	Sample size
All SSC	198
South Staffs	155
Cambridge	43
0 employees	25
1-49 employees	124
50-249 employees	26
250 plus employees	10
1 site	137
2-4 sites	37
5 plus sites	17
Water used in manufacturing	23
Water used in service	42
Water used as an ingredient	48
Water used for domestic purposes	158



Segmentation analysis overview

SP1 – Impact choice modelling

- **SP1 model specification**
 - Same models used as in Collaborative ODI research, ie no new estimation.
 - Bayesian models adopted – one HH and one NHH model for each water company, ie one per customer type for SSC.
 - Individual-level coefficients from models used to obtain average impact scores, and confidence ranges, for each HH and NHH segment, and for each complement of segment (ie the remainder).
 - T-tests used to test for significant differences (95% level of significance) between each segment and its complement for each of the 26 service issue impact scores.
 - **RESULTS: NO SIGNIFICANT DIFFERENCES ACROSS ANY SEGMENTS**

SP2 – Compensation choice modelling

- **SP2 model specification**
 - Same model type used as in Collaborative ODI research (panel interval model), but new models estimated for present analysis focussed on SSC sample only.
 - Separate models estimated for each segment, allowing results to be obtained for that segment and its complement, as well as directly allowing for t-tests of the significance of the difference between them for the values of each of the two pivot service issues: Boil water notice, and Planned 6h supply interruption.
 - **RESULTS: SOME SIGNIFICANT DIFFERENCES FOUND – SEE NEXT SLIDE.**

Scaling to ODI values

- Final values rescaled to match ODI final values for the SSC samples (HH and NHH)

Results: SP1 Impact score differences

Scenario	Household				Non-household			
	England & Wales	South Staffs	SSW	CAM	England & Wales	South Staffs	SSW	CAM
Sewer flooding: inside your property (1 month)	31.1	23.7	23.7	23.8	35.7	25.4	26.6	22.9
Sewer flooding: outside your property (1 week)	11.0	12.7	12.6	13.2	14.3	22.7	22.4	23.0
Emergency drought restrictions (2 months)	7.3	7.7	7.8	7.4	7.5	7.7	7.5	8.3
Unexpected water supply interruption (24h)	6.2	7.5	7.5	7.4	8.4	10.6	10.3	11.1
Do not drink notice (48h)	5.7	5.4	5.4	5.4	4.5	5.5	5.1	6.6
Unexpected water supply interruption (6h)	3.8	4.6	4.6	4.5	5.9	3.9	4.0	3.8
Boil water notice (48h)	4.1	4.1	4.1	4.2	3.2	3.0	3.1	2.9
Discoloured water (24h)	2.4	3.2	3.3	3.1	1.8	1.9	1.9	1.9
Water taste and smell (24h)	2.5	3.2	3.2	3.1	1.8	2.6	2.6	2.8
Significant pollution incident nearby (4 weeks)	2.9	3.1	3.0	3.1	1.2	1.5	1.5	1.6
Significant pollution incident elsewhere (4 weeks)	2.4	2.7	2.7	2.8	1.1	0.9	0.9	0.9
Discoloured water (6h)	2.2	2.6	2.6	2.5	2.0	1.8	1.8	1.7
Water taste and smell (6h)	2.2	2.5	2.5	2.4	1.6	2.0	2.1	2.0

Legend:

Higher value

Lower value

Results: SP1 Impact score differences (cont.)

Scenario	Household				Non-household			
	England & Wales	South Staffs	SSW	CAM	England & Wales	South Staffs	SSW	CAM
Planned water supply interruption (6h)	2.0	2.1	2.1	2.0	3.3	3.5	3.5	3.6
Unexpected low water pressure (6h)	1.9	1.7	1.7	1.6	1.7	1.5	1.5	1.4
Low flows in rivers elsewhere (2 months)	1.3	1.7	1.7	1.7	0.6	0.6	0.6	0.7
Minor pollution incident elsewhere (1 day)	1.1	1.5	1.5	1.6	0.5	0.4	0.5	0.4
Minor pollution incident nearby (1 day)	1.4	1.4	1.4	1.4	0.9	0.7	0.7	0.7
Low flows in rivers nearby (2 months)	1.7	1.4	1.4	1.4	0.7	0.6	0.6	0.6
Storm overflow nearby (4 hours)	1.2	1.4	1.4	1.3	0.8	1.1	1.0	1.2
Hosepipe ban (5 months)	1.2	1.3	1.3	1.3	0.5	0.5	0.4	0.6
River water nearby is not High quality	1.3	1.2	1.2	1.3	0.5	0.5	0.5	0.5
River water elsewhere is not High quality	1.0	1.2	1.1	1.2	0.4	0.2	0.2	0.2
Storm overflow elsewhere (4 hours)	0.9	1.0	1.0	1.0	0.5	0.6	0.6	0.5
Coastal bathing water is not Excellent quality	0.7	0.6	0.6	0.6	0.2	0.1	0.1	0.1
Coastal bathing water is neither Excellent nor Good quality	0.7	0.5	0.5	0.6	0.2	0.1	0.1	0.1
Total	100	100	100	100	100	100	100	100

Legend:

Higher value

Lower value

Results: SP2 Compensation values segment differences

Households

Segment	Value
All SSC	Planned 6h interruption £67.6
	Boil notice £221.9
Age18_29	Planned 6h interruption £36.4
	Boil notice £101.8
Age65plus	Planned 6h interruption £154.7
	Boil notice £436.7
Financial vulnerability	Planned 6h interruption £15.3
	Boil notice £54.6

Younger people had lower values than older people.

Those in financial vulnerability also had lower values.

Legend:

Higher value

Lower value

Non-households

Segment	Value
All SSC	Planned 6h interruption 3.2 x bill
	Boil notice 8.8 x bill
South Staffs	Planned 6h interruption 2.1 x bill
	Boil notice 4.7 x bill
Cambridge	Planned 6h interruption 8.4 x bill
	Boil notice 33.3 x bill
1-49 employees	Planned 6h interruption 1.1 x bill
	Boil notice 5.4 x bill
Water used as an ingredient	Planned 6h interruption 19.4 x bill
	Boil notice 14.3 x bill

South Staffs business customers had lower values than Cambridge business customers, as did small businesses compared to larger businesses.

Those businesses using water as an ingredient had higher values than other businesses.

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

- HH: £ per incident
- NHH: multiple of annual water and wastewater bill per incident

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

Results: WTA values for service issue scenarios: South Staffs vs Cambridge

Scenario	Households		Non-households	
	SSW	CAM	SSW	CAM
Unexpected water supply interruption (24h)	£302.3	£308.5	£18,781	£74,149
Emergency drought restrictions (2 months)	£291.1	£287.6	£13,741	£59,265
Do not drink notice (48h)	£207.7	£215.4	£8,929	£42,003
Boil water notice (48h)	£195.2	£206.3	£5,919	£21,887
Unexpected water supply interruption (6h)	£170.2	£174.9	£7,152	£25,394
Discoloured water (24h)	£132.8	£130.9	£3,560	£13,511
Significant pollution incident nearby (4 weeks)	£118.1	£125.2	£2,852	£11,153
Water taste and smell (24h)	£117.2	£119.9	£4,884	£19,989
Water taste and smell (6h)	£106.2	£105.9	£3,904	£13,744
Significant pollution incident elsewhere (4 weeks)	£102.5	£112.8	£1,760	£6,137
Discoloured water (6h)	£97.5	£100.7	£3,368	£12,505
Planned water supply interruption (6h)	£75.7	£73.6	£6,124	£21,870
Unexpected low water pressure (6h)	£69.8	£66.5	£2,737	£10,159
Low flows in rivers elsewhere (2 months)	£66.1	£67.6	£1,080	£4,682
Minor pollution incident elsewhere (1 day)	£62.0	£67.6	£861	£2,499
Minor pollution incident nearby (1 day)	£61.0	£62.5	£1,356	£4,701
Low flows in rivers nearby (2 months)	£57.2	£59.4	£1,102	£4,001
Hosepipe ban (5 months)	£48.0	£48.1	£819	£3,937

Legend:
Higher value
Lower value

Cambridge household customers had somewhat higher WTA values for most scenarios than South Staffs customers.

Cambridge non-household customers had considerably higher valuations compared to South Staffs customers, for all scenarios.

Caveat: The Cambridge non-household sample is quite small, leading to wide confidence ranges around the estimates. The SSW and CAM confidence ranges overlap for all scenarios.

Results: WTA values for service issue scenarios: vulnerable customers

Scenario	All HH	Medical	Comm	Life stage	Financial
Unexpected water supply interruption (24h)	£307.4	£435.8	£490.3	£371.0	£73.8
Emergency drought restrictions (2 months)	£291.9	£410.0	£493.4	£379.6	£68.9
Do not drink notice (48h)	£210.9	£313.5	£329.1	£272.7	£46.5
Boil water notice (48h)	£201.0	£272.8	£315.9	£261.8	£45.2
Unexpected water supply interruption (6h)	£171.9	£237.7	£287.3	£224.5	£39.7
Discoloured water (24h)	£134.2	£180.9	£218.6	£174.5	£34.1
Significant pollution incident nearby (4 weeks)	£120.4	£166.6	£199.5	£160.8	£28.0
Water taste and smell (24h)	£118.4	£165.1	£193.6	£156.7	£29.2
Water taste and smell (6h)	£107.8	£149.1	£181.2	£139.0	£26.8
Significant pollution incident elsewhere (4 weeks)	£105.4	£151.2	£173.8	£135.8	£26.9
Discoloured water (6h)	£99.0	£143.3	£154.3	£128.9	£24.5
Planned water supply interruption (6h)	£75.7	£107.7	£122.1	£100.3	£17.5
Unexpected low water pressure (6h)	£70.1	£94.9	£111.8	£87.8	£17.6
Low flows in rivers elsewhere (2 months)	£67.1	£91.7	£109.0	£84.4	£16.3
Minor pollution incident elsewhere (1 day)	£64.0	£88.1	£101.0	£75.8	£17.2
Minor pollution incident nearby (1 day)	£62.2	£85.3	£98.0	£78.4	£16.7
Low flows in rivers nearby (2 months)	£58.5	£78.9	£96.0	£77.9	£14.5
Hosepipe ban (5 months)	£48.3	£69.0	£81.7	£65.1	£11.1

Customers who had medical, communications, or life-stage vulnerabilities had higher valuations compared to the average customer.

As expected, financially vulnerable customers had considerably lower valuations than the average customer.

Key findings

- No significant differences were found across any household/non-household segments in terms of the impacts of the service issue scenarios (SP1 impact exercise)
- Some significant differences found across segments in the compensations required for the 'pivot' scenarios 'Boil water notice' and 'Planned 6h supply interruption' (SP2 compensation exercise)
 - Cambridge household customers required somewhat higher compensations for most scenarios than South Staffs customers
 - Cambridge non-household customers required considerably higher compensations compared to South Staffs customers, for all scenarios (Caveat: The Cambridge sample is small which leads to wide confidence intervals)
- The top-three water supply/pollution incidents requiring the highest compensations among household/non-household South Staffs/Cambridge customers were
 - Unexpected water supply interruption (24h)
 - Emergency drought restrictions (2 months)
 - Do not drink notice (48h)
- NB Customer valuations need to be supplemented by cost assessments in order to inform investment priorities via benefit-cost ratios.