Distributional impact of introducing household retail competition in the water sector

Report to Water UK

April 2016

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Executive Summary

Key Messages

The water sector in conjunction with Ofwat is currently working hard to harness market forces in order to deliver savings for customers within a number of areas of the supply chain. This report evidences the distributional impacts to be managed as part of any future market design should household retail competition be progressed.

The evidence presented in this report is based on data for water companies representing about 12 million households, about just over half of the total households supplied with water and sewerage services in England and Wales. The report does not reflect or imply the policy of Water UK or the water industry; it is presented as an input to the evidence base to inform discussion and debate.

Within existing water and sewerage charges there are a wide range of cross-subsidies between different categories of customer and services. This includes cross-subsidies for the differing costs of providing retail services for households. The retail cost to serve at the household level will be an important determinant of the size of these estimated cross subsidies.

Based on the average cost to serve assumed in current regulatory price controls, we estimate retail cross subsidies of about £52 million per year which is equivalent to £4.30 per billed household. With a de-averaged cost approach that accounts for wider variations in the household cost to serve, the estimate for total retail cross subsidies increases to about £184 million per year or about £15.10 per billed household.

Our analysis suggests a complex pattern of how these cross subsidies are distributed across household customers. Within all demographic segments there are patterns of households who contribute subsidies (typically low cost to serve households) and those who benefit from subsidies (typically higher cost to serve households). Examples of the net positions (based on the upper de-averaged estimate of cross subsidies) for different household segments include:

- Households who are mostly likely to be in debt with their water bills receive a benefit of £145 per household. Households who are least likely to be in debt contribute on average £20 per household. The most recent Ofwat estimate of the cost of household bad debt is a similar £21 per household.
- Households in the bottom 30% of incomes receive retail cross-subsidies equal to about £43 per household. Households in the top 30% of incomes contribute on average £17.
- Households who pay by direct debit contribute on average a subsidy of £14. Households who do not pay by direct debit receive on average a subsidy of £19.

Introducing retail competition for households could potentially create new drivers to unravel these retail cross-subsidies. Drawing upon recent evidence from the energy sector, we model the impact of retail switching on these current cross-subsidies across a range of market scenarios.

In the absence of policy and regulatory measures to mitigate the distributional impacts of retail switching, our evidence suggests that these retail cross-subsidies, particularly to households in vulnerable circumstances could come under pressure.

Our modelling suggests the overall cross subsidy recoverable from current retail charges could over time, and if not mitigated, reduce. This may constrain the ability of incumbent companies to assist those households in vulnerable circumstances within the current financial and regulatory framework for household retail services. Careful attention to these distributional impacts will therefore be required as part of any overall market design if household retail competition is introduced in the water sector.

Introduction

In November 2015 the Government requested that Ofwat provide an assessment by summer 2016 of the costs and benefits of extending retail competition to household customers. [1]

Through Water UK, the water sector has been exploring the key policy areas which the potential analysis should cover. One emerging theme for consideration is the potential distributional impacts of introducing household retail competition for water and sewerage services.

The analysis presented in this report is based on data for companies that provide water supply services to about 12 million households in regions across England and parts of Wales.

The purpose of this report is to inform Ofwat's call for evidence with an assessment of the distributional impacts of introducing retail competition in water.

Current cross subsidies in retail services to households

There is now an increased level of transparency about the costs of providing households with their wholesale and retail water services. Wholesale services and household retail services are subject to separate revenue controls that reflect regulatory assessments of efficient costs for these categories of service. The household retail controls are set to reflect, primarily, the average cost of providing retail services.

The current regulatory framework for household retail recognises differences in the costs of providing retail services to unmetered and metered households and whether the retail service is single (water only, sewerage only) or dual (combined water and sewerage).

Compliance with these retail controls provides the main current driver for how water companies currently set the retail component of household charges.

An important finding of this study is that within the average retail cost to serve there is potential for significant variation in retail costs across different types of household customer. These variations in turn will imply that the actual retail margins (broadly the margin between total household bills and household wholesale bills) can be expected to differ more markedly across households.

The starting point for this study has been to understand what these variations in the retail cost to serve and retail margins could look like at the overall and household level. This comparison between the retail cost to serve and actual retail margins also allows the current pattern of cross subsidies in household retail charging to be better understood. We measure cross subsidy as the difference between a household's estimated retail margin and a household's retail cost to serve.[2]

The retail cost to serve at the household level will be an important determinant of the size of these estimated cross subsidies. We present estimates based on two measures of the household retail cost to serve. The first is the average cost to serve

[1] *A better deal: boosting competition to bring down bills for families and firms* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/480798/a_better_deal_for_families_and_firms_web.pdf

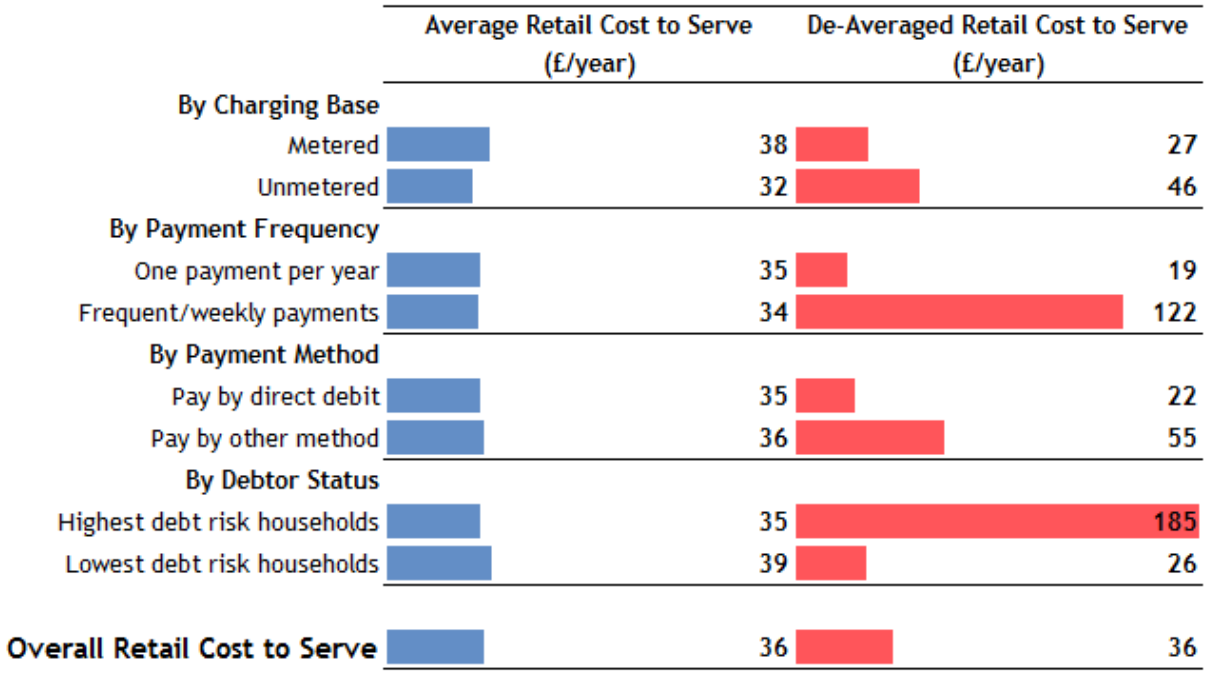
[2] In this study we define the retail margin as the total household bill (revenue) less the allowed net margin (the retail profit margin) less the household wholesale bill.

assumed in the regulatory price controls and the second is derived from an alternative measure of the household retail cost to serve.

This alternative measure is based on recognising that not all households are "average" in terms of the retail cost to serve and the actual retail cost for different household groups is likely to reflect differences in the factors that drive retail costs. Our "de-averaged" measure takes account of evidence on how the household retail cost to serve varies with a number of factors. For example, bill payment frequency (i.e. more frequent payment contacts equals higher cost), bill payment method (i.e. payments like direct debit are less costly to handle) and the handling of customer debt (i.e. management of debt and debt write-offs equals higher cost).

Figure 1 below illustrates the difference between these two measures of the household retail cost to serve used in this study. For both measures the overall retail cost to serve averages out at £36 per household per year. This data shows the average cost to serve measures is relatively uniform across the cost drivers, except for the dimension of charging base which is already recognised in the regulatory controls. The de-averaged measure shows significantly more variation across the cost drivers and also highlights that when the other retail cost drivers are explicitly recognised the differences between metered and unmetered retail cost to serve also differ.

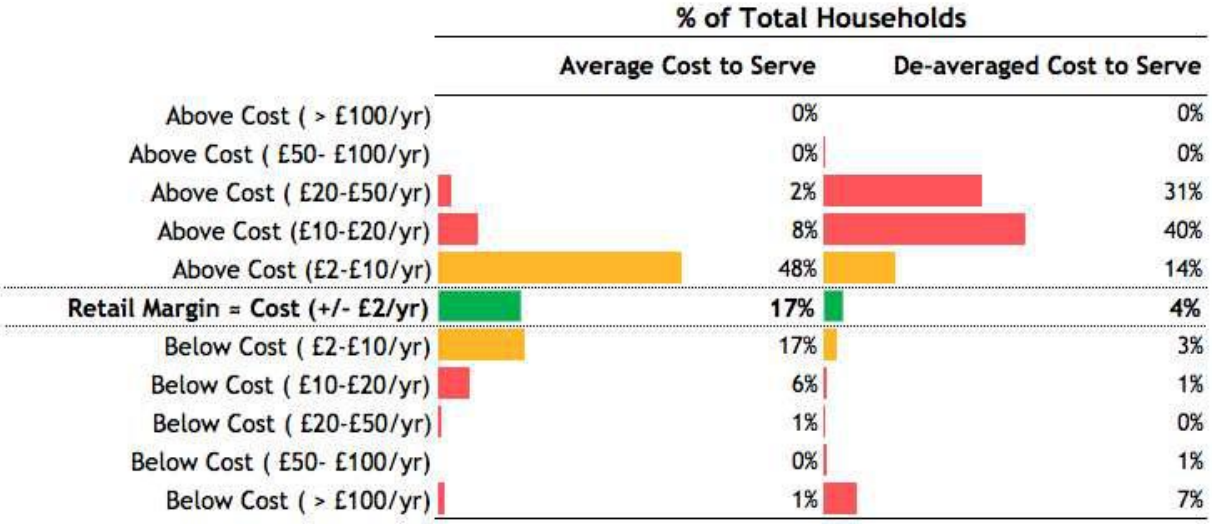
Figure 1: Comparing the measures of the household retail cost to serve



Source: ICS analysis of data provided by companies

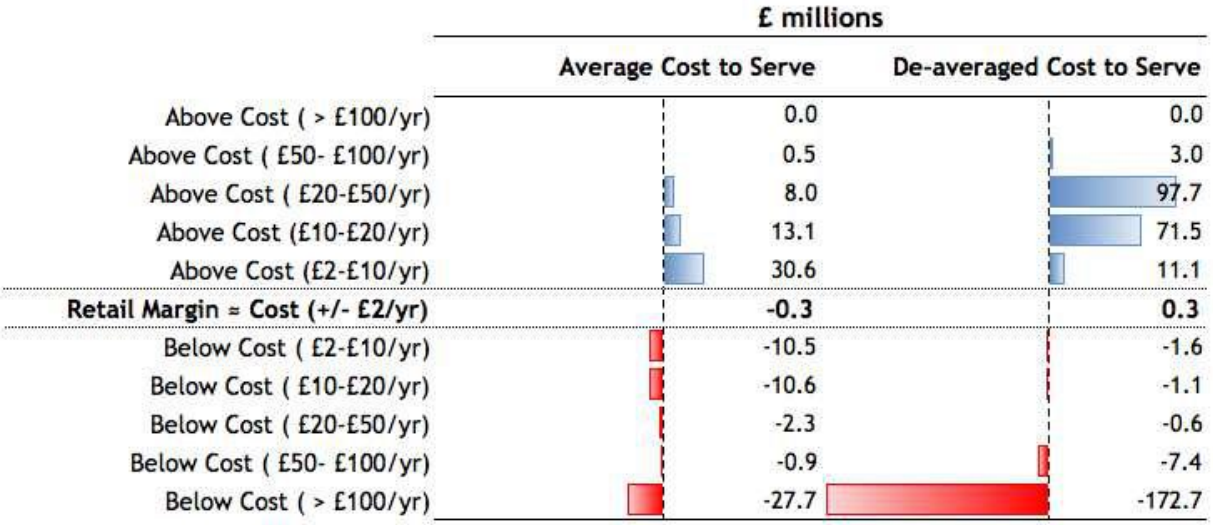
Figure 2 and Figure 3 below provide a summary view of the distribution of cross subsidies (by size of subsidy) for each measure of the retail cost to serve.

Figure 2: Comparing the distribution of retail cross subsidies under average and de-averaged cost to serve measures (% of households)



Source: ICS Analysis

Figure 3: Comparing the distribution of retail cross subsidies under average and de-averaged cost to serve measures (£ millions)



Source: ICS Analysis

Figure 2 shows the spread of households by size (and sign) of retail cross-subsidy. The "Above Cost" categories represent households contributing to cross-subsidies. These are households currently paying total bills that generate retail margins that exceed their retail costs. The "Below Cost" categories are those households benefiting from cross-subsidies (retail margins below cost).

As expected given current regulatory and business drivers the average cost to serve measure gives a distribution of cross subsidy that is concentrated around the effective zero subsidy position (margin equals cost) – 82% of households have retail margins that are within ±£10 of the average cost to serve. On this measure just under 60% of households are contributing a positive cross subsidy (> £2 per year).

Just over half of the total cross-subsidy under the average cost measure (£27.7 million out of £52 million) is attributed to the 1% of households in the "Below Cost > £100/yr" category. These households are primarily households benefiting from

social tariff subsidies that average about £180 per year per recipient (further detail on the distribution of cross-subsidies is shown below).

With the de-averaged cost to serve measure a different picture emerges. The overall value of cross-subsidies is greater (£184 million/year) and there is a wider spread. More households are estimated to be contributing cross-subsidies (> 80%) and the number of households benefiting from cross-subsidies > £100/yr is significantly higher at 7%. These differences with the de-averaged cost to serve are explored further with Table 1 and Table 2 below.

Table 1: A) Estimated cross subsidies in household retail services

Total Retail Cross Subsidies	Average Cost to Serve	De-averaged Cost to Serve
Total value of cross-subsidies in current retail charges	£52 million/yr	£184 million/yr
Total value as % of total retail costs	12%	43%
Total value as % of total revenue	1.0%	3.7%
Total cross subsidy as £ per household	£4.30	£15.10

Source: ICS Analysis

Expressed in terms of a simple £ per billed household, the de-averaged measure of cross-subsidies is £15.10 per household which is about 3.5x greater than the £4.30 per household figure under the average cost to serve measure.

This comparison reveals the impact of accounting for variations in the cost to serve within current household retail categories such a metered, unmetered, single or dual. The estimates based on the average cost to serve largely identify variations in household retail margins arising solely from tariff structures. The higher de-averaged estimates combine the effects of variations in household margins due to tariff structures with household differences in the retail cost to serve.

One factor behind the de-averaged cross subsidy estimate of £15.10 per year is the explicit recognition of retail costs due to customer debt. In its recent *Affordability and Debt 2014-15* report, Ofwat has estimated that the cost of customer debt adds the equivalent of £21 per year to household bills; in effect a comparable measure of the cross-subsidy related to customer debt.[3]

Table 2 presents more detail on which categories of household either benefit from or contribute to these retail cross-subsidies. Table 2 provides alternative segmentations of the estimated cross-subsidies by retail cost driver and household demographic for both the average cost to serve and de-averaged cost to serve measures. The estimates are not additive and represent the same overall levels of cross-subsidy segmented across these different dimensions.

[3] See Ofwat, Affordability and Debt 2014-15, December 2015. http://www.ofwat.gov.uk/publication/affordability-and-debt-2014-15/

Table 2: B) Distribution of estimated cross subsidies across household groups

Household groups receiving cross-subsidies (£ per household in group per year)			
Segmented by Retail Cost Driver:	**Nr. Of H'holds (millions)**	**Average Cost to Serve (£/yr)**	**De-Averaged Cost to Serve (£/yr)**
Households most likely to be in water debt	1.1	-6	-145
Households paying bills frequently / weekly	0.7	-6	-93
Households not on direct debit	5.1	0	-19
Segmented by Demographics:			
Bottom 30% of income distribution	3.2	-5	-43
Single parent households	0.8	-6	-40
Households with 3 or more children	0.4	-16	-34
Households living in 20% most deprived areas[1]	2.5	0	-11
Household groups contributing to cross-subsidies (£ per household in group per year)			
Segmented by Retail Cost Driver:	**Nr. Of H'holds (millions)**	**Average Cost to Serve (£/yr)**	**De-Averaged Cost to Serve (£/yr)**
Households least likely to be in water debt	1.0	7	20
Households paying bills quarterly or less	4.0	-1	15
Households on direct debit	7.0	0	14
Segmented by Demographics:			
Top 30% of income distribution	4.0	3	17
Households with 2 or more pensioners	1.2	1	9
Households with working age adults, no children	5.0	1	3
Households living in 20% least deprived areas[1]	2.4	2	7

1. Measured as the 20% of local authorities represented in the water company areas with the highest Index of Multiple Deprivation

Notes: A positive value indicates a category currently paying retail charges above retail cost. A negative value indicates a category currently paying retail charges below retail cost.

Source: ICS Calculations

These estimates represent the net effect for each group. Within the overall assessment for each group (detailed more fully in the main report) the underlying patterns show a spread of households within each category who benefit and who contribute. For example, for households in the bottom 30% of incomes the de-averaged estimate of -£43/year is made up of 2.2. million households who contribute an average cross-subsidy of £16 each and 0.95 million households who receive an average cross subsidy of £180 each. The former will include low income households who are also below average cost to serve, while the latter will be low income households who are either above average cost to serve or benefiting from social tariff subsidies or both.

In general, the patterns of cross-subsidy become more acute when wider differences in the retail cost to serve are recognised with the de-averaged measure of retail

cross subsidy. It is these wider cross-subsidies and the associated differences in the retail cost to serve that have not yet been recognised within present charging structures and which could as a result come under more focus with household retail competition.

Market scenarios for household retail services

In this report we have considered a range of market scenarios to estimate how the current cross-subsidies could potentially be impacted over time should new household retail markets develop in water. The analysis also considers these impacts in the absence of any mitigating policy or regulatory interventions as part of an overall market design.

We present the assessment of the potential impacts with reference to the wider estimate of retail cross-subsidies derived from the de-averaged cost to serve measure. The current regulatory and business drivers mean that current household retail prices do not explicitly reflect the retail cost variations due to factors like billing frequency, billing method and customer debt. These wider cross subsidies could become more exposed under retail markets scenarios as new competing retailers seek to identify profitable retailing opportunities and establish and grow retail market share.

The retail scenarios considered range from a basic generic option where all households are given the option to choose their supplier to more limited options where choice is offered only to metered households and to retail options for categories of unmetered household.

The scale and distribution of the impacts will also depend on the strength of household engagement with retail markets in water. Engagement with retail markets in turn would be influenced by a number of factors, including the levels of potential bill savings offered by competing retailers, the ease of switching and experience in other markets. Our analysis uses evidence about household retail switching in other utility markets – principally energy – to develop ranges of impacts based on low to high switching scenarios. Under the low scenario overall 14% of water households are predicted to switch, whereas the figure is 32% under the high scenario.[4]

For our generic market scenario we estimate that household retail switching could over time result in the unwinding of around £25 to £60 million of annual cross-subsidies out of the upper estimate of £184 million for current cross subsidies. The main driver for these effects will be the retail cost to serve and demographic characteristics of the households who are predicted to switch retailers and those who are not.

Similar to evidence from analysis of switching in other utility markets, our modelling suggests that households who pay their bills more frequently, households who are less likely to pay by direct debit and more generally households likely to be in vulnerable circumstances will tend to participate less, and hence benefit less, in water retail markets compared to other households.

The distributional impacts under retail competition

Figure 3 below present an assessment of the distributional impact of unwinding the current cross-subsidies in household retail services. These impacts are assessed

[4] These modelled switching rates are based on an assumed annual retail bill saving to switchers on average of £8/year (which is relatively modest but considered realistic in the water retail context)

against the "low" and "high" scenarios for the generic option of allowing all households the opportunity to switch their retailer. A key finding is that as retail switching increases the distribution of cross-subsidies will become more acute.

Table 3: Distributional impact of unwinding cross subsidies in household retail services

Category	Current Estimate	Alternative under retail competition	
	With de-averaged cost to serve	Low Scenario	High Scenario
Total cross-subsidies in water company retail charges (£, millions)	184	158	124
Household groups receiving cross-subsidies (£ per household in group per year)			
Segmented by Retail Cost Driver:	With de-averaged cost to serve	Low Scenario	High Scenario
Households most likely to be in water debt	-145	-152	-161
Households paying bills frequently / weekly	-93	-99	-108
Households not on direct debit	-19	-23	-32
Segmented by Demographics:			
Bottom 30% of income distribution	-43	-49	-60
Single parent households	-40	-46	-56
Households with 3 or more children	-34	-40	-51
Households living in 20% most deprived areas[1]	-11	-16	-22
Household groups contributing to cross-subsidies (£ per household in group per year)			
Segmented by Retail Cost Driver:	With de-averaged cost to serve	Low Scenario	High Scenario
Households least likely to be in water debt	20	20	20
Households paying bills quarterly or less	16	15	14
Households on direct debit	14	13	13
Segmented by Demographics:			
Top 30% of income distribution	17	17	17
Households with 2 or more pensioners	9	8	6
Households with working age adults, no children	3	1	-3
Households living in 20% least deprived areas[1]	7	6	3

Notes: The switching scenario assumes a relatively modest average retail cost saving of 20% (£8 per year) for switching households. The household group impacts reported in the table are not additive and represent the same overall levels of cross-subsidy segmented across these different household dimensions.

Source: ICS Calculations

The impacts reported above should be interpreted as the medium term consequences that could be expected to arise in the absence of mitigating policies. With retail competition the amount of cross subsidy recovered by the incumbent companies through their current retail charges is estimated to decline by between £25 million/yr (low switching) to £60 million/yr (high switching). This reflects the expected market dynamic of the incumbent companies losing above average retail margin households to competing retailers.

This pattern of retail switching will impact directly on the distribution of current cross subsidies. Within the overall cross subsidy deficit, higher margin households will be those most likely to switch and this reduces the average cross-subsidy contribution recoverable from the positive margin households who do not switch. Similarly, the average cross-subsidy required by the subsidised households who remain with incumbents will tend to rise.

Conclusions and future considerations

The findings of this study emphasise the importance of recognising in current policy debates the potential for distributional impacts arising from household retail competition.

A key factor that underlies these potential impacts is the assessment of the actual costs of providing retail services to different household groups. Understanding how these costs vary across household segments will be important to informing the consideration of overall costs and benefits, and the design of any potential household retail markets.

Any market design of household retail markets will also need to consider ways to mitigate the challenges of these potential distributional impacts. Managing the transition to household retail markets in the water sector, should this reform be taken forward, could also have an important influence on the pace and scale of any unwinding of these cross-subsidies.

These challenges are similar to those observed in related utility markets and the experience of the recent reviews in the retail energy market will provide key learning points for policy makers. Understanding how these challenges may be managed across these markets if retail competition is to develop in water will be an important further consideration.

Our assessments have relied – given time constraints - on readily available data for household demographics and the household retail cost to serve. In the report we make a number of recommendations for taking forward this analysis and areas for data improvement.

1 Introduction

Water UK has commissioned ICS Consulting to report on the distributional impacts of household retail competition in the water sector, to support Ofwat's call for evidence (as detailed below).

1.1 Background

In November 2015 the Government requested that Ofwat provide an assessment by summer 2016 of the costs and benefits of extending retail competition to household customers. [5]

As part of this work, Ofwat published both its draft terms of reference[6] for the assessment and issued a call for evidence. [7]

Through Water UK, the water sector has been exploring the key policy areas which the potential analysis should cover. One emerging theme for consideration is the ***potential distributional impacts*** of introducing household retail competition for water and sewerage services.

The purpose of this report is to contribute to Ofwat's call for evidence with an assessment of the distributional impacts of introducing retail competition. As such the contents of this report should not be taken to reflect or imply the policy of Water UK or the water industry but regarded as an input to the evidence base to inform discussion and debate.

1.2 Issues to be explored

The focus for this report is to consider the potential impact of household retail competition and the potential impact of unwinding existing cross subsidies affecting different classes of customer, in particular customers in vulnerable circumstances.

These impacts will depend on the assumptions of which retail competition model could be introduced. In its draft terms of reference Ofwat has identified the following potential models:

- A "thin" retail market: where the scope of the market activities was limited to providing core retail activities, such as billing and payment handling;
- A "thick" retail market: one which includes a wider scope of activities (risk and opportunity) that retailers could undertake, including resource procurement, local distribution networks, meter provision and metering, new connections and more customer interactions;
- A "narrow" market: one in which a specific sub-set or sub-sets of household customers are contestable. This would for example allow different regions or segments of the market to opened at different times;
- A "wide" market: one in which all household customers are contestable.

[5] *A better deal: boosting competition to bring down bills for families and firms* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/480798/a_better_deal_for_families_and_firms_web.pdf

[6] http://www.ofwat.gov.uk/wp-content/uploads/2016/01/pap_con20160115hhcompetitiontor.pdf

[7] http://www.ofwat.gov.uk/wp-content/uploads/2016/01/pap_con20160118hhcompetitioncfe.pdf

These potential models have informed the development of the scenarios considered in this report.

1.3 Project approach

The approach adopted for this project is summarised below:

Figure 4: Approach to assessment of distributional impacts

Review of evidence from other sectors

- Previous studies of distributional impacts in other utility sectors
- Experience of switching in household energy markets

Methodology for estimating distributional impacts

- Development of a methodology (informed by earlier studies)
- Development of competition scenarios
- Data requirements (and issues) - household and cost data
- Modelling assumptions

Assessment

- Estimated distributional impacts under each modelled scenario

Recommendations

- Identify further developments, particularly on household data

1.4 Structure of this report

The rest of this report is structured as follows:

- Section 2 presents conclusions from a review of evidence from other utility sectors. A key focus relates to evidence on the number and type of households who have engaged with the liberalised retail markets in other sectors.
- Section 3 provides details of our methodology and the data and assumptions used to develop the analysis.
- Section 4 presents the main findings on the distributional impacts of the retail market scenarios considered.
- Section 5 provides conclusions and recommendations for further work to improve the evidence presented in this report.
- Annex 1 provides more detail from the literature review underpinning assumptions presented in Section 2

2 Review of evidence from other sectors

A key question with the introduction of household retail competition will be: ***who switches***?

The evidence presented in this section largely draws upon recent experiences in the energy markets, though experience from other markets where household switching is established (e.g. telecoms) is also noted.

A notable finding for instance is that a strong determinant of the propensity to switch in energy is a propensity to switch in other markets. This is useful to know in the water context as it provides grounds for expecting "water switchers" to mirror switchers in other markets.

2.1 The factors that may influence retail switching in water

This section provides a summary of conclusions on factors and evidence used as part of developing scenarios for evaluation. The factors in Table 4 taken from literature are a mix of demographic characteristics and behavioural factors. The former can typically be modelled as explanatory variables using available data. The latter have informed assumptions made about switching behaviours we may observe based upon experience from similar markets.

A more detailed analysis of the literature underpinning the assumptions below can be found in Annex 1.

Table 4: Potential factors influencing future retail switching

Factor	Strength	Evidence	Captured by modelling (Y/N)
Actual/perceived bill saving	High	Most customers state their first reason for switching utility supplier is to save money. Evidence from banking and energy suggests savings of £100-£120 are needed to tempt significant numbers of customers to switch in baking and energy. The CCP estimated maximum savings in the region of £40 on average in household water retail[8]. • CCP (2016) • Deller et al (2014) • He and Reiner (2015) • SWW Customer Research (2016)	Y
Perceived time costs of switching	High	Part of the trade-off customers consider with the above. The expected time to switch amongst 'non-switchers' often exceeds both the actual time and the expectations of those who did switch. • CCP (216) • Deller et al (2014) • Hortaçsu et al (Feb 2015)	Y
Access to internet	Medium	Both access to the internet and confidence using price comparison websites are	N

[8] £40 being an assumed maximum scope for switching based on an average bill of £400 and Retail = 10%

Factor	Strength	Evidence	Captured by modelling (Y/N)
		positively correlated with switching behaviour in energy. Potential crossover with age, disability, education, SEG as indicator of vulnerability. • CMA Energy Market Investigation • Deller et al (2014)	
Product characteristics	High	Homogenous products can fail to excite consumers reducing market participation. Low levels of switching partially explained by 'inattention'. Water could therefore be similar. • CMA Energy Market Investigation • He and Reiner (2015) • Hortaçsu et al (Feb 2015)	Y
Switching behaviour in similar markets	High	Literature suggests a positive association between switching in different sectors, i.e. if a consumer switches supplier in one market it is associated with the consumer being more likely to switch in other markets as well. • CCP (2016) • He and Reiner (2015) • Waddams Price and Zhu (2016) • Flores and Waddams Price (2013)	Y
Household income	Medium	The picture is complex. In isolation it would appear higher income households are more willing to switch. When controlling for other factors literature suggests low income households are more willing to switch, but crucially have less patience for the time required to perform a switch than higher income/education equivalent households. • Waddams Price and Zhu (2016) • Hortaçsu et al (Feb 2015)	Y
Socio Economic Grouping	Medium	Groups D to A engagement and switching increases with social status despite bill savings forming a falling proportion of income. Group E reverses the trend slightly, possibly through more frequent market interactions when on pre-pay meters. • Ofgem/CMA evidence	Y
Payment type	High	Evidence from energy suggests customers paying by direct debit are more likely to switch than customers paying annual/quarterly bills. DD payment an indicator of budgeting and desire to realise savings. Pre-pay customers in energy sit between the two, but have reduced options	Y

Factor	Strength	Evidence	Captured by modelling (Y/N)
		and potential savings. • Ofgem/CMA evidence	
Education	Medium	Both international and UK experience show participation increasing with educational attainment. • CMA Market Investigation • Hortaçsu et al (Feb 2015)	N
Disability	Medium	Disabled customers are less likely to switch. Potential explanations include complexity of tariffs, more likely to lack confidence using PCWs and more likely to be on a prepay meter. • CMA evidence[9]	N
Age	Low	Non-linear relationship whereby probability of switching lowest amongst youngest and oldest groups. Reflects attitudes and barriers such as internet access in latter case. • Ofgem/Ipsos Mori tracking survey • Waddams Price and Zhu (2016)	Y
Property tenure	Medium	Several factors suggest rental households may be less likely to engage. These include shorter payback period for time invested in the process, knowledge of meters, responsibility for bills with landlord or multiple tenants. This is in addition to underlying income effects. • CCP (2016) • CMA Energy Market Investigation	Y
Gender	Low	There is some evidence suggesting a weak relationship between propensity to switch and gender. This suggested males were less likely to switch and females more sensitive to switching time. • Waddams Price, Webster and Zhu (2013)	Y
Ethnicity	Low	Evidence that engagement is lower in BME groups. Some studies suggest language barriers can increase complexity associated	Y

[9] https://assets.digital.cabinet-office.gov.uk/media/54e75c53ed915d0cf700000d/CMA_customer_survey_-_energy_investigation_-_GfK_Report.pdf

Factor	Strength	Evidence	Captured by modelling (Y/N)
		with the switching process, reducing market participation[10]. • Ofgem/Ipsos Mori tracking survey • Age UK	
Location (Rural/Urban)	Low	Correlation exists in energy between participation and location. Could be a proxy for income effects. • Ofgem/Ipsos Mori tracking	Y

10 http://www.ageuk.org.uk/brandpartnerglobal/kensingtonandchelseavpp/documents/information%20and%20advice/switching-energy-tariffs-jun12.pdf (P.5)

3 Methodology for estimating distributional impacts

This section of the report describes the methodology and data we have used to estimate both current cross subsidies and how they could be impacted under different scenarios for retail household markets.

3.1 Economic underpinnings

Any assessment of the distributional impact of a potential policy change requires, at least conceptually, an estimate of welfare changes at individual household level and also by market or customer segment. It is also usual to assume aggregate welfare remains unchanged though this is not an absolute requirement and this may be applicable to the current context. It is this context that the Ofwat review will have to address.

In practice, economic welfare changes are not readily observed as they require knowledge of often unobserved demand curves. Therefore, it is standard practice to estimate welfare changes through simpler measures like bill changes or proportionate price changes. This is noted in Waddams Price and Hancock (1998).[11]

The Waddams Price and Hancock (1998) study used the annual Family Expenditure Survey to explore the impact on household utility bills of changes to relative prices to different market segments (household types) following liberalisation of residential telecoms, gas and electricity markets. The study models, in effect, bills at the household level before and after the introduction of retail markets in these sectors.

This itself identifies an essential pre-requisite as being the measurement of "before" and "after" bills and / or prices.

For the present study, the design of any household retail markets in water are not yet known and the "after" position for bills/prices is not yet observable, i.e. there are no market prices as yet. Therefore, any impacts can only be estimated on the basis of assumed parameters for both market design and household participation in water retail markets.

For this study, the "before" bills are defined as current wholesale and retail bills. Within these baseline bills there will be patterns of cross-subsidies that can be measured and estimated. Given, the "after" bills are not observable the focus of our methodology is on quantifying how different retail market scenarios may impact on this baseline distribution of cross-subsidies.

These distributional impacts will be influenced by a number of factors, specifically:

- The retail market competition scenario (e.g. thin, thick, narrow, wide); and
- The expected likelihood of a household switching to competing suppliers. This will depend on the value proposition that is assumed for each household. In very broad terms, "high value" households would those households who are high margin customers (due to paying baseline bills above their full retail cost to serve) and conversely low margin

[11] Waddams Price, C. and R. Hancock (1998) Distributional effects of liberalising UK Residential Utility Markets. Fiscal Studies, 19(3) pp 295-319.

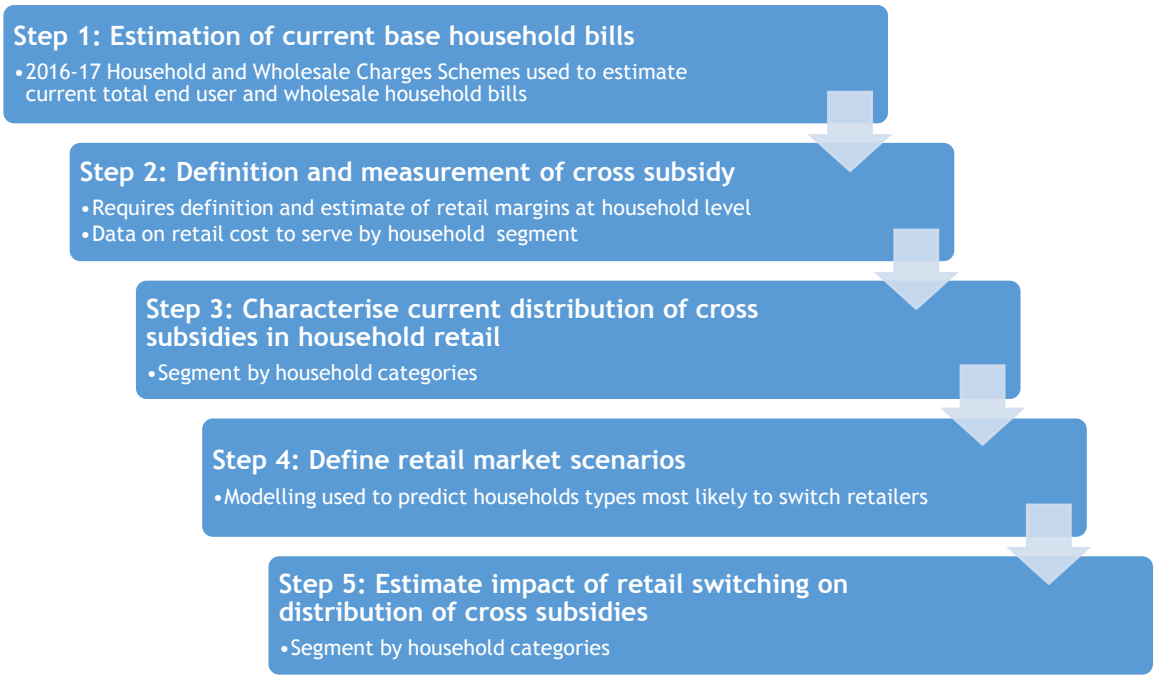
customers are those segments who benefit from current subsidies in water charges.

The distribution of retail margins (and related to that the distribution of the retail cost to serve) across different household segments will have an important bearing on the current pattern of cross subsidies within retail charges. This makes it necessary to understand how the retail costs to serve at the level of individual household segments differ compared to the average costs of retail services (which provide the underpinnings to the current revenue controls for household retail services).

The distribution of retail margins relative to actual retail costs at the household level will also influence levels of activity in household retail markets. Households who currently generate high retail margins will be the households attractive to competing retailers and where those high retail margins reflect current cross-subsidies embedded in current charges, market pressures could potentially erode and unwind those cross-subsidies.

Figure 5 sets out the methodological steps we have adopted for this study. Further detail on the data sources employed is provided in the subsequent sections.

Figure 5: Methodology for estimating distributional impacts on retail cross subsidies



3.2 Step 1: Estimation of current base household bills

We have estimated current total (wholesale + retail) and wholesale household bills using the published 2016-17 charging schemes. The baseline bills are for water supply and sewerage services and are estimated for samples of water supply households, which are used to represent the household charging bases for each of the water company areas (see below).

Each sample household is identified with a water supply provider and a sewerage provider. All the water supply providers in this study are represented by the companies providing data. Where sewerage services are provided by a non-

participating sewerage company, the published charges schemes have been used to provide the appropriate sewerage charges.

3.2.1 Household data

The analysis developed in this report employs the household data-sets employed previously for the 2009 UKWIR Future Charging Methods project. This previous project developed a suite of company specific spreadsheet modelling tools that were designed to allow companies to estimate the household distributional impacts of alternative charging methods and options.

The same modelling tools were also used as part of the independent Walker Review of Charging. These modelling tools contain data samples for household customers in each company area. These samples are derived from versions of the Family Resources Survey dating back to 2005-06.

Table 5 below summarises below the sample sizes available for the companies that provided data for this project.

Table 5: Household sample sizes by water company providing data

Company	Size of Household Sample (n)
Affinity Water	1,246
Central	1,160
East	41
South	45
Anglian Water	1,918
Anglian Water Supply Area	1890
Hartlepool Area	28
Northumbrian Water	1,879
North	1,072
South	807
Severn Trent Water	2,991
South West Water/Pennon	791
South West Water	660
Bournemouth Water	131
United Utilities	2,840
Total Sample	**11,665**

This provides a total household sample size of 11,665 to represent the charging bases of these companies.

The household charging bases were originally calibrated to 2007-08 levels. The UKWIR charging models include a forecast of charging base (metered, unmetered RV) to 2019-20 based on the predictions of a meter optant switching model and we utilise the predicted charging base classifications for the sample households to align with actual meter penetrations for each company in 2016-17. This provides a slightly more accurate view of the actual current mix of households by charging base for this project.

We have re-calibrated the metered and unmetered household numbers represented in the model to current levels (2016-17). This in effect requires a re-weighting of the available sample data for numbers of metered and unmetered households. We have not re-weighted the demographic composition of the unmetered and metered sub-samples (which is a limitation of using this data for the present analysis).

Table 6 below describes the main variables held within the datasets.

Table 6: Variables included in the household datasets

Variable	Type of Variable
Water Supplier	Categorical
Sewerage Supplier	Categorical
Charging Base	Categorical
Water Resource Zone	Categorical
Council Tax Band	Categorical
Property Type	Categorical
Number of Bedrooms	Continuous
Household Size	Continuous
Average Rateable Value (if unmetered)	Continuous
Average Household Income (various measures)	Continuous
Household Water Demand - annual	Continuous
Household Water Demand - winter	Continuous
Household Water Demand - summer	Continuous
Acorn A Household	Categorical
Receipt of Pensioner Benefits	Categorical
Receipt of Disability Benefits (Pre ESA)	Categorical
Receipt of Council Tax Benefit	Categorical
Receipt of Housing Benefit	Categorical
Receipt of Income Support	Categorical
Receipt of Job Seekers Allowance	Categorical
Receipt of Working Tax Credits	Categorical
Receipt of Child Tax Credits	Categorical
Vulnerable Group Status	Categorical
Income Decile	Categorical
Household Composition / Type	Categorical
Region	Categorical
Local Authority	Categorical

In addition to the above variables currently held in the model, the following further variables are also available:

- Number of water and sewerage payments in year
- Housing tenure/status (e.g. owner occupier, renter, social housing)
- Age group (for head of household)
- Ethnic Grouping
- Number of dependent children.

Using the Local Authority variable we also extended the datasets to include location classifications (e.g. predominately urban, significantly rural)[12] and deprivation measures by local authority area.[13] These variables were identified as being relevant to our modelling of retail switching and household water debt status.

We advised the project Steering Group of our assessment that the benefits receipt indicators were are the least reliable variables in these household datasets. For this reason the use of these variables was minimised in the development of the study methodology.

3.2.1.1 Household income data

A number of adjustments were also made to the measures of household income available in the household samples. Specifically:

- Household income levels were rebased to 2013-14 prices
- The rebased household incomes were then scaled by observed growth (by income decile) in household income over the period 2005-06 to 2013-14.

Both adjustments made use of analysis of the 2013-14 Family Resources Survey recently published by the Institute of Fiscal Studies.[14]

The thresholds for income deciles were also updated to match the rebased 2013-14 income levels.

3.2.2 Charges data

The published 2016-17 household and wholesale charges schemes provide the basis for estimating baseline bills for the household samples. Individual company charges and in some cases zonal charges have been used in this study.

Most companies now offer social tariffs for households in vulnerable circumstances and the numbers of households on these social tariffs have been matched to subsets of households with our sample datasets. The recognised social tariffs in the datasets are:

- WaterSure (offering eligible households bills capped at the average household bill in each company area);
- AquaCare (this is a social tariff specific to households served by Anglian Water);
- Affordability tariffs - these capture the new social tariffs introduced by companies. In most cases we have modelled the discounts offered under

[12] These are derived from data described in DEFRA (2005) Defra Classification of Local Authority and Unitary Authorities in England: A Technical Guide, July 2005.
[13] For this study would have sourced indices of multiple deprivation from ONS Neighbourhood statistics https://www.neighbourhood.statistics.gov.uk/dissemination/)
[14] See Belfield, Chris et al (2015) Living Standards, Poverty and Inequality in the UK: 2015, Institute for Fiscal Studies, July 2015 and http://www.ifs.org.uk/uploads/publications/bns/bn19figs_update2015.xlsx

these arrangements as average % reductions or capped levels of household bill.

In total around 200,000 households (127,000 metered, 73,000 unmetered) on these social tariffs are represented in our datasets.

The calculation of baseline bills also takes account of direct debit discounts offered by two companies in this study (United Utilities and Northumbrian Water).

3.2.3 Baseline bills

Table 7 below presents the estimated baseline household bills derived from the household data and company specific charging structures.

Table 7: Estimated baseline total and wholesale household bills

Category	Average End User (wholesale + retail) Bills (£, 2016-17 prices)	Average Wholesale Bills (£, 2016-17 prices)
Water		
Unmetered	199	181
Metered	181	160
Sewerage		
Unmetered	215	197
Metered	210	190
Combined		
Unmetered	414	378
Metered	391	350

Source: ICS Calculations

3.2.3.1 Affordability of baseline bills

As a simple sense-check of the baseline bills and income levels utilised for the present study, we have compared our data to recently published Ofwat evidence on the affordability of water bills.

In its *Affordability and Debt Report 2014-15*, Ofwat has published estimates for the affordability of water (and sewerage) bills based on analysis of the 2013-14 Family Resources Survey. These estimates are provided for England and Wales. [15].

Ofwat measures affordability of water bills as the % of household income that is expended on a household's water and sewerage bill. Household income is measured as unequivalised household income after taxes and after housing costs. [16]

Table 8 below compares the affordability statistics reported by Ofwat for 2014-15 and compares them to similar statistics derived using data for our sample households/water companies.

[15] See Ofwat, Affordability and Debt 2014-15, December 2015. http://www.ofwat.gov.uk/publication/affordability-and-debt-2014-15/

[16] Unequivalised means no adjustment to household income to reflect differences in purchasing power / living standards across different types of household composition.

Given differences in the populations represented, the underlying data-sets and time periods covered, this comparison provides only a broad sense-check. Nevertheless comparing the present study to the Ofwat estimates for England shows a broad convergence in the affordability statistics.

Table 8: Affordability of baseline bills compared to previous Ofwat estimates.

Category	% of household spending > 3% of weekly household income on water and sewerage bills	% of households spending > 5% of weekly households income on water and sewerage bills
Ofwat (2014-15)		
England	23%	11%
Wales	32%	15%
Present study		
6 water companies (12.1. million households)	20%	5%

Sources: Ofwat (2015) Affordability and Debt 2014-15 and ICS calculations

3.3 Step 2: Definition and measurement of cross subsidy

3.3.1 The relevant cross-subsidies

The current cross-subsidies within the water sector can be classified into 3 broad categories:

- Wholesale service cross-subsidies
- Retail service cross-subsidies
- Wholesale cross-subsidies recovered through retail charges

3.3.1.1 Wholesale service cross-subsidies

These would include the cross-subsidies associated with rural vs. urban, peak vs. off peak, location on system, large users vs. small users, unmetered vs. metered.

Our view is that these cross-subsidies should be largely un-affected under most household retail scenarios and hence would not feature in our modelled scenarios. Wholesale cross-subsidies would be preserved through the wholesale charges paid by household retailers.

The one exception to this will be scenarios where a household retail offering includes meter choice (see further below on scenarios).

3.3.1.2 Retail service cross-subsidies

The current household retail controls are average controls across charging base (unmetered and metered) and service (water and/or sewerage). These retail controls make allowance for an efficient average cost to serve and a uniform net (profit) margin of up to 1% (of revenue). These controls do not currently recognise any customer acquisition and retention costs.

As such the current retail prices that comply with these controls will mask a range of cross-subsidies that relate to differences in the retail cost to serve across different household segments within the current controls (see further below in section 3.3.3).

The analysis of distributional impacts presented in this report focuses on the unwinding of these current retail cross-subsidies.

3.3.1.3 Wholesale cross-subsidies recovered through retail charges

At present companies are required to recover the subsidies associated with social tariffs and protections through the household retail controls.

These subsidies are largely related to charging eligible households below cost for their wholesale services as a form of affordability protection. Under present mechanisms these wholesale subsidies would not be recoverable from new retailers and hence this will generate potential impacts for non-switching and non-eligible households.

3.3.2 Defining and measuring cross-subsidies at the household level

The baseline household bills estimated for total and wholesale services provide our starting point for the measurement of retail cross subsidies.

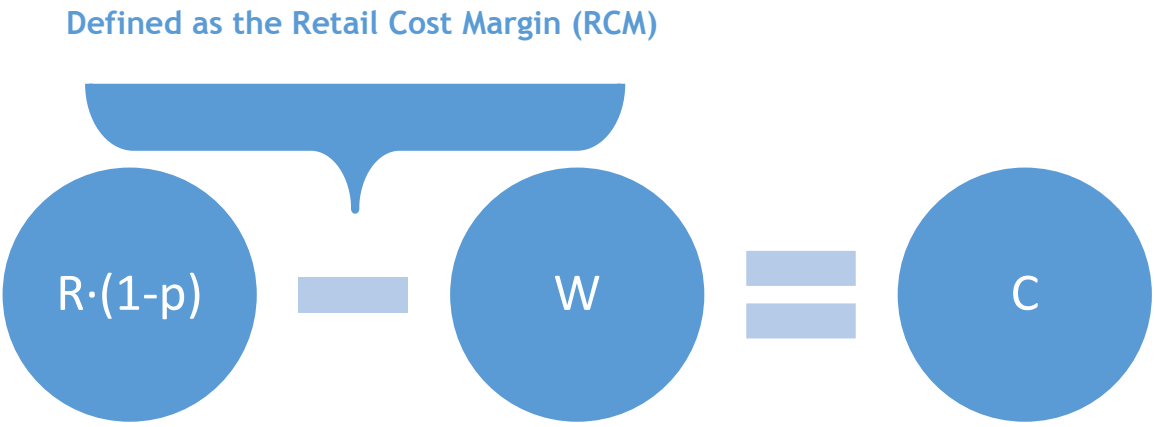
First, we define the total household bill as representing the sum of two components – a bill for wholesale services and a bill for retail services. This in turn allows us to calculate for each household an estimated (gross) retail margin as the difference between the total end user bill and its wholesale bill:

Next, we recognise that gross retail margins (GM) are intended to reflect two components:

The gross retail margin (GM) in effect measures the price for retail services faced by each household.

Under Ofwat's price setting methodology, net margins (NM) are set to provide a profit margin on retail activities providing amongst other things a return on these retail activities. These net margins are set – or limited – to be a fixed % of total revenue (R) which we denote as $p{\cdot}R$ (where p is a percentage value). In its PR14 Final Determinations Ofwat made allowance for a value for p = 1% for household retail services.

This allows us to re-write the above definitions as:

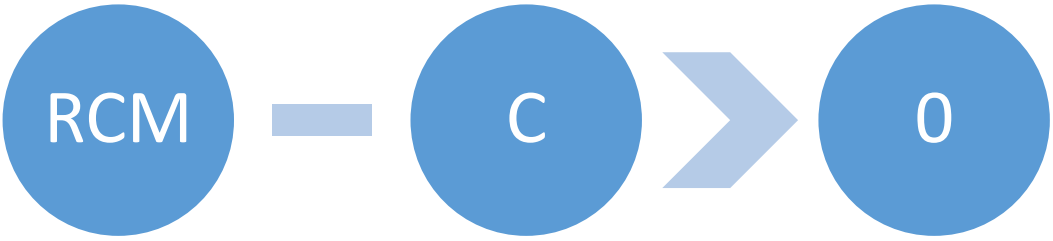


The left hand side of this expression measures the total household bill (less the retail profit margin) less the wholesale bill. We label this difference for the purposes of this study as the *Retail Cost Margin (RCM)*.

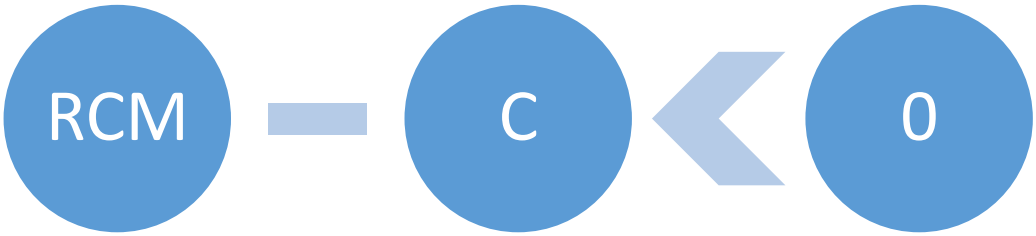
When this *Retail Cost Margin* is equal to the retail cost to serve (C), then the household is paying a price for retail services that will recover exactly the cost of providing to retail services to that household. Given end user prices reflect retail controls set on the basis of averaged retail costs, this outcome will only be observed when averaged across all households (within each retail revenue control category).

At the individual household level, differences between our measure *RCM* and *C* will reflect situations where a household is actually either paying above its retail cost to serve or below its retail cost to serve. These differences will capture underlying cross-subsidies within the structure of retail charging as well as any cross-subsidies embedded in our measure of *RCM* (for example, the discounts in end user bills associated with social tariffs).

We define the situation of positive cross-subsidy (or positive net RCM) as cases where:



Conversely, cases of negative cross subsidy (or negative net RCM) are measured as:



This latter case we would expect to be especially true for customers on social tariffs because of the wholesale discounts embedded in the measure of *RCM (where R·(1-p)*

< *W*). The observation of a negative value for the measure *RCM – C* will also, however, apply to situations where the *RCM* for a particular household is below its cost to serve.

3.3.3 Average retail cost to serve versus de-averaged retail cost to serve

The preceding discussion and definitions serve to highlight also the importance of the measure of *C* – the retail cost to serve – at the level of individual households and in particular its importance to the estimation of cross-subsidies.

A key requirement for this study has been to develop the ability to segment this household retail cost to serve by underlying cost drivers for different household segments.

Within the timescales available to this study this requirement has been met primarily through:

- Developing models of payment frequency and methods;
- Developing models of debt risks; and
- Combining the outputs of these models with available company data on how retail costs to serve vary by payment frequency/method and debt risk.

These factors were identified early on in the project as the ones most likely to drive differences in the retail cost to serve for households and we have utilised various data-sources. These sources include:

- Data on the frequency of water bill payments available in the household data-sets;
- Company data segmenting household payment methods by ACORN/MOSIAC demographic classifications;
- Company models/data relating retail costs to indices of multiple deprivation at level of local areas.

Utilising this data, Logit econometric models were used to predict:

- Probability of sample household payment frequency and method; and
- Probability of sample household being in debt.

We provide further details on this modelling in the sub-sections below.

3.3.3.1 Frequency of water payments as proxy for payment type

The household datasets include information on how frequently the sample households make payments for water and sewerage services within a year. Data was missing for about 16% of the available sample.

A multi-nominal logit (MNL) model of payment frequency categories was estimated as a function of the following variables:

- Charging base (metered =1);
- Income decile;

- Household age category;
- Housing tenure (rented property = 1); and
- Benefit status (receipt of benefits =1).

The MNL model estimates the influence of these factors on the probability (likelihood) of a particular payment frequency category being observed relative to a base category. The payment categories modelled are listed below (with category 4 representing the base category):

1. Annual payments,
2. Half-Yearly,
3. Quarterly,
4. Regular Payments (< monthly),
5. Monthly,
6. Frequent/Weekly

The estimated coefficients for the MNL model are in line with expectations and in most cases statistically significant at the 5% level. Table 9 summarises the findings from the modelling of payment frequencies

Table 9: Findings from modelling of payment frequencies

Variable/factor	Finding
Charging Base (Metered = 1)	Positive and statistically significant across all categories. Metered status has strongest influence on quarterly and monthly payment categories. Influence is weakest for categories 1 (annual) and 6 (frequent)
Income Decile (1 = bottom, 10 = top)	Negative and statistically significant for category 2 (half yearly) and category 6 (frequent). This means higher income households are less likely to use these payment frequencies compared to the base category 4.
Age Band	Statistically significant across all payment categories. Higher age groups are more likely (relative to base category 4) to use category 1 (annual), and category 2(half yearly). Higher age groups are less likely (relative to the base category) to use quarterly payments, monthly payments and frequent/weekly payments.
Housing Tenure (Renting = 1)	Positive and statistically significant for all payment categories. This means households in rented properties are more likely to use all of the other payment categories compared to the base category, with the effect strongest for the frequent/weekly category.
Benefits status (Receipt = 1)	Statistically significant for category 1 (less likely than category 4) and category 6 (more likely than category 4). Factor with the strongest influence on households paying by category 6 (frequent/weekly).

Source: ICS analysis

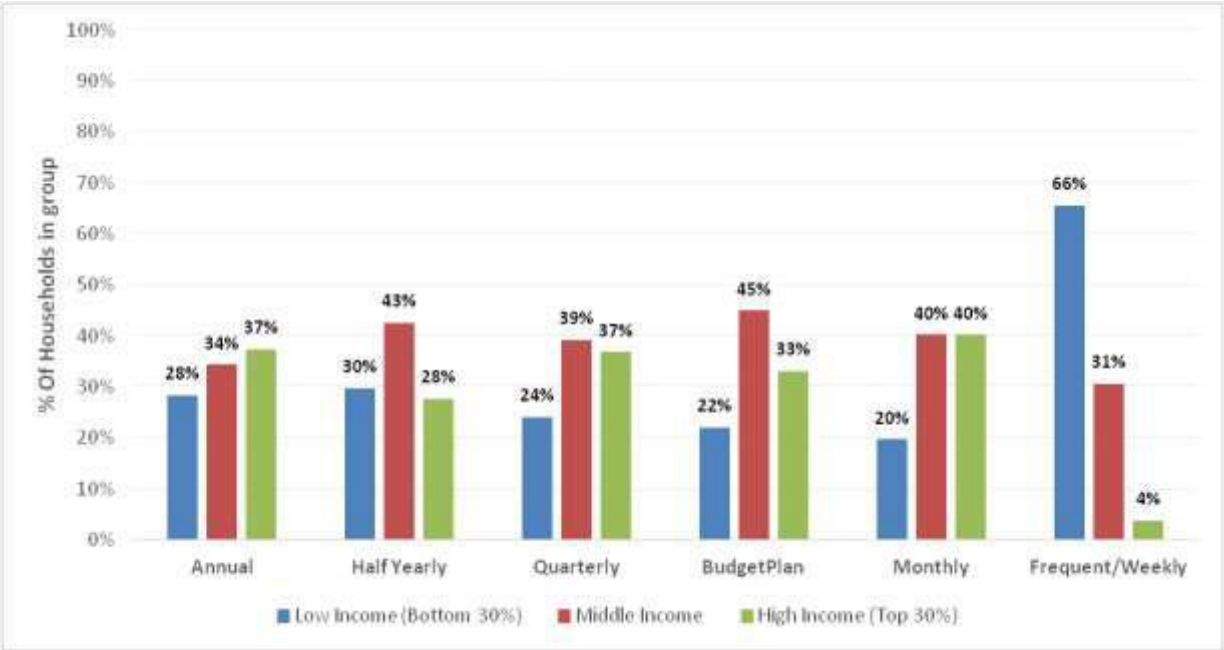
This estimated probability model was then used to predict a payment category for the sample households (including "infilling for the 16% of sample observations with missing data), covering as above the categories:

- Annual payments,

- Half-Yearly,
- Quarterly,
- Regular Payments (< 12 per year),
- Monthly,
- Frequent/Weekly

Figure 6 below summarises how the reported and estimated payment frequencies vary across different income groups. The lower income groups dominate the category of most frequent payments and are least likely to make monthly payments.

Figure 6: Modelled payment frequencies segmented by income group



Source: ICS analysis

3.3.3.2 Payment by direct debit

Further evidence provided by companies suggested an important driver of differences in the retail cost to serve is the type of payment method. More specifically, analysis and data provided by companies shows direct debit customers tend to have lower than the average retail cost to serve.

To utilise this evidence in the household datasets a binary logit model of payment method (Direct Debit =1) was estimated from data provided by companies. The available dataset provided 3,029 individual records (counts of customer payments), of which 32% were payments by direct debit.

This model predicts the probability of payment by direct debit. The model related the observed payment method to payment frequency, charging base (Metered = 1) and Acorn Group.

Acorn is a geo-demographic segmentation of the UK's population. It segments households, postcodes and neighbourhoods into 6 categories, 18 groups and 62 types. For the purposes of our analysis we have used the 6 primary groupings:

- A Affluent Achievers
- B Rising Prosperity
- C Comfortable Communities
- D Financial Stretched
- E Urban Adversity

Table 10 below presents the findings from the modelling of payment method.

Table 10: Findings from modelling of payment method (direct debit = 1)

Variable/factor	Finding
Payment Frequency	Negative and highly statistically significant. This means that higher payment frequencies reduce the probability of payment by direct debit.
Acorn Grouping (1 = A, 6 = E)	Negative and statistically significant. This means that the lower socio-economic Acorn classifications are less likely to pay by direct debit.
Charging base (metered = 1)	Positive, implying that metered customers are more likely to pay via direct debit but effect is small and not statistically significant

Source: ICS analysis

The estimated model was then used to predict the probability that each sample household will make payments by direct debit. This required an Acorn grouping to be imputed from demographics observable in the household datasets (see **Table 11**).

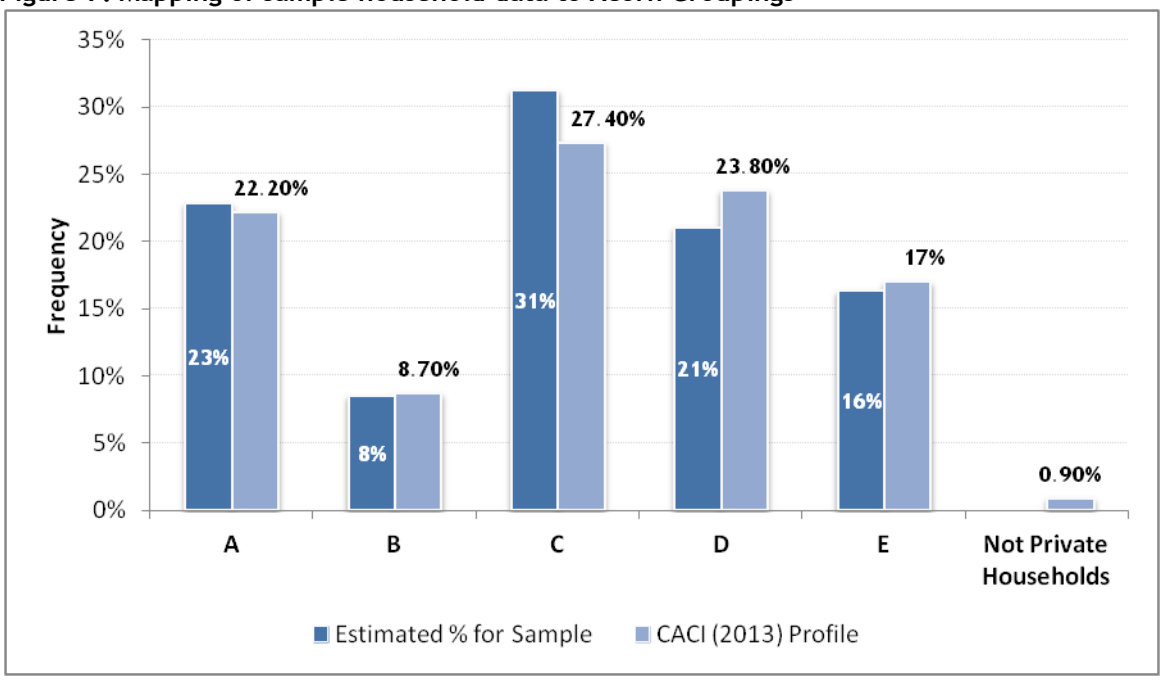
Table 11: Mapping of Acorn groupings to observed household characteristics

		Mapping to Acorn Definitions			
Acorn Group	**Acorn Label**	**Income Decile**	**Age Band**	**Location**	**Benefits Receipt**
A	Affluent Achievers	Top 20%	All	All	n/a
B	Rising Prosperity	Deciles 5 to 8	Below 40 yrs	All Urban & Significantly Rural	n/a
C	Comfortable Communities	**Residual Category**			
D	Financial Stretched	Bottom 40%	All	All	n/a
E	Urban Adversity	Bottom 30%	All	All Urban	n/a

Source: ICS analysis

The population proportions resulting from these mapping compare well with the actual ACORN proportions for each group – see Figure 7 below. This suggests the mapping provides a reasonable proxy for the ACORN categories.

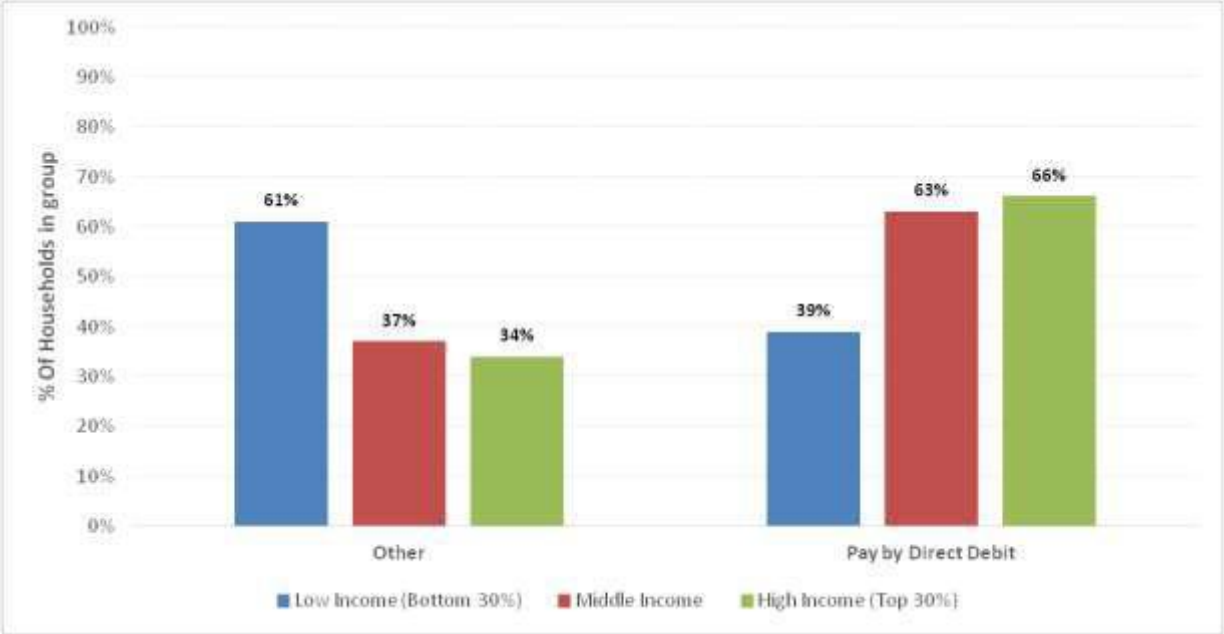
Figure 7: Mapping of sample household data to Acorn Groupings



Source: ICS analysis and www.caci.co.uk

Derived from the modelled probabilities, Figure 8 below shows that lower income groups are less likely to pay by direct debit, a payment method associated with below average retail costs.

Figure 8: Modelled direct debit payment by income group



Source: ICS analysis

3.3.3.3 The probability of household debt

Household water debt is also an important driver in differences across households in retail costs to serve.

These differences are captured in this study through a calculation of the probability of a household being in debt. For the purposes of the calculation we assume the probabilities follow the logistic distribution, calculated as:

$$\Pr(debt = 1) = \frac{exp(X'\beta)}{1 + exp(X'\beta)}$$

The model is used to predict the likelihood that a household would be in debt based on (X) variables such as income, size of bill, charging method and the extent of deprivation in a household's local area. The coefficients used in these calculations are based on a number of sources, but primarily previous work reported in UKWIR (2009).[17]

Table 12: Assumed coefficients for modelling probability of household debt

Variable/factor	Coefficient	Source and interpretation
Ln (Total Water and Sewerage Bill)	+2.0	Based on UKWIR (2009) and implies the size of household bills increases the probability of being in debt all other factors constant
Ln Household Income * Ln Bill	-0.3671	Based on UKWIR (2009) and suggests for a given bill level, higher household incomes reduced the probability of water debt
(Metered = 1)*lnBill	-0.3076	Based on UKWIR (2009) and suggests for a given bill level, metered households have a lower probability of being in debt
Ln (Index of Multiple Deprivation at Local Authority Level)	+0.1	Based on company analysis and ICS judgement. Implies a higher level of local area deprivation is associated with higher probability of water debt

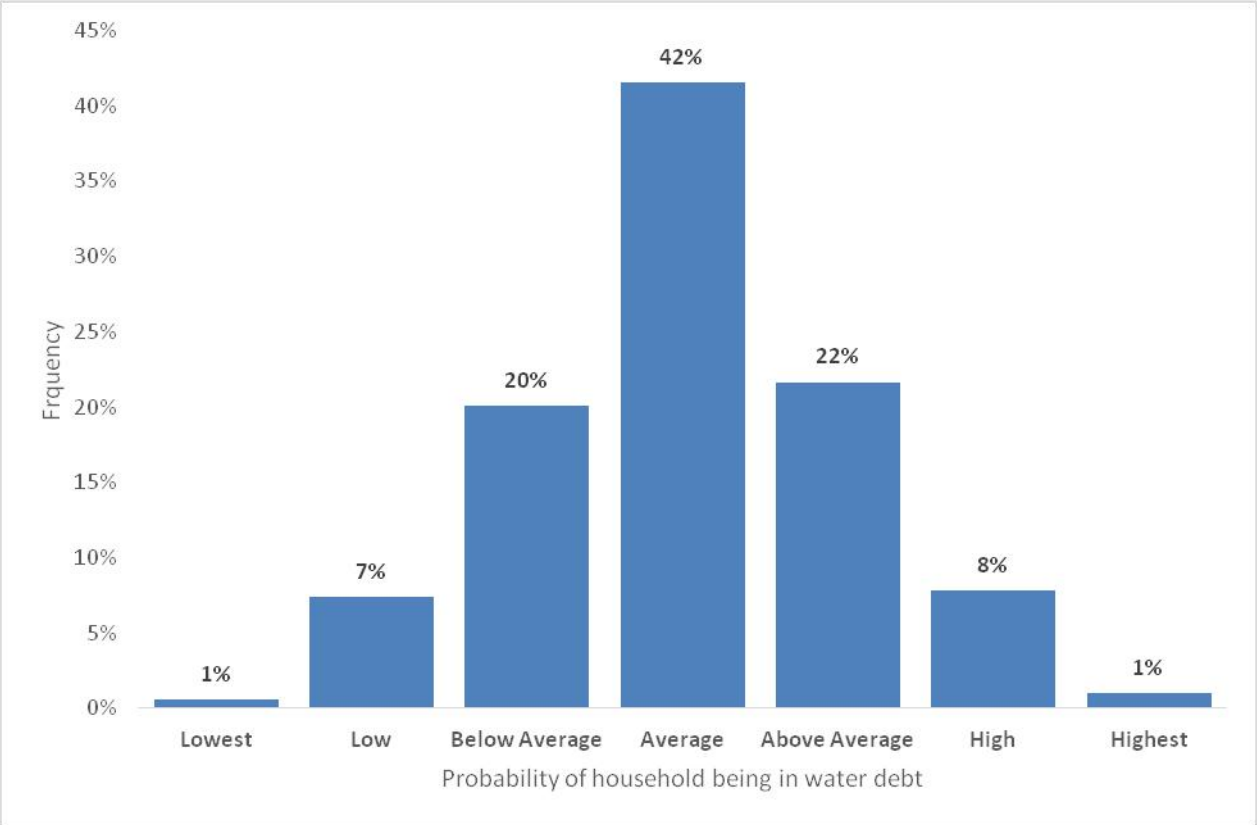
Source: ICS analysis

This assumed model is then used to generate estimated probabilities of our sample households being in debt. The median probability is 38% with a range of 2% to 99%.

Figure 9 below presents the distribution of the estimated probabilities in our household sample. For our analysis it is assumed that households in the high or highest probability category are treated as being high debtor risks. This translates to about 9% of sample households being treated as "debtors".

[17] UKWIR (2009) Future Methods of Charging for the Water Industry – CU-02.

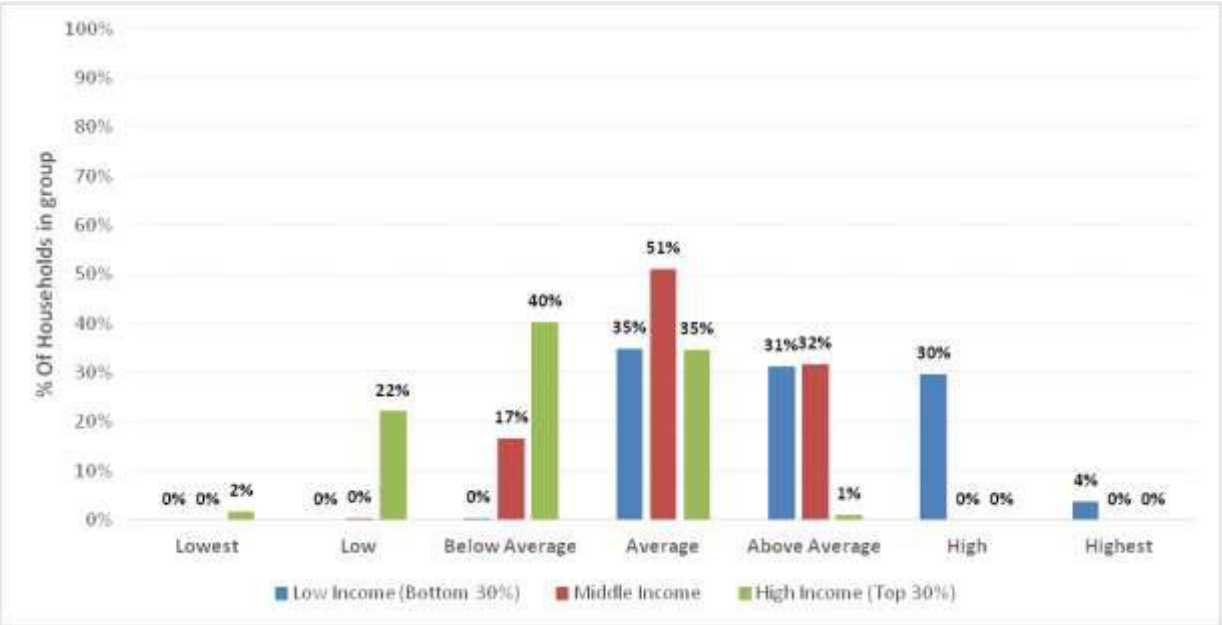
Figure 9: Distribution of water debt probabilities



Source: ICS analysis

Based on this model, lower income households are most likely to have the highest probability of being in debt– see Figure 10 below.

Figure 10: Probability of household water debt segmented by income group



Source: ICS analysis

3.3.3.4 Relative retail cost factors

The preceding analysis allows our sample households to be categorised in terms of their payment frequencies, payment methods and debt risks.

These categories allow households to be differentiated in terms of an estimate of their actual retail cost to serve. Actual in this context relates to a de-averaged measure of the retail cost to serve for households across the aforementioned dimensions and cost drivers.

Our data on de-averaged retail costs for households comes from analysis and data provided to us by the project steering group. This de-averaged cost data covers the dimensions of charging base (metered, unmetered), payment frequency (6 categories), payment method (Direct Debit =1) and debt (debtors =1). This gives a total of 2x6x2x2 = 48 retail cost categories.

Each retail cost category is assigned a relative cost factor, calculated as the ratio of the de-averaged retail cost to serve to the overall average retail cost to serve for unmetered and metered households (single and dual services).

The cost factors are then assigned to individual sample households based on charging base, payment frequency, payment method and debt classification. The estimated de-averaged retail cost to serve for each household is then derived as the assigned cost factor times the average retail cost to serve allowed for each company in 2016-17.

Table 13: Retail Cost Factors

Group	Charging Base	Payment Frequency	Direct Debit	Debtor	Cost Factor
1	Metered	Annual	Yes	No	0.480
2	Metered	BudgetPlan	Yes	No	0.739
3	Metered	Frequent/Weekly	Yes	No	1.050
4	Metered	Half Yearly	Yes	No	0.480
5	Metered	Monthly	Yes	No	0.480
6	Metered	Quarterly	Yes	No	0.480
7	Metered	Annual	No	Yes	7.876
8	Metered	BudgetPlan	No	Yes	5.822
9	Metered	Frequent/Weekly	No	Yes	8.270
10	Metered	Half Yearly	No	Yes	7.876
11	Metered	Monthly	No	Yes	7.876
12	Metered	Quarterly	No	Yes	7.876
13	Metered	Annual	No	No	0.519
14	Metered	BudgetPlan	No	No	0.739
15	Metered	Frequent/Weekly	No	No	1.050
16	Metered	Half Yearly	No	No	0.519
17	Metered	Monthly	No	No	0.519
18	Metered	Quarterly	No	No	0.519
19	Metered	Annual	Yes	Yes	0.480
20	Metered	BudgetPlan	Yes	Yes	0.739
21	Metered	Frequent/Weekly	Yes	Yes	1.050
22	Metered	Half Yearly	Yes	Yes	0.480
23	Metered	Monthly	Yes	Yes	0.480
24	Metered	Quarterly	Yes	Yes	0.480
25	Unmetered	Annual	Yes	No	0.546
26	Unmetered	BudgetPlan	Yes	No	0.656
27	Unmetered	Frequent/Weekly	Yes	No	1.121
28	Unmetered	Half Yearly	Yes	No	0.546
29	Unmetered	Monthly	Yes	No	0.546
30	Unmetered	Quarterly	Yes	No	0.546
31	Unmetered	Annual	No	Yes	9.106
32	Unmetered	BudgetPlan	No	Yes	5.974
33	Unmetered	Frequent/Weekly	No	Yes	10.207
34	Unmetered	Half Yearly	No	Yes	9.106
35	Unmetered	Monthly	No	Yes	9.106
36	Unmetered	Quarterly	No	Yes	9.106
37	Unmetered	Annual	No	No	0.453
38	Unmetered	BudgetPlan	No	No	0.656
39	Unmetered	Frequent/Weekly	No	No	1.121
40	Unmetered	Half Yearly	No	No	0.453
41	Unmetered	Monthly	No	No	0.453
42	Unmetered	Quarterly	No	No	0.453

Group	Charging Base	Payment Frequency	Direct Debit	Debtor	Cost Factor
43	Unmetered	Annual	Yes	Yes	0.546
44	Unmetered	BudgetPlan	Yes	Yes	0.656
45	Unmetered	Frequent/Weekly	Yes	Yes	1.121
46	Unmetered	Half Yearly	Yes	Yes	0.546
47	Unmetered	Monthly	Yes	Yes	0.546
48	Unmetered	Quarterly	Yes	Yes	0.546

Source: Company data and ICS analysis

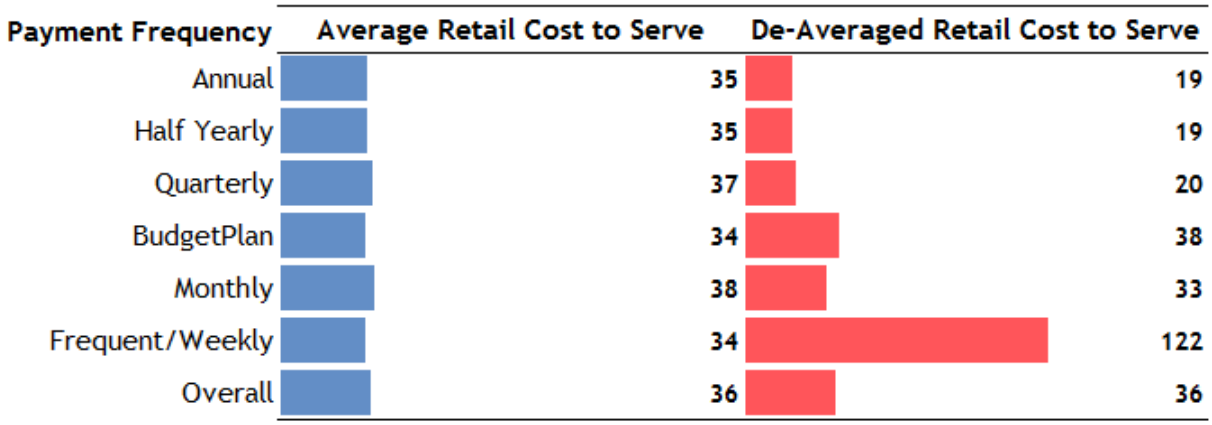
3.3.4 Comparing average cost to serve and de-averaged cost to serve

The figures below summarise the resulting estimates for the average cost to service and de-averaged cost to serve used in this study and compare the estimates across a number of household dimensions. Both measures have been calibrated to be consistent with an overall average retail cost to serve of £36 per household and total retail allowed cost of £433 million/year.

The key points from these comparisons are:

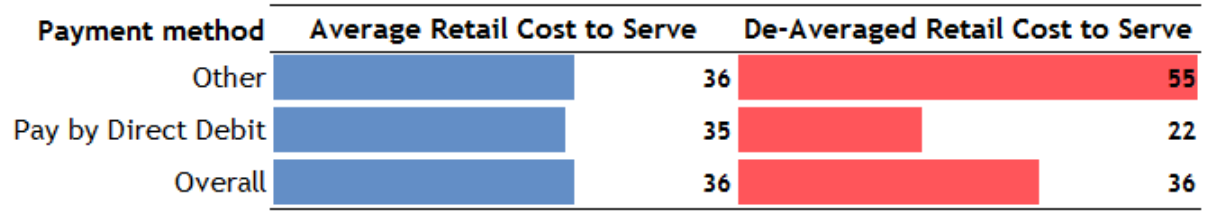
- The average cost to serve is relatively uniform across the different dimensions / drivers of retail cost. This is to be expected as by definition the average cost to serve measure "averages" out cost variations attributable to the cost drivers like payment frequency, method and (to a degree) debt;
- Lower payment frequencies, payment by direct debit and low debt risk customers are associated with costs to serve below the average. High debt risk customers and frequent payment customers are associated with actual retail costs to serve significantly above the average value of £36 per household;
- When segmented by household demographic, low income households have a higher retail cost to serve compared to high income households and the overall average cost to serve.
- On the de-averaged measure the retail cost to serve for unmetered households is higher than the higher and notably higher than metered households. This is indicative, amongst other factors, of unmetered households attracting higher proportion of costs due to factors like debt and payment frequency.

Figure 11: Average versus de-averaged cost to serve by payment frequency



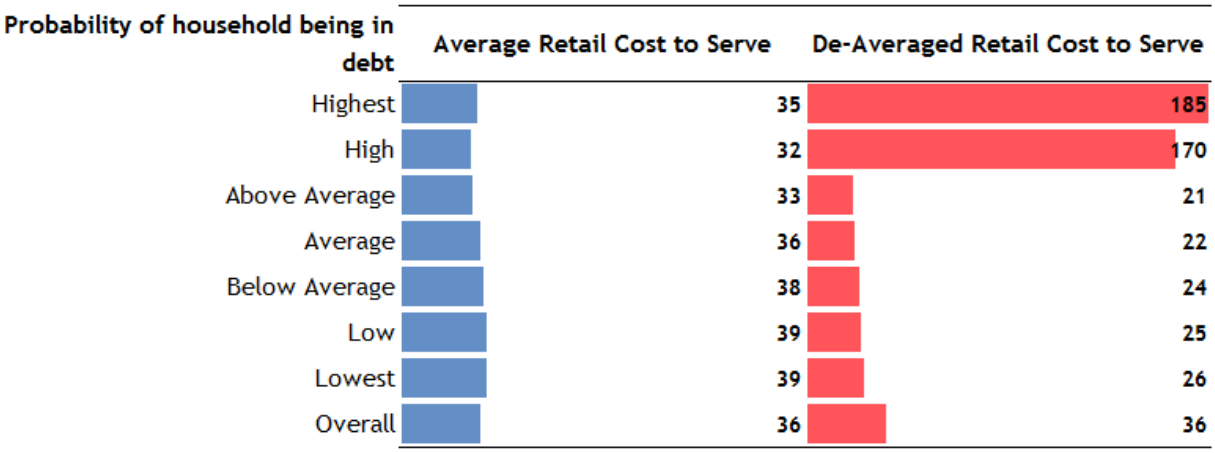
Source: ICS analysis

Figure 12: Average versus de-averaged cost to serve by payment method



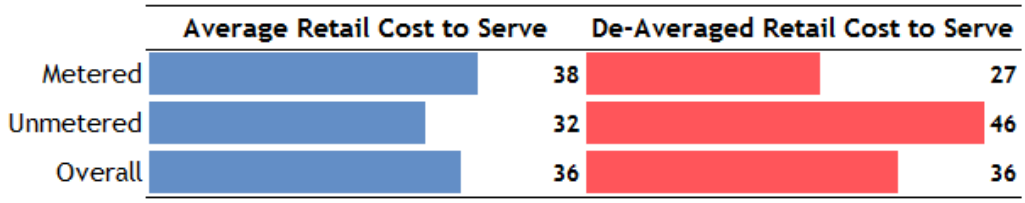
Source: ICS analysis

Figure 13: Average versus de-averaged cost to serve by debt status



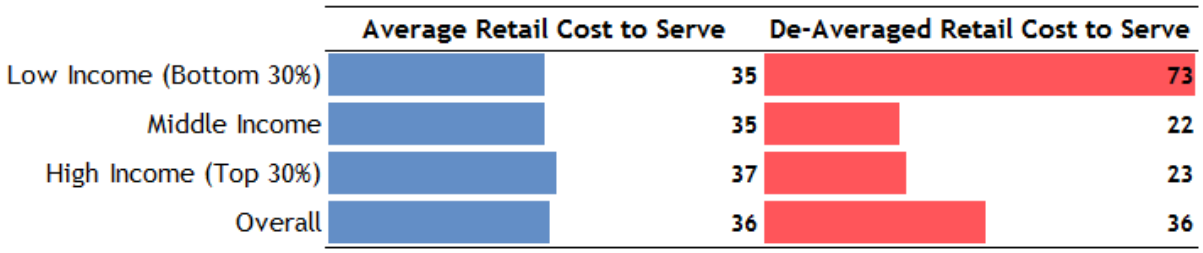
Source: ICS analysis

Figure 14: Average versus de-averaged cost to serve by charging base



Source: ICS analysis

Figure 15: Average versus de-averaged cost to serve by income group



Source: ICS analysis

3.4 Step 3: Characterise current distribution of cross subsidies in household retail

We now bring together the definitions and data analysis presented as Step 2 of our methodology to provide our estimates of the current distribution of retail cross - subsidies.

Our key measure of these retail cross subsidies is defined as the difference between what we term the *Retail Cost Margin* and the retail cost to serve:

We estimate these measures of cross subsidy at the household level and then aggregate by household segment to provide an overall view of the level and distribution of the cross subsidies.

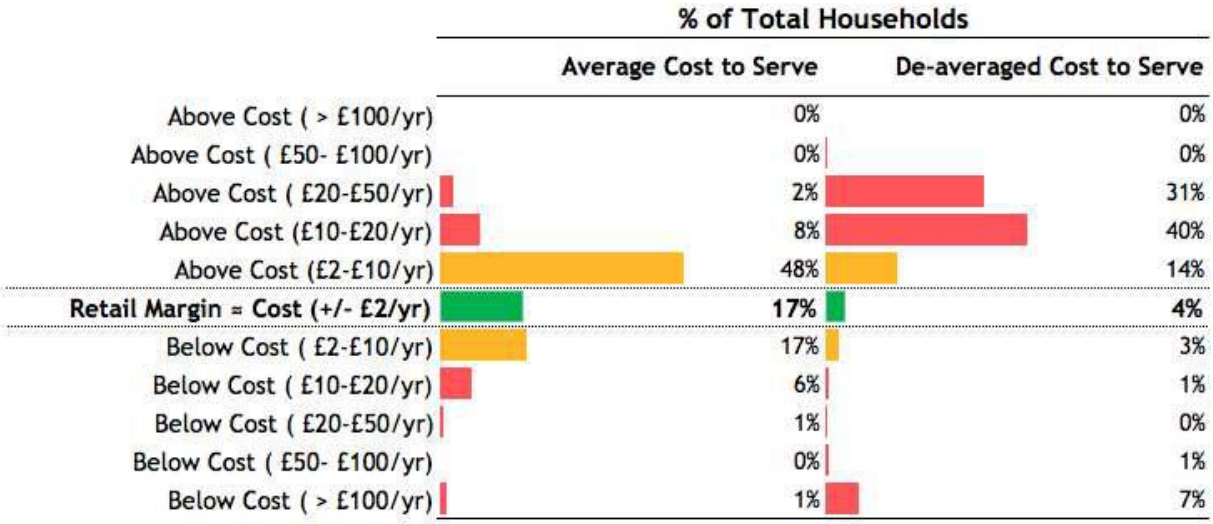
3.4.1 Distribution of current cross subsidies by size of household level cross-subsidies

In aggregate total retail cross subsidies are estimated to be £184 million/year, based on the de-averaged measure of retail costs. This value is relative to total retail costs of £433 million/year.

Using the average cost to serve with no relative cost factor adjustment, this estimated cross-subsidy is lower at £52 million/year. This finding in itself reinforces the observation that significant differences in cross-subsidies arise once retail costs are de-averaged and this will drive to a notable degree the true picture on cross-subsidies.

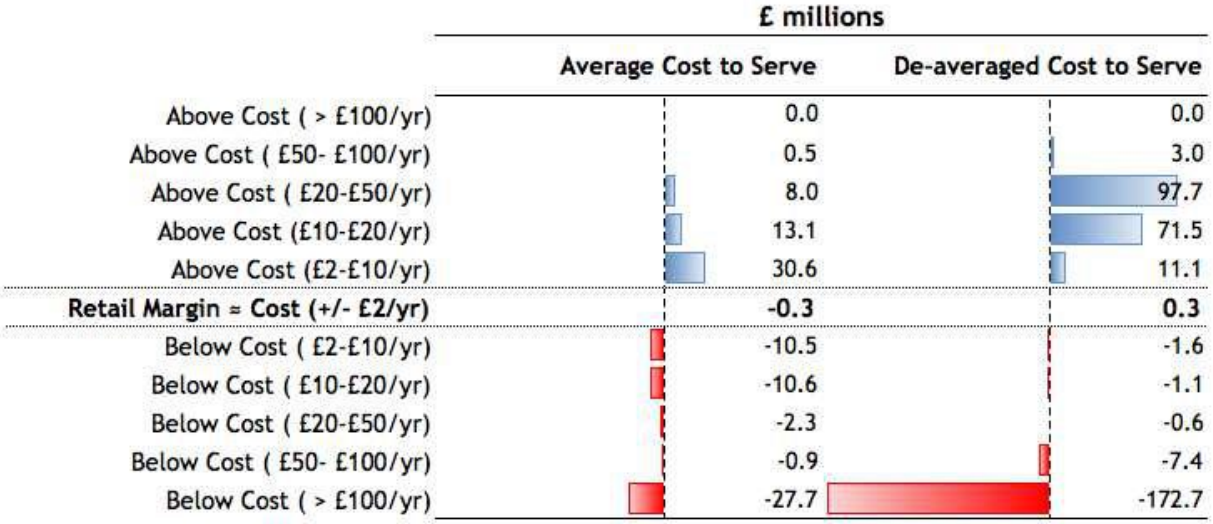
Figure 16 and Figure 17 overleaf compare the distribution of the estimated cross-subsidies under the average and de-averaged retail cost to serve measures.

Figure 16: Distribution of number of estimated cross-subsidies by size band



Source: ICS analysis
Note: the %'s sum to 100 over the retail cost to serve measures.

Figure 17: Distribution of value of estimated cross subsidies by size band



Source: ICS analysis
Note: the cross subsidies sum to zero over the retail cost to serve measures.

Figure 16 shows the spread of households by size (and sign) of retail cross-subsidy. The "Above Cost" categories represent households contributing to cross-subsidies. These are households currently paying total bills that generate retail margins that exceed their retail costs. The "Below Cost" categories are those households benefiting from cross-subsidies (retail margins below cost).

As expected given current regulatory and business drivers the average cost to serve measure gives a distribution of cross subsidy that is concentrated around the effective zero subsidy position (margin equals cost) – 82% of households have retail margins that are within ±£10 of the average cost to serve. On this measure just under 60% of households are contributing a positive cross subsidy (> £2 per year).

Just over half of the total cross-subsidy under the average cost measure (£27.7 million out of £52 million) is attributed to the 1% of households in the "Below Cost > £100/yr" category. These households are primarily households benefiting from social tariff subsidies that average about £180 per year per recipient (further detail on the distribution of cross-subsidies is shown below).

With the de-averaged cost to serve measure a different picture emerges. The overall value of cross-subsidies is greater (£184 million/year) and there is a wider spread. More households are estimated to be contributing cross-subsidies (> 80%) and the number of households benefiting from cross-subsidies > £100/yr is significantly higher at 7%.

3.4.2 Distribution of current cross subsidies by household segment

The evidence presented below provides further insight on how the current cross subsidies are distributed across a range of household segments. We present first the evidence for the cross subsidies estimated using the average cost to serve.

3.4.2.1 Distribution of cross subsidies under average cost to serve

Figure 18: Average cost to serve - distribution of number of cross subsidies by size band and income group

	% of Total Households		
	Low Income (Bottom 30%)	Middle Income	High Income (Top 30%)
Above Cost (> £100/yr)	0%	0%	0%
Above Cost (£50- £100/yr)	0%	0%	0%
Above Cost (£20-£50/yr)	3%	2%	3%
Above Cost (£10-£20/yr)	7%	7%	9%
Above Cost (£2-£10/yr)	44%	47%	52%
Retail Margin ≈ Cost (+/- £2/yr)	**17%**	**17%**	**16%**
Below Cost (£2-£10/yr)	18%	18%	14%
Below Cost (£10-£20/yr)	7%	7%	5%
Below Cost (£20-£50/yr)	1%	1%	1%
Below Cost (£50- £100/yr)	0%	0%	0%
Below Cost (> £100/yr)	4%	1%	0%

Source: ICS analysis

Figure 18 summarises the distribution of the numbers of households in each cross-subsidy category and segmented by income group.

Comparing the income groups there is evidence of broadly similar distributions of subsidy "contributors" and "recipients". Low income households are slightly more skewed to the "recipient" category, while the reverse is true for high income households.

This highlights that within each demographic segment it can expected that some households within each segment will be contributing to the overall subsidy position and some will be recipients. In the case of the average cost to serve the balance of these types will be determined primarily by company tariff structures given the average cost to serve is comparatively uniform across households types. This also

contributes to the overall cross subsidies being lower under the average cost to serve measure.

Figure 19 below also shows that the primary recipients of cross-subsidies are low income households through, for example, the protection of social tariffs. However, there are also smaller numbers of middle and high income households who also appear to benefit from cross subsidies exceeding £100 per year (see Figure 20).

Figure 19: Average cost to serve - distribution of value of cross subsidies by size band and income group

	£ millions		
	Low Income (Bottom 30%)	Middle Income	High Income (Top 30%)
Above Cost (> £100/yr)	0.0	0.0	0.0
Above Cost (£50- £100/yr)	0.2	0.3	0.1
Above Cost (£20-£50/yr)	2.2	2.6	3.2
Above Cost (£10-£20/yr)	3.0	4.9	5.2
Above Cost (£2-£10/yr)	7.0	12.4	11.2
Retail Margin ≈ Cost (+/- £2/yr)	**-0.1**	**-0.2**	**0.1**
Below Cost (£2-£10/yr)	-3.1	-4.6	-2.8
Below Cost (£10-£20/yr)	-3.1	-4.9	-2.6
Below Cost (£20-£50/yr)	-0.7	-0.8	-0.8
Below Cost (£50- £100/yr)	-0.8	-0.1	0.0
Below Cost (> £100/yr)	-20.7	-6.2	-0.8

Source: ICS analysis

Figure 20: Average cost to serve - distribution of average cross subsidies by size band and income group

	£ per household per year		
	Low Income (Bottom 30%)	Middle Income	High Income (Top 30%)
Above Cost (> £100/yr)	0	0	0
Above Cost (£50- £100/yr)	54	61	61
Above Cost (£20-£50/yr)	27	26	27
Above Cost (£10-£20/yr)	14	14	14
Above Cost (£2-£10/yr)	5	5	5
Retail Margin ≈ Cost (+/- £2/yr)	**0**	**0**	**0**
Below Cost (£2-£10/yr)	-5	-5	-5
Below Cost (£10-£20/yr)	-14	-14	-14
Below Cost (£20-£50/yr)	-29	-23	-23
Below Cost (£50- £100/yr)	-80	-79	-58
Below Cost (> £100/yr)	-176	-202	-184

Source: ICS analysis

3.4.2.2 Distribution of cross subsidies under de-averaged cost to serve

The graphics below present similar evidence to that above for the de-averaged cost to serve measure. In addition, we also present the distributions for the de-averaged cross subsidy measure segmented by category of debt risks

Figure 21: De-averaged cost to serve - distribution of number of cross subsidies by size band and income group

	% of Total Households		
	Low Income (Bottom 30%)	Middle Income	High Income (Top 30%)
Above Cost (> £100/yr)	0%	0%	0%
Above Cost (£50- £100/yr)	0%	0%	1%
Above Cost (£20-£50/yr)	24%	32%	37%
Above Cost (£10-£20/yr)	32%	42%	43%
Above Cost (£2-£10/yr)	11%	17%	13%
Retail Margin ≈ Cost (+/- £2/yr)	**3%**	**5%**	**4%**
Below Cost (£2-£10/yr)	3%	3%	2%
Below Cost (£10-£20/yr)	1%	1%	1%
Below Cost (£20-£50/yr)	0%	0%	0%
Below Cost (£50- £100/yr)	2%	0%	0%
Below Cost (> £100/yr)	24%	1%	0%

Source: ICS analysis

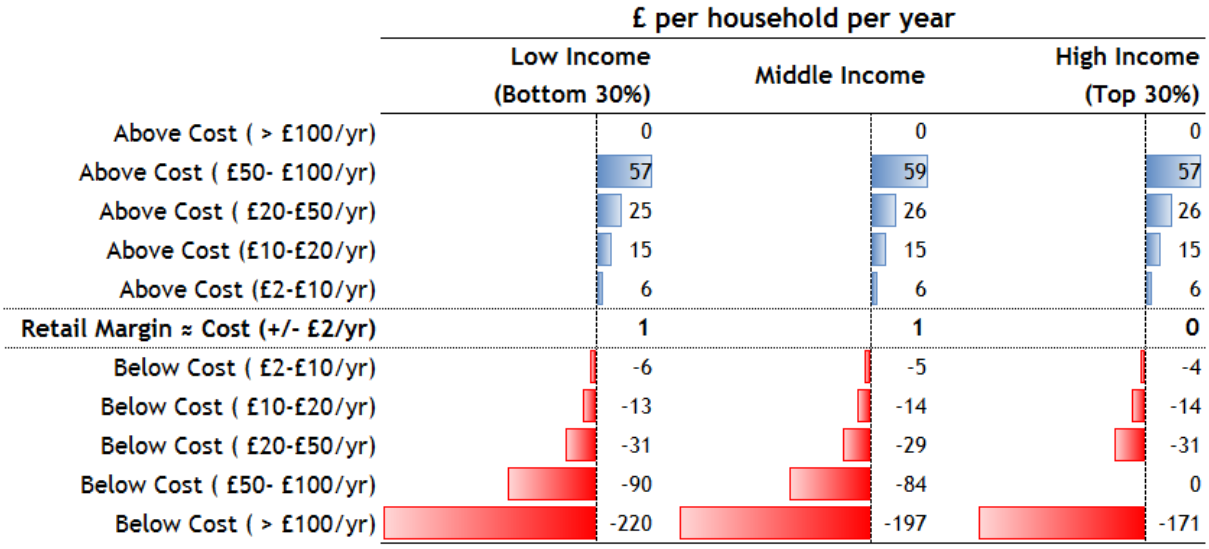
Within the distribution for each household group the underlying patterns show a spread of households within each category who benefit and who contribute. This remains evident with the de-averaged cost to serve but it is more skewed towards households in vulnerable circumstances. For example, 30% of low income households are estimated to benefit from cross-subsidies with these heavily skewed toward the largest category of subsidy (> £100/year). However, it is also the case that 2 in every 3 low income households are subsidy contributors with the value of the subsidies around £37 million per year (see Figure 22 and Figure 23).

Figure 22: De-averaged cost to serve - distribution of value of cross subsidies by size band and income group

	£ millions		
	Low Income (Bottom 30%)	Middle Income	High Income (Top 30%)
Above Cost (> £100/yr)	0.0	0.0	0.0
Above Cost (£50- £100/yr)	0.5	1.1	1.4
Above Cost (£20-£50/yr)	18.8	40.6	38.3
Above Cost (£10-£20/yr)	15.5	30.8	25.2
Above Cost (£2-£10/yr)	2.2	5.4	3.4
Retail Margin ≈ Cost (+/- £2/yr)	**0.1**	**0.1**	**0.0**
Below Cost (£2-£10/yr)	-0.5	-0.8	-0.3
Below Cost (£10-£20/yr)	-0.3	-0.6	-0.3
Below Cost (£20-£50/yr)	-0.3	-0.3	0.0
Below Cost (£50- £100/yr)	-7.1	-0.3	0.0
Below Cost (> £100/yr)	-166.3	-5.7	-0.8

Source: ICS analysis

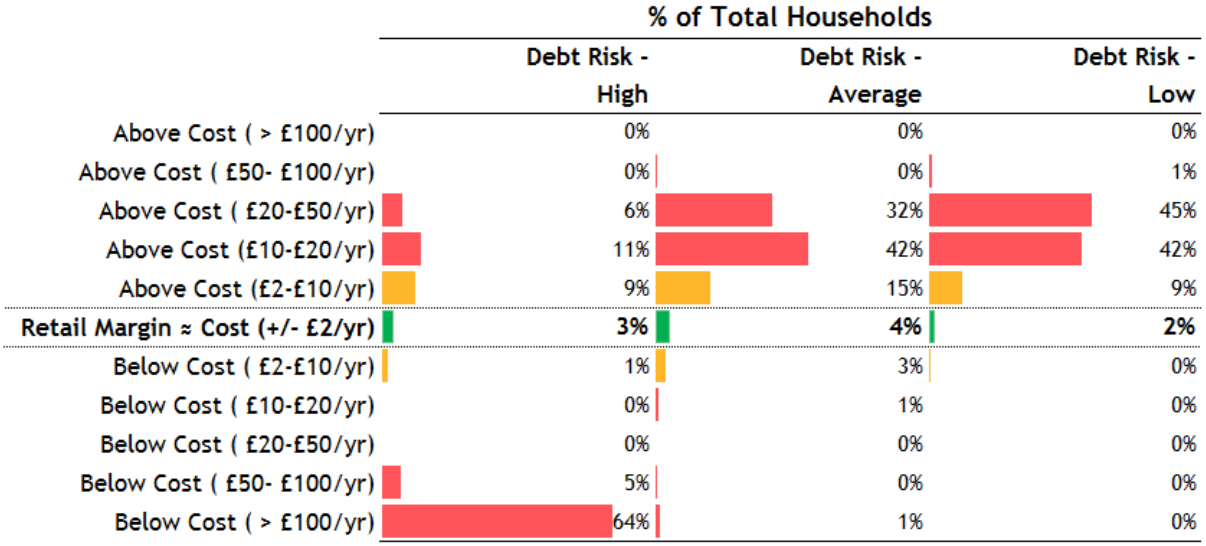
Figure 23: De-averaged cost to serve - distribution of average cross subsidies by size band and income group



Source: ICS analysis

Figure 24 provides the expected finding that households with high risks of being in debt with their water bills are predominately benefiting from cross subsidies. About 7 in 10 of high debt risk households benefit and most benefit from subsidies exceeding £100/year.

Figure 24: De-averaged cost to serve - distribution of number of cross subsidies by size band and debt risk group



Source: ICS analysis

Moreover as shown below in Figure 25 this category of household accounts for just less than £160 million of the total £184 million cross-subsidy. This identifies customer debt as the primary driver of household retail cross subsidies, which is consistent with previous evidence consistently presented by Ofwat.

Figure 25: De-averaged cost to serve - distribution of value of cross subsidies by size band and debt risk

	£ millions		
	Debt Risk - High	Debt Risk - Average	Debt Risk - Low
Above Cost (> £100/yr)	0.0	0.0	0.0
Above Cost (£50- £100/yr)	0.0	2.5	0.4
Above Cost (£20-£50/yr)	1.5	84.1	12.1
Above Cost (£10-£20/yr)	1.7	63.5	6.3
Above Cost (£2-£10/yr)	0.6	10.0	0.5
Retail Margin ≈ Cost (+/- £2/yr)	**0.0**	**0.2**	**0.0**
Below Cost (£2-£10/yr)	-0.1	-1.6	0.0
Below Cost (£10-£20/yr)	0.0	-1.1	0.0
Below Cost (£20-£50/yr)	0.0	-0.6	0.0
Below Cost (£50- £100/yr)	-5.3	-2.1	0.0
Below Cost (> £100/yr)	-153.5	-19.2	0.0

Source: ICS analysis

Figure 26: De-averaged cost to serve - distribution of average cross subsidies by size band and debt risk

	£ per household per year		
	Debt Risk - High	Debt Risk - Average	Debt Risk - Low
Above Cost (> £100/yr)	0	0	0
Above Cost (£50- £100/yr)	50	58	58
Above Cost (£20-£50/yr)	25	26	28
Above Cost (£10-£20/yr)	15	15	15
Above Cost (£2-£10/yr)	6	6	6
Retail Margin ≈ Cost (+/- £2/yr)	**0**	**1**	**0**
Below Cost (£2-£10/yr)	-4	-5	-4
Below Cost (£10-£20/yr)	-10	-14	-13
Below Cost (£20-£50/yr)	-44	-29	0
Below Cost (£50- £100/yr)	-94	-82	0
Below Cost (> £100/yr)	-224	-182	0

Source: ICS analysis

3.4.2.3 Estimates of net subsidy position under de-averaged cost to serve by household segments

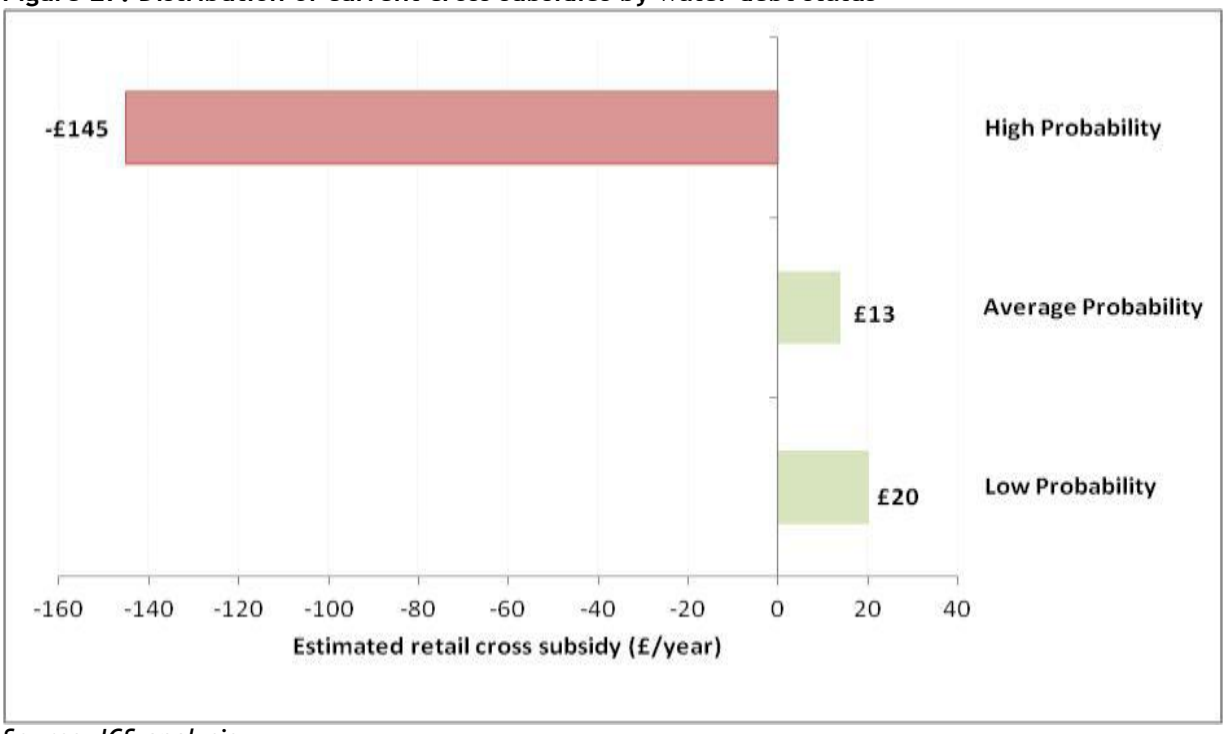
We present below further evidence representing the net subsidy position for each household segment. This net position represents the combination of positive and negative cross subsidies within each household segment.

For example, the de-averaged estimate of -£43/year for low income households (see Figure 28) is made up of 2.2. million households who contribute an average cross-subsidy of £16 each and 0.95 million households who receive an average cross subsidy of £180 each. The former will include low income households who are also below average cost to serve, while the latter will be low income households who are either above average cost to serve or benefiting from social tariff subsidies or both.

The estimates presented below are not additive and represent the same overall levels of cross-subsidy segmented across these different dimensions.

By Water Debt Status/Probability

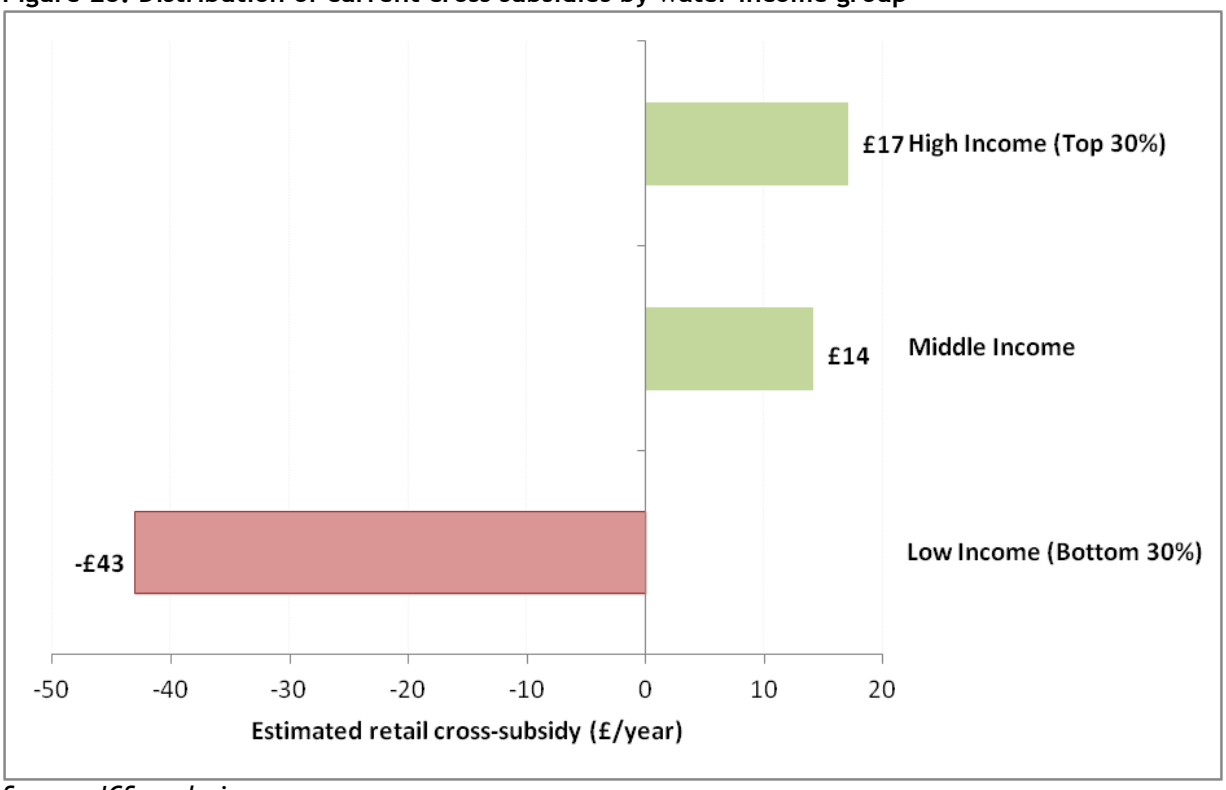
Figure 27: Distribution of current cross subsidies by water debt status



Source: ICS analysis

By Income Group

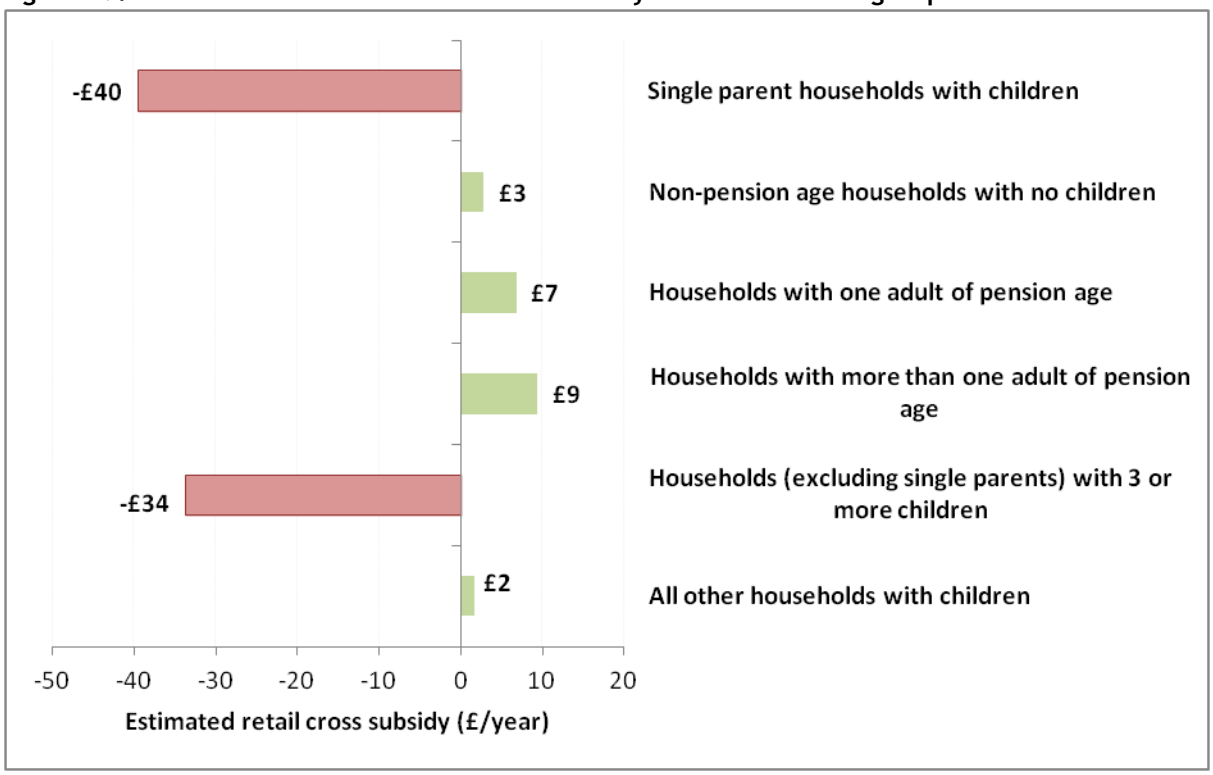
Figure 28: Distribution of current cross subsidies by water income group



Source: ICS analysis

By Household Group

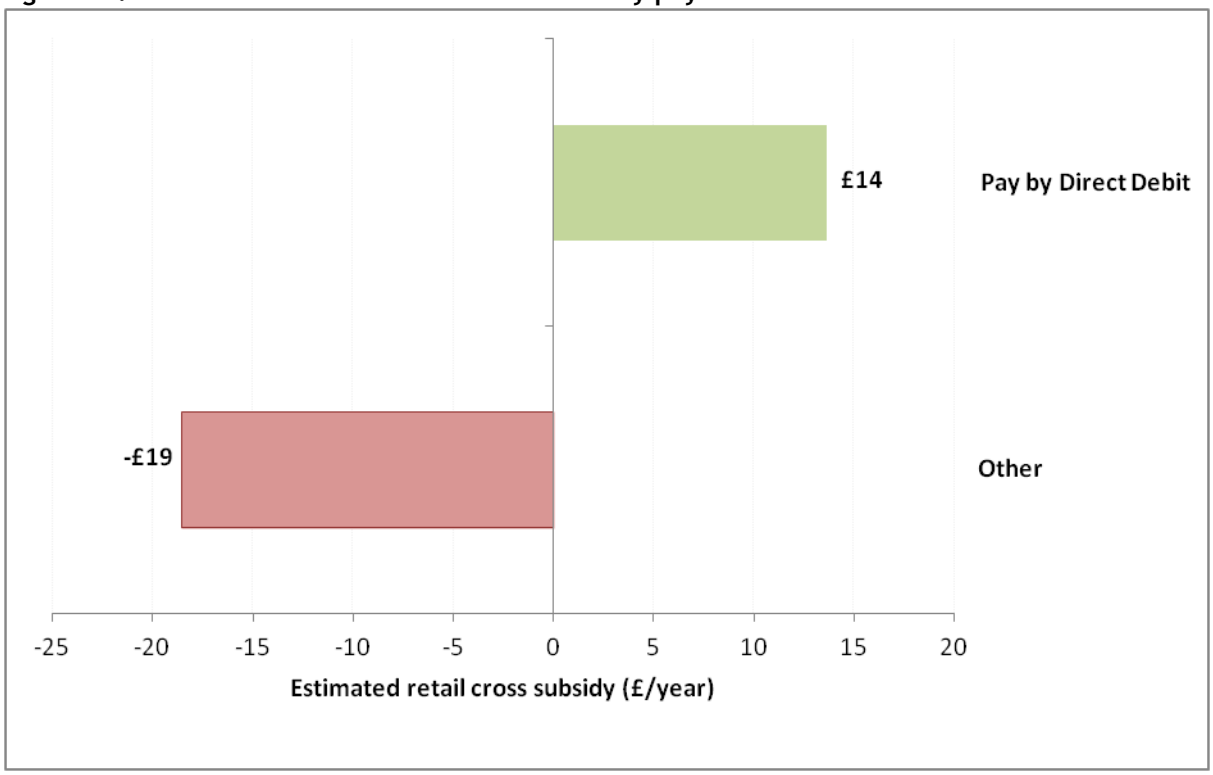
Figure 29: Distribution of current cross subsidies by water household group



Source: ICS analysis

By Payment Method (Direct Debit)

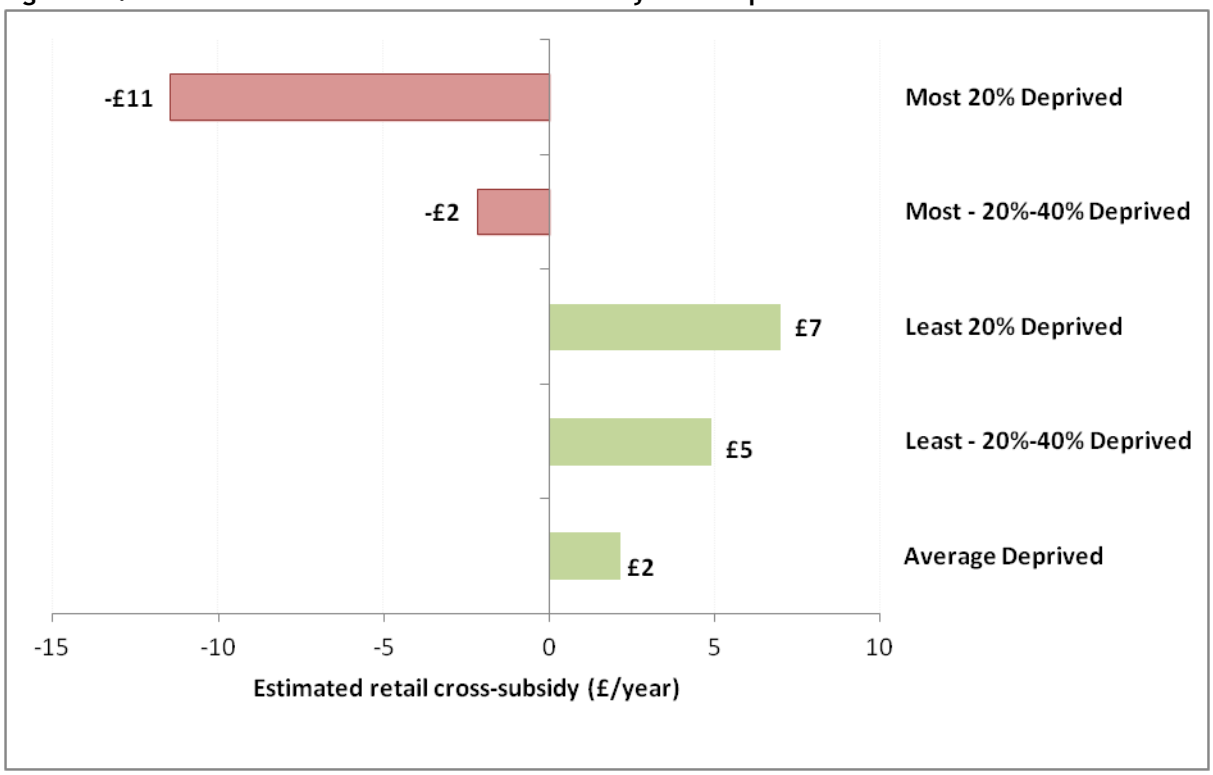
Figure 30: Distribution of current cross subsidies by payment method



Source: ICS analysis

By Area Deprivation

Figure 31: Distribution of current cross subsidies by area deprivation



Source: ICS analysis

3.5 Step 4: Define retail market scenarios

3.5.1 Ofwat's thinking on market scenarios

The key market design questions that Ofwat are considering are summarised as:

- What services and activities are included in the market?
- Who can participate in it and what are the licence and entry/exit arrangements?
- Which customers are covered and how do they make a choice and participate?

The scenarios Ofwat are seeking to compare to the existing framework for household retail include:

1. Extending the scope of the non-household retail market framework to measured household customers.
2. Choice of retailer for all customers, with retailers able to offer a wider range of services such as meter choice.
3. Separate markets for retail, metering and developer services to enable retailers to provide customers a combined service offer and bill for different utilities.

Our view is that scenarios 1) and 2) above are the ones that lend themselves most readily to the proposed analysis of distributional impacts.

Under 1) the focus would be on the distributional impact arising from the propensity of some segments of metered household (or indeed all households) choosing to switch retailers.

Under 2) these impacts are widened to include:

- The switching of unmetered households to metering via new retailers, replicating the current unwinding of unmetered and metered cross-subsidies but through the choice of alternative retailers.
- A shift in the boundary between wholesale and retail cost recovery, reflecting a wider scope of responsibility for retailers (e.g. ownership of meters).

3.5.2 Development of our retail market scenarios

Our approach to developing the market scenarios has been to outline a number of high level market structures based on the three initial scenarios proposed by Ofwat. These scenarios are outlined below.

Whilst these scenarios cover market structure they do not allow for levels of engagement. We apply a Low to High scenario approach to each of the market structures. These scenario ranges will represent a number of interactions that influence the push and pull factors associated with choosing retail suppliers.

The market scenarios we have considered are summarised as:

A: Extending retail choice to all households

This scenario provides a set of generic options to provide a benchmark for more targeted market scenarios (see below). We model expected water savings "savings" of £8 and 24 per year

B: A "home services" market for all households

In this scenario the expected saving is £100/year and this is interpreted as a bundled savings across a basket of retail utility services including water. Savings of this level have been identified in other sectors as the tipping point that persuades many more households to become engaged with retail markets.

Within these groups of scenarios for A and B we have included further scenarios labelled:

- Low (low numbers of households engaging with retail markets)
- Medium
- High (high numbers of households engaging with retail markets)

C: Limiting retail choice to metered households (as part of an extension of the currently designed systems for retail competition for non-households)

D Extending retail choice to unmetered households who:

- Would benefit from switching to metered charging
- Pay by direct debit

These scenarios could be conceived as introducing competition "for" retail markets and could involve an element of forced choice for unmetered households.

3.6 Step 5: Estimate impact of retail switching on distribution of cross subsidies

Section 4 presents in detail our assessment of the impact on the distribution of cross subsidies under each of our market scenarios.

A precursor to the modelling of these impacts is an ability to identify through modelling those households who are likely to switch retailers within these market scenarios.

3.6.1 Predicting the quantum of household retail switchers

Informed by our review of energy sector literature (see section 2 and Annex 1) we have calibrated a Logit model to predict the probability of the sample households switching retail suppliers.

For the purposes of the calculation we assume the probabilities follow the logistic distribution, calculated as:

$$\Pr(switch = 1) = \frac{exp(X'\beta)}{1 + exp(X'\beta)}$$

This estimated probability times the numbers of households represented by each sample household provides a measure of the *expected* number of retail switchers under each scenario.

This model is calibrated using variables (X) and coefficients (signs and magnitudes) that are consistent with the available empirical evidence from the energy sector literature combined with socio-economic and demographic variables available in the household datasets. This approach is used in the absence of empirical evidence on actual retail switching behaviour (or intentions) in the water sector, though we would note a key finding from the energy evidence is that switching in related markets strongly influences retail switching in other markets. It is reasonable therefore to anticipate that energy switchers are most likely to become water retail switchers.

The variables, coefficients and main sources are described in Table 14 below. Importantly the modelling allows the expected numbers of retail switchers to be segmented by socio-economic and demographic characteristics.

3.6.1.1 Simulating Low to High scenario ranges

The Low to High scenario ranges are defined in terms of two key variables:

- The time cost of switching (this impacts negatively on expected participation in retail markets. Ease of switching will drive higher participation.)
- The degree of product differentiation in retail markets. This is positively related to participation and indicates variety in retail offerings is more likely to engage and attract potential switchers.

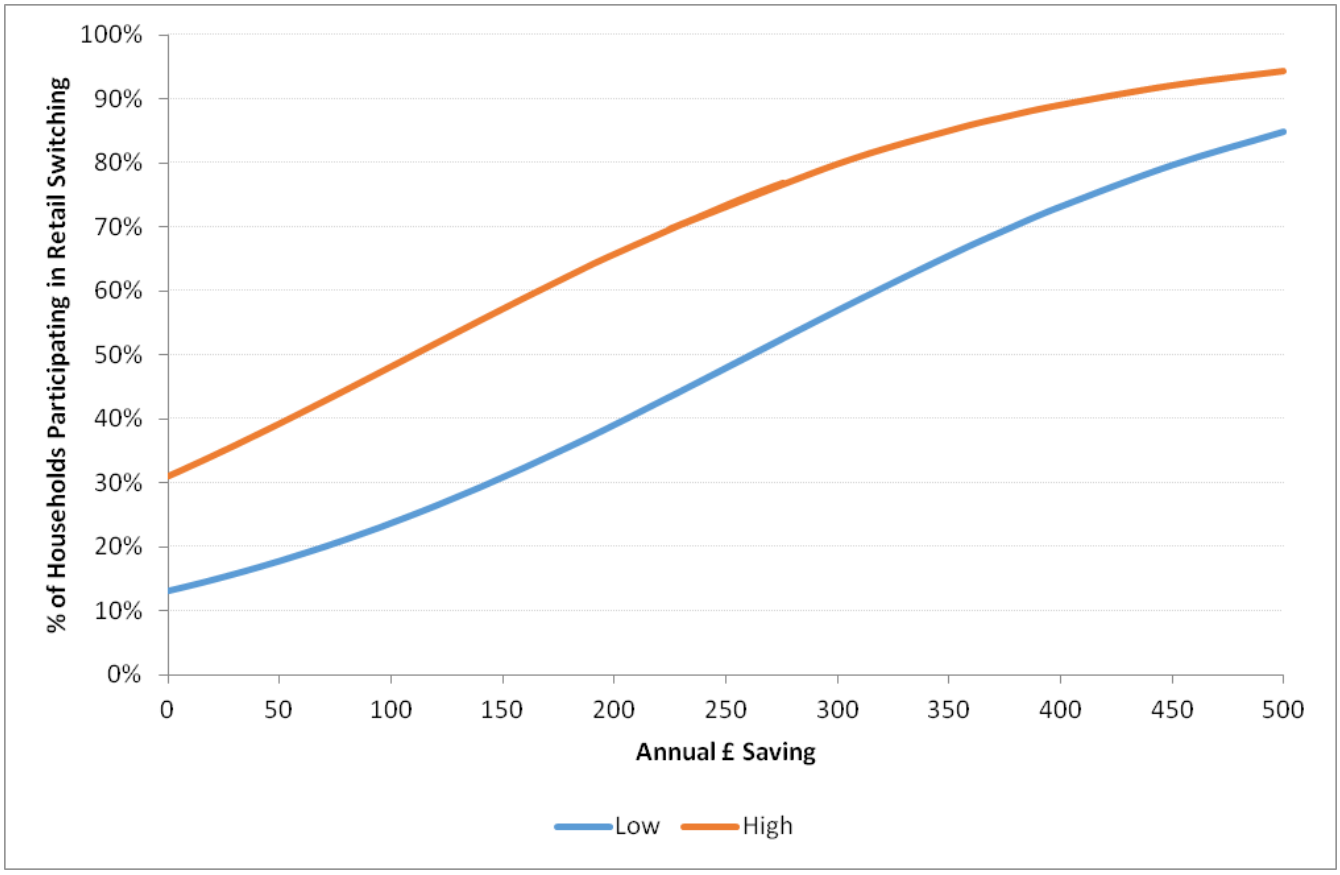
Both of these factors are cited in the energy sector literature as being drivers for participation in retail markets and we combine their influence using the following matrix:

Degree of Differentiation in Market	Time Costs of Switching: Low	Medium	High
High	+	+	-
Medium	+	±	-
Low	+	-	-

Time Costs of Switching

Using our assumed (logistic) switching model Figure 32 below shows the levels of participation predicted under low and high scenarios and for different levels of expected retail savings.

Figure 32: Predicted participation rates under different levels of expected retail saving



Source: ICS Calculations

The evidence from energy sector experience suggests a saving level of about £100/year is a tipping point for many households. It is at this level of saving that the numbers of households switching retailers starts to grow more rapidly. At this level our switching model predicts switching of about 48% under High and about 25% under Low.

This level of saving exceeds the level of retail costs in water sector retailing and more likely levels of around £10 to £20 annual savings in water will only encourage relatively low levels of households switching. This more limited ability to offer savings based on more efficient water retail costs may also have indirect consequences for the cross subsidies we have estimated. Cross-subsidies present opportunities for exploiting margins that are created by retail prices not aligned to retail costs. The cross subsidies estimated in this study and their unwinding may therefore become the focus for potential retailing entrants.

Table 14: Variables and coefficients used to estimate the probability of retail switching

Variable/Factor	Units	Source	Sign	Coefficient Value	Reference
1. Actual /Perceived Bill Saving	£/month	Assumption	+	0.087	Source: Waddams Price, Webster and Zhu (2013)
2. Time Costs of Switching	Hours (1 = Low, 8 = high)	Assumption	-	-0.1	Source:Waddams Price, Webster and Zhu (2013)
3. Access to Internet		not included	+		
4. Product Characteristics	1=Low, 3=High	Assumption	-	0.2	
5. Behaviour in similar markets		not included	+		
6. Household Income	£/yr (000s)	Data	+	-0.01	Source:Waddams Price, Webster and Zhu (2013)
7. SEG		not included	+		
8. Payment Type	DD=1	Data	+	1.2	Source: He and Reiner (2015)
	PaymentPlan=1	Data	+	0.6	Source: He and Reiner (2015)
9. Education		not included	+		
10. Disability		not included	-		
11. Age Band					Based on Waddams Price, Webster and Zhu (2013) & Source: Flores and Waddams Price (2013)
Age 16 to 19		Data	+/-	0.47	
Age 20 to 24		Data	+/-	0.266	
Age 25 to 29		Data	+/-	0.086	
Age 30 to 34		Data	+/-	-0.044	
Age 35 to 39		Data	+/-	-0.124	
Age 40 to 44		Data	+/-	-0.154	
Age 45 to 49		Data	+/-	-0.134	
Age 50 to 54		Data	+/-	-0.064	
Age 55 to 59		Data	+/-	0.056	
Age 60 to 64		Data	+/-	0.226	
Age 65 to 69		Data	+/-	0.446	
Age 70 to 74		Data	+/-	0.446	
Age 75 to 79		Data	+/-	0.446	
Age 80 to 84		Data	+/-	0.446	
Age 85 or over		Data	+/-	0.446	
13. Property Tenure	Renter =1	Data	-	-0.15	Source: Flores and Waddams Price (2013)
14. Ethic Group	Non-white=1	Data	-	-0.1	Source: Flores and Waddams Price (2013)
15. Location	Non-rural=1	Data	+	-0.05	Source: Flores and Waddams Price (2013)
16. Size of Monthly Water & Sew Bill	£/month	Data	+	0.001	Source: He and Reiner (2015)
17. Single Male Adult	1=Single Male Adult	Data	-	-0.6	Source: Waddams Price, Webster and Zhu (2013)
18. Area Deprivation		Data	0	-0.03	Based on evidence that hardship reduces probability of switching

3.6.2 Estimated switching by scenario

We conclude this section of the report with a summary of the expected level of switching associated with each of our market scenarios. The total pre-switching household base across the scenarios is 12.1 million households.

Table 15: Expected levels of switching under each retail market scenario

A- Retail Choice for all households	Expected Number of Retail Switchers (% of total households)	
	Low Scenario	***High Scenario***
Scenario: Bill Saving for Switchers (£8 per year)	14%	32%
Scenario 2: Bill Saving for Switchers (£24 per year)	15%	35%
B - Extend Retail Choice to all households in a "home services" market	**Expected Number of Retail Switchers (% of total households)**	
	Low Scenario	***High Scenario***
Scenario: Bundled Bills Savings for Switchers = £100 per year	24%	48%
C - Extend Retail Choice only to Metered Households	**Expected Number of Retail Switchers (% of total households)**	
	Low Scenario	***High Scenario***
Scenario 1: Bill Saving for Switchers (£12 per year)	7%	17%
Scenario 2: Bill Saving for Switchers (£24 per year)	8%	18%
Scenario 3: Bill Saving for Switchers (£36 per year)	8%	19%
D - Competition for retailing to segments of unmetered households	**Expected Additional Retail Switchers (% of total households)**	
Scenario 1: Retail choice for unmetered households offered savings through switch to metered charge	6%	
Scenario 2: Retail choice for unmetered households paying by direct debit	23%	

Source: ICS analysis

4 Assessment of Distributional Impacts

In this section of the report we set out our main findings on the potential distributional impacts of the retail market scenarios we have considered.

Our focus is on the impacts for the current levels and distribution of cross-subsidies presently recovered by the incumbent companies (see section 3.4). These impacts are the expected medium term consequences that could arise in the absence of any policy or regulatory mitigation and/or changes to the current regulatory price controls for household retail services.

For each category of retail market scenario we present:

1. Estimates of proportion of households switching and the associated impact on the overall level of cross-subsidy that is recoverable from remaining (non-switching) households;
2. The impact on these cross-subsidies by household segment.

The household segmentations we present cover:

- **Water debt status** (with households segmented in terms of the estimated probability of being in water debt).
- **Social tariff status** (whether households are currently on a social tariff or not).
- **Income group** (e.g. low income households in bottom 30% of the income distribution, high income households in the top 30% of the income distribution and middle income households).
- **Household composition** (e.g. single parent households, households with three or more children, single pensioner households, households with more than one pensioner, households with working age adults and no children).
- **Area Deprivation** (households living in least or more deprived areas, where deprivation is measured in terms of the Index of Multiple Deprivation at local authority level. For examples households living in the 20% of local authorities with the highest index values are described as "Most 20% Deprived").

These segmentations are used to highlight and draw out in particular the impacts for the households most likely to be in vulnerable circumstances.

4.1 Scenario A: Extending choice of retailer to all households

This scenario provides a set of generic options to provide a benchmark for more targeted market scenarios (see below).

4.1.1 Overall impact on retail cross-subsidies

Table 16 below presents the estimated impact on overall cross-subsidies for 4 variants of this scenario:

- Low and High switching scenarios associated with an assumed saving of £8 per year in retail water and sewerage bills. The expected level of retail bill saving is one of the factors that are assumed to influence the switching

decisions of households. This saving level is broadly equivalent to a 20% reduction in the average retail cost to serve. Overall, these assumed savings would be considered very modest compared to experience in other utility sectors.

- Low and High switching scenarios with an assumed saving of £24 per year. This saving is broadly equivalent to a more aggressive 60% reduction in the average retail cost to serve. The small impact of these additional savings on the estimated number of switchers indicates that even at this higher end of assumed savings in water service retail costs, there is likely to still be a high degree of customer inertia.

Table 16: Scenario A - Estimated impact on total cross-subsidies

A- Retail Choice for all households	Expected Number of Retail Switchers (% of total households)	Value of Expected Reduction in Retail Cross Subsidies (£m)
Scenario: Bill Saving for Switchers (£8 per year)		
Low Scenario	14%	25.3
High Scenario	32%	59.5
Scenario 2: Bill Saving for Switchers (£24 per year)		
Low Scenario	15%	27.9
High Scenario	35%	64.2

Source: ICS Calculations

Across these 4 versions of scenario A, the overall level of retail cross-subsidies are estimated to reduce by £25 to £64 million per year (in 2016-17 prices). This is the consequence of incumbent companies no longer being able to recover cross-subsidies from the switching households. These switching households are the above average margin households who would be attractive to competing retailers.

4.1.2 Distributional impact on retail cross-subsidies

The distributional impacts by household segment are summarised in the graphics below. These graphics compare the current cross-subsidy to each household segment (positive or negative) and how this is estimated to change under the scenarios.[18] We present in the graphics below the low and high alternatives for the £8/yr saving scenario.

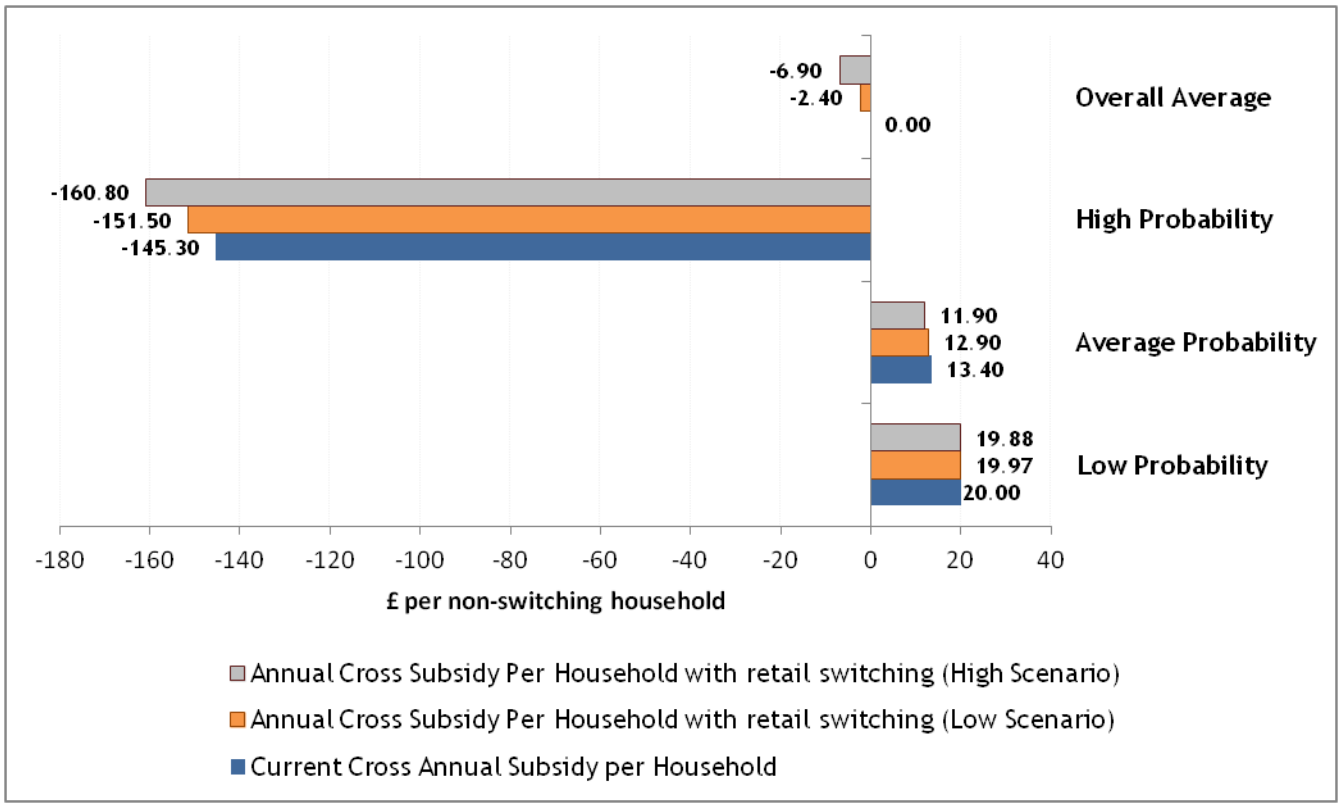
The key finding across all of the segmentations is that higher margin households will be those most likely to switch and this reduces the average cross-subsidy contribution recoverable from the positive margin households who do not switch.

[18] As a reminder, a positive margin indicates a situation where retail margins are greater than retail costs (over-recovery) and a negative margin indicates a situation where retail margins are lower than retail costs (under-recovery).

These higher margin households tend to be in the higher income groups, live in the least deprived areas and are least likely to experience water debt. Similarly, the average cross-subsidy required by the subsidised households (typically those households in vulnerable circumstances) who remain with incumbents will rise. These changes are all set in a context where the overall capacity for cross-subsidies is reduced through the unwinding generated by retail switching.

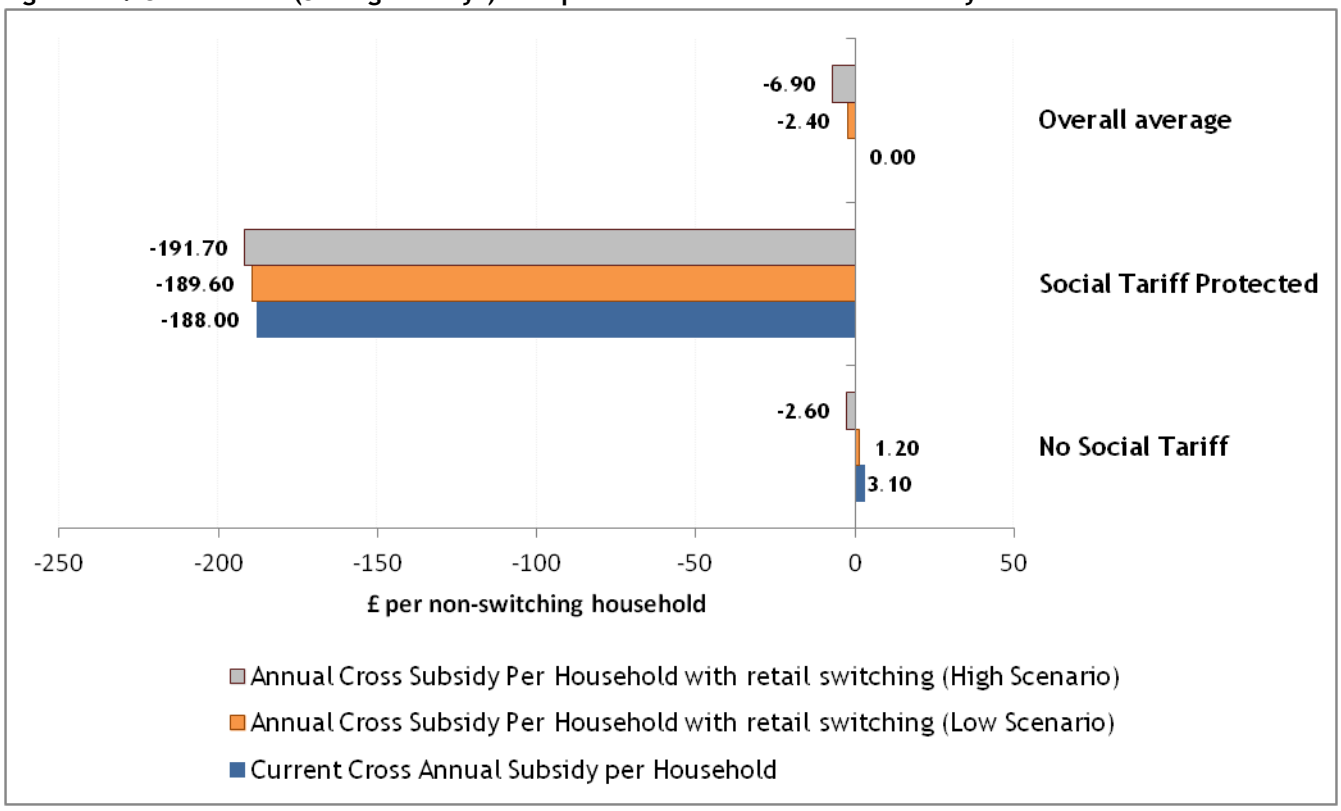
By Water Debt Status/Probability

Figure 33: Scenario A (Saving = £8/yr) - Impact on retail cross-subsidies by water debt status



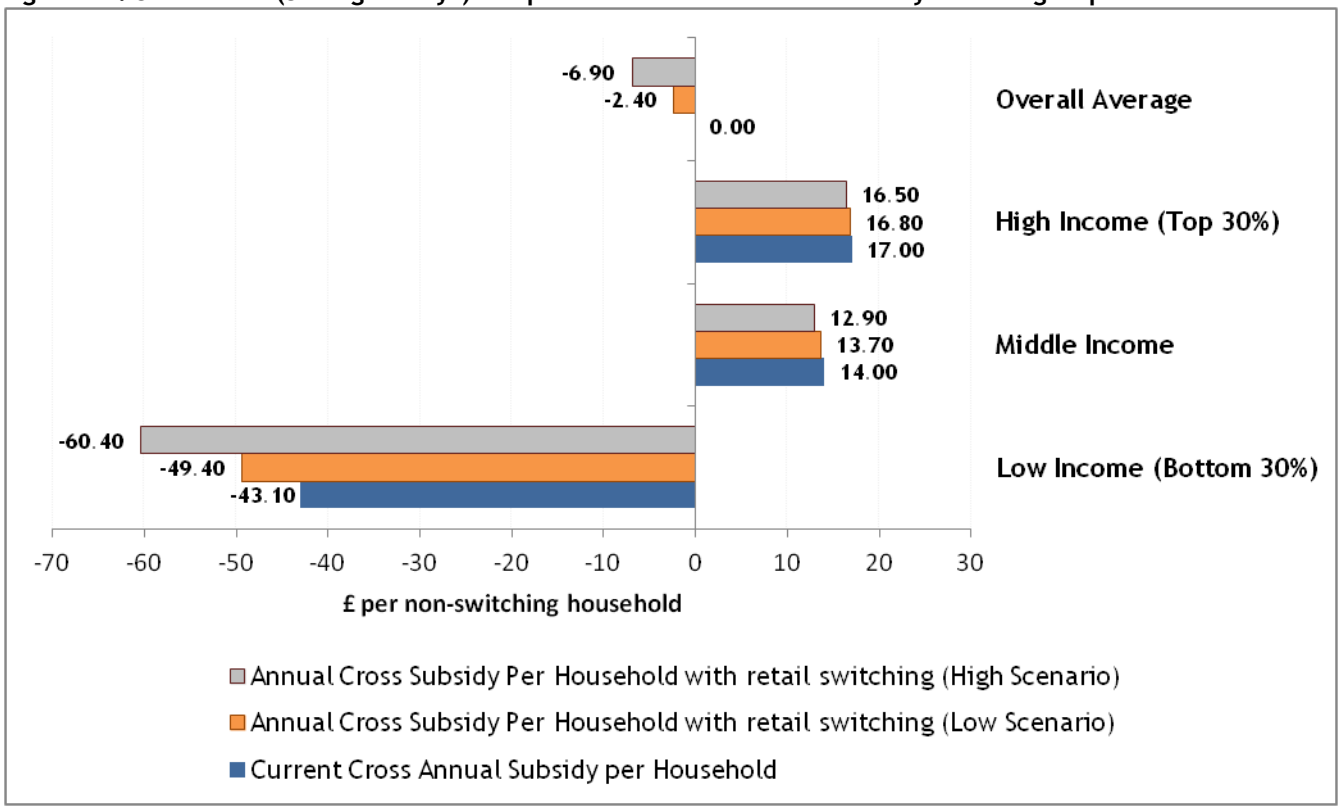
By Social Tariff Status

Figure 34: Scenario A (Saving = £8/yr) - Impact on retail cross-subsidies by social tariff status



By Income Group

Figure 35: Scenario A (Saving = £8/yr) - Impact on retail cross-subsidies by income group



By Household Type

Figure 36: Scenario A (Saving = £8/yr) - Impact on retail cross-subsidies by household group (current vs. low scenario)

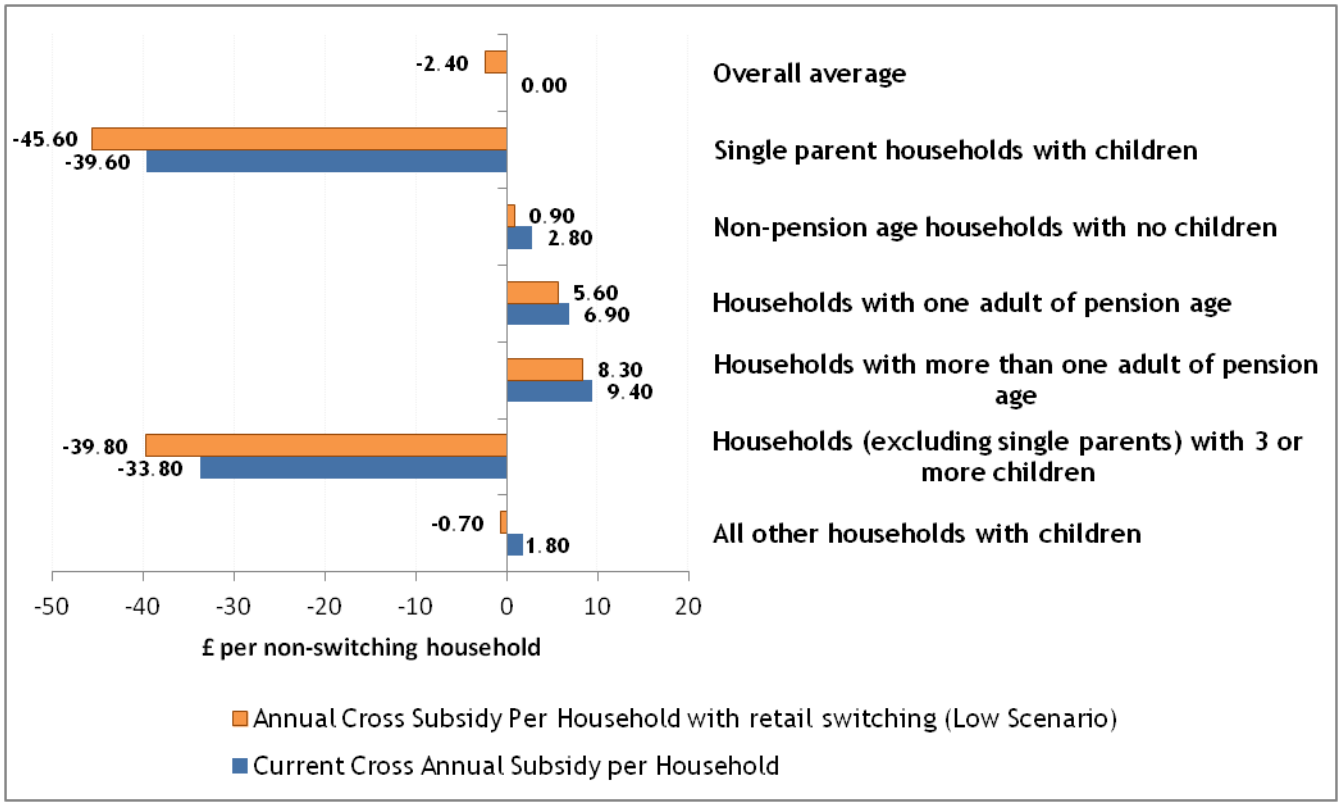
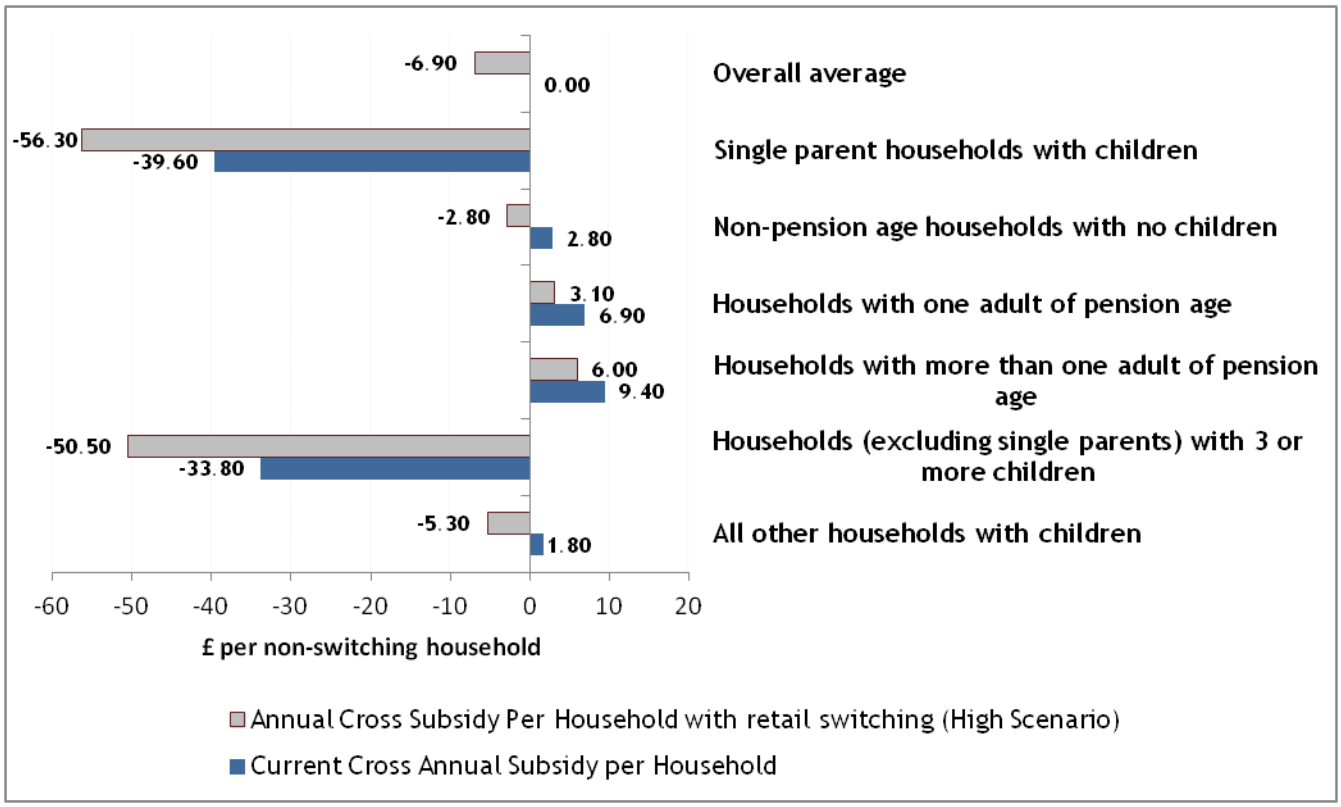


Figure 37: Scenario A (Saving = £8/yr) - Impact on retail cross-subsidies by household group (current vs. high scenario)



By Area Deprivation

Figure 38: Scenario A (Saving = £8/yr) - Impact on retail cross-subsidies by area deprivation

4.2 Scenario B: A "home services" market for all households

In this scenario the assumed expected saving we model is £100/year. This allows us to explore the sensitivity of the impacts to higher levels of switching in response to higher expected savings. This level of saving exceeds the likely the level of reduction competing retailers could offer in respect of an unbundled water retail service. Therefore, this level of saving can be interpreted as a bundled saving across a basket of retail utility services that would include water and sewerage services. Savings of this level have been identified in other sectors as the tipping point that persuades many more households to become engaged with retail markets.

4.2.1 Overall impact on retail cross-subsidies

As Table 17 below shows the higher expected saving is associated with higher levels of retail switching; up to 48% of households under the high scenario.

Under these scenarios, the overall level of retail cross-subsidies is estimated to reduce by £43 to £87 million per year (in 2016-17 prices). Under the current position the total value of retail cross-subsidies is £184 million, so these represent respectively reductions of 23% and 47%.

Table 17: Scenario B - Estimated impact on total cross-subsidies

B - Extend Retail Choice to all households in a "home services" market	Expected Number of Retail Switchers (% of total households)	Value of Expected Reduction in Retail Cross Subsidies (£m)
Scenario: Bundled Bills Savings for Switchers = £100 per year		
Low Scenario	24%	43.5
High Scenario	48%	88.7

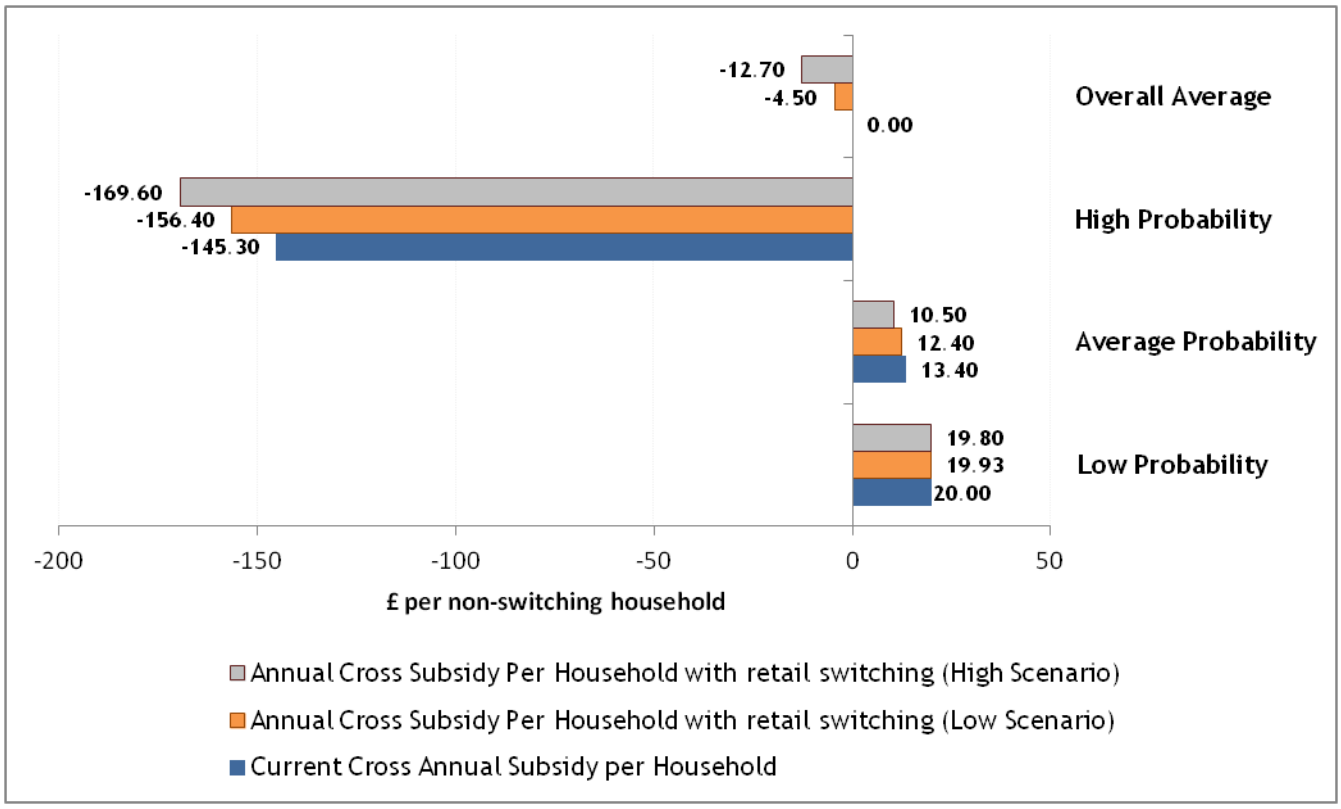
Source: ICS Calculations

4.2.2 Distributional impact on retail cross-subsidies

The same market dynamic observed under Scenario A is assumed to apply to Scenario B. The main difference lies in the overall levels of market activity that are predicted under the Scenario B parameters and the consequences that has for the distribution of current cross subsidies. As before these impacts are summarised by each household segment in the graphics below. In summary, the direction of changes observed for Scenario A is also observed for Scenario B, albeit the impacts are larger throughout.

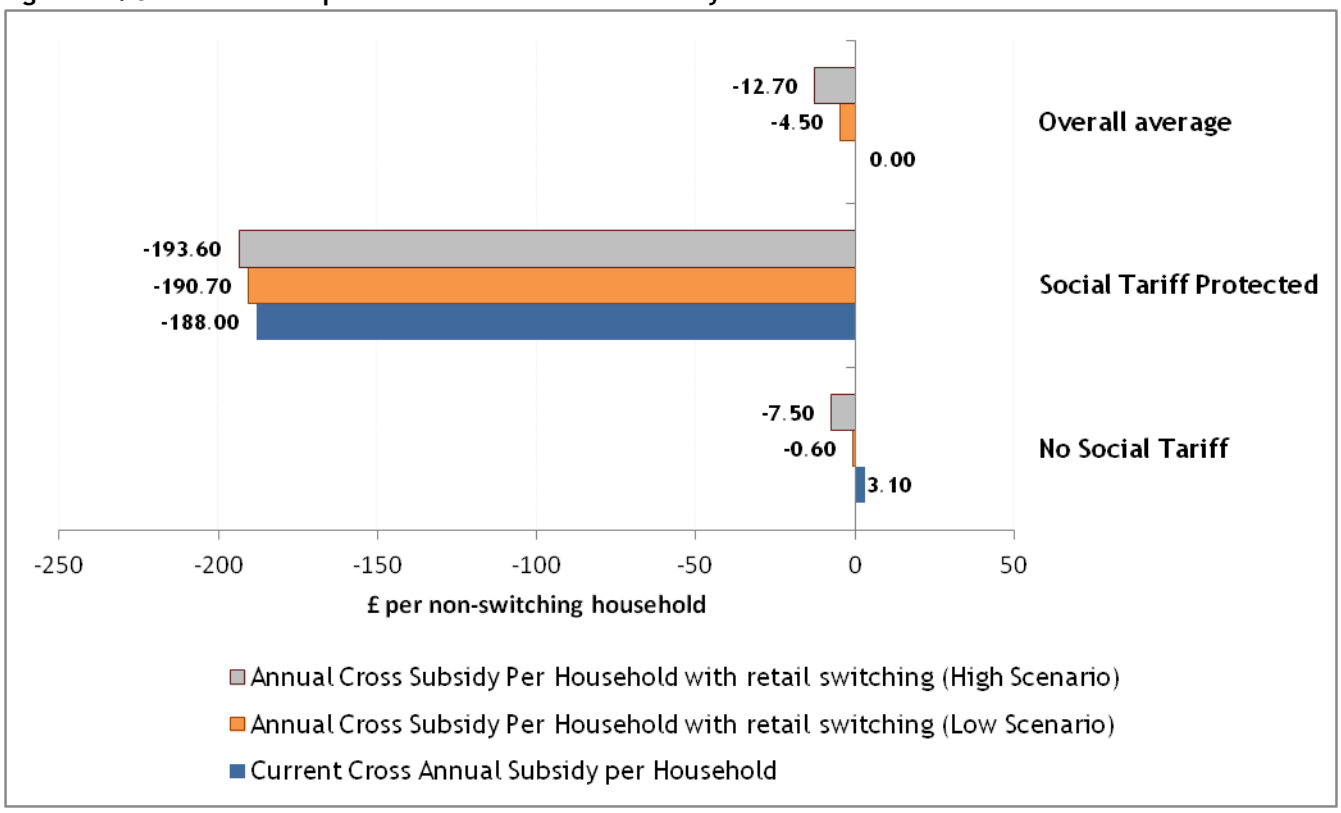
By Water Debt Status/Probability

Figure 39: Scenario B - Impact on retail cross-subsidies by water debt status



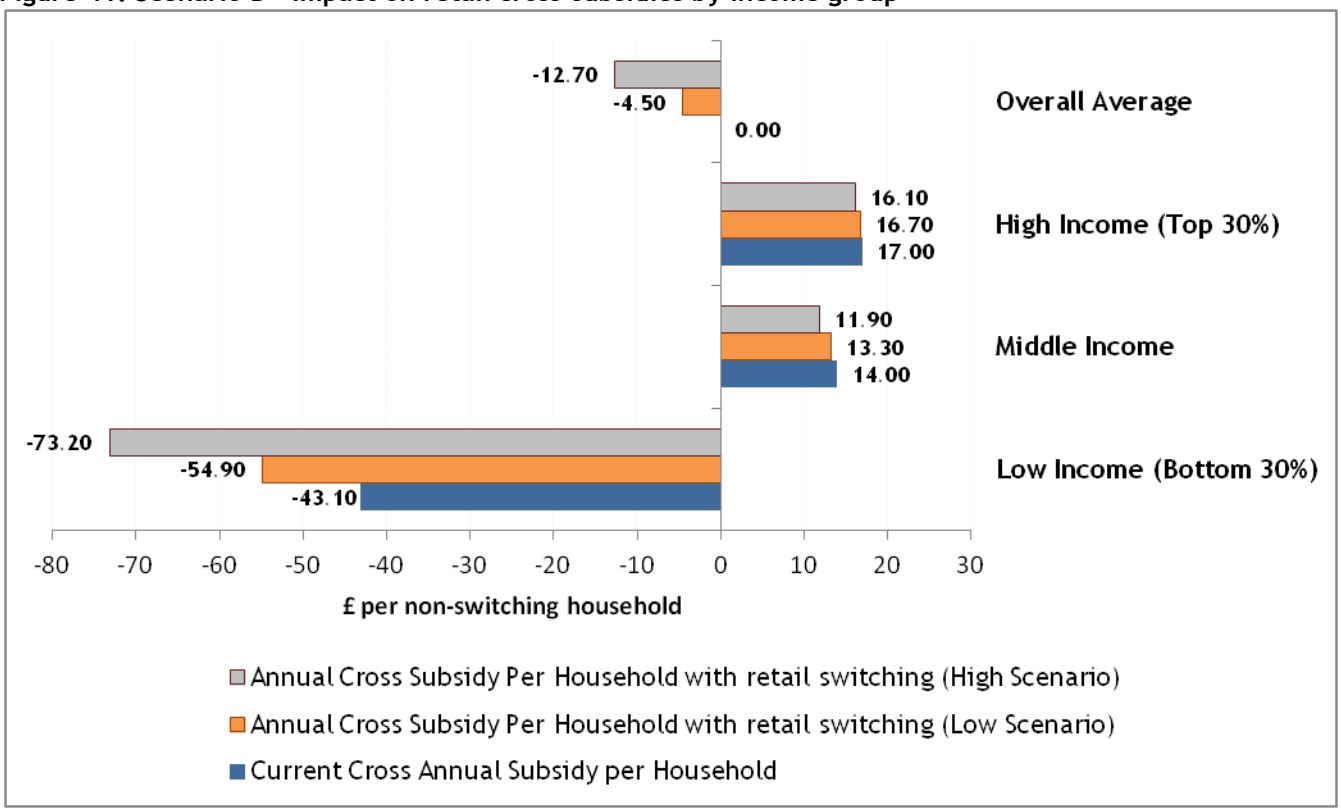
By Social Tariff Status

Figure 40: Scenario B - Impact on retail cross-subsidies by social tariff status



By Income Group

Figure 41: Scenario B - Impact on retail cross-subsidies by income group



By Household Type

Figure 42: Scenario B - Impact on retail cross-subsidies by household group (current vs. low scenario)

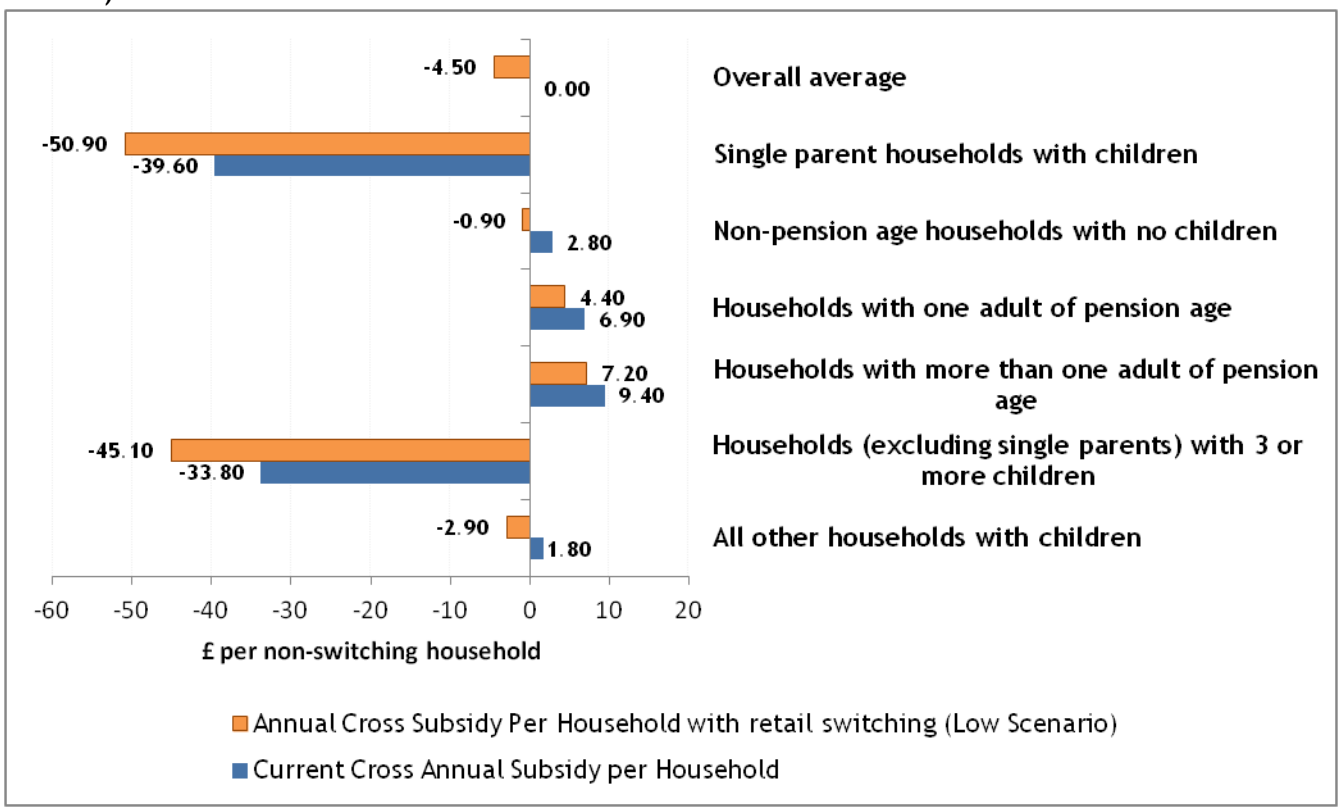
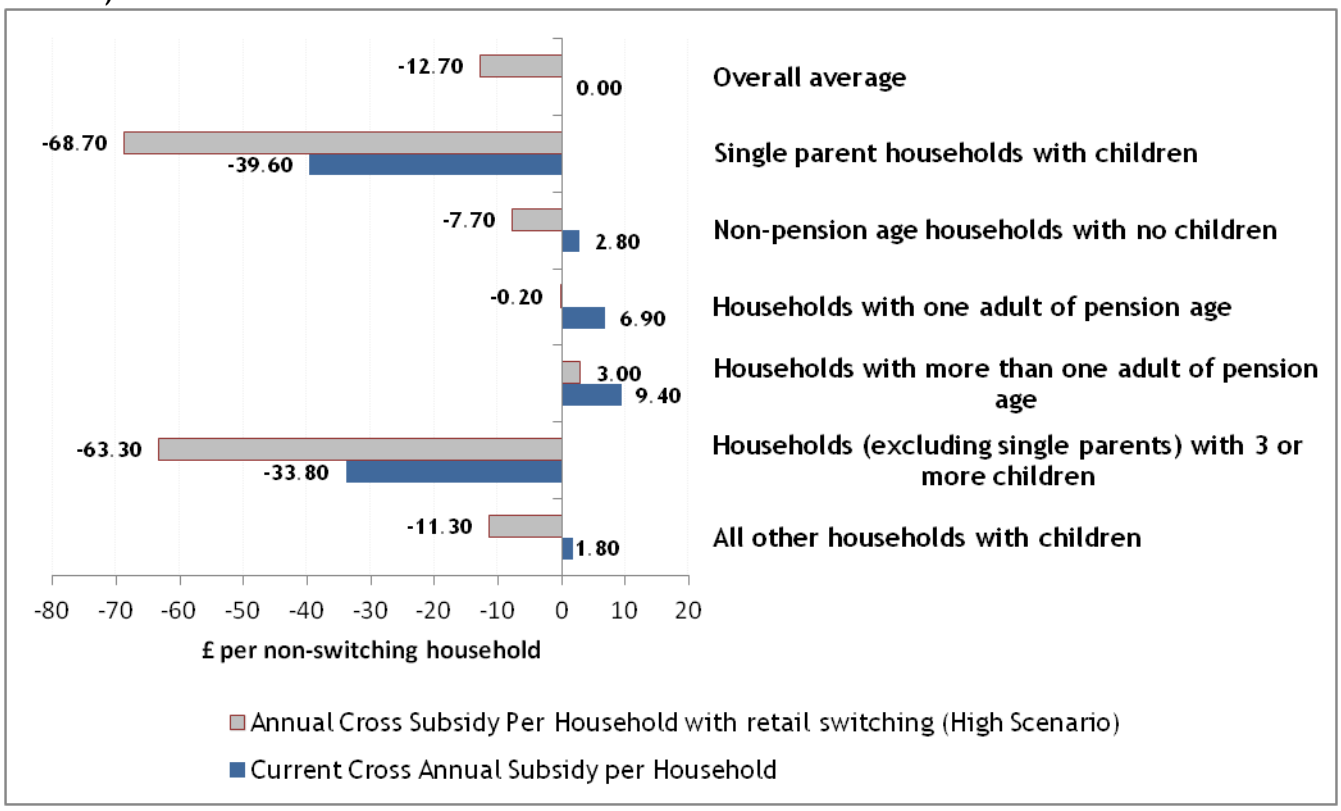
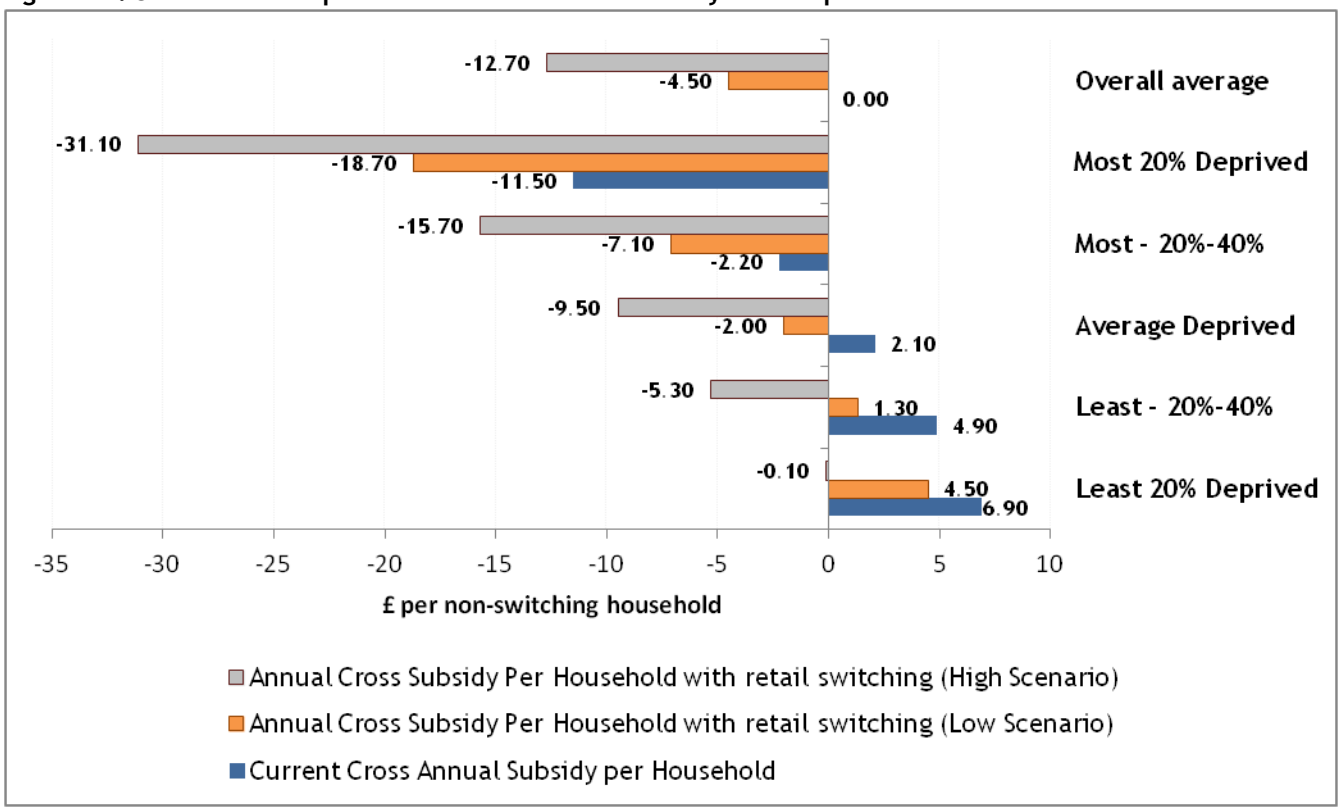


Figure 43: Scenario B - Impact on retail cross-subsidies by household group (current vs. high scenario)



By Area Deprivation

Figure 44: Scenario B - Impact on retail cross-subsidies by area deprivation



4.3 Scenario C: Retail choice for metered households only

Scenario C represents a group of scenarios that limit retail choice to metered households. These scenarios could be implemented as an extension of the currently designed systems that will be used for the opening of retail competition to non-household customers. The limiting of the scope of household retail markets in this way also offers a way to understand the extent to which that limiting may mitigate some of the impacts for cross-subsidies already noted above.

4.3.1 Overall impact on retail cross-subsidies

A total of 9 scenarios are summarised in Table 18 below. These cover:

- 3 levels of expected savings for metered households (£12 per year, £24 per year and £36 per year). Again these levels are chosen from modelling to cover a spectrum from modest/likely to aggressive/ambitious.
- These 3 levels are then combined with assumptions for low, medium and high engagement with these retail markets.

The range of reductions in cross-subsidies across these scenarios is £16 million/year to £43 million/year (2016-17 prices). As a comparison the metered only low scenario for expected savings of £24/year has an impact of £17.4 million compared to the Scenario A equivalent of £28 million/year. Hence, the restricting the scope to metered households only reduces the negative impact on retail cross subsidies by

£10.6 million/year or 38%. These reduced impacts are also reflected in the distributional impacts by household segment (shown below).

Table 18: Scenario C - Estimated impact on total cross-subsidies

C - Extend Retail Choice only to Metered Households	Expected Number of Retail Switchers (% of total households)	Value of Expected Reduction in Retail Cross Subsidies (£m)
Scenario 1: Bill Saving for Switchers (£12 per year)		
Low Scenario	7%	16.2
Medium Scenario	12%	26.4
High Scenario	17%	37.9
Scenario: Bill Saving for Switchers (£24 per year)		
Low Scenario	8%	17.4
Medium Scenario	13%	28.2
High Scenario	18%	40.2
Scenario 3: Bill Saving for Switchers (£36 per year)		
Low Scenario	8%	18.8
Medium Scenario	13%	30.1
High Scenario	19%	42.5

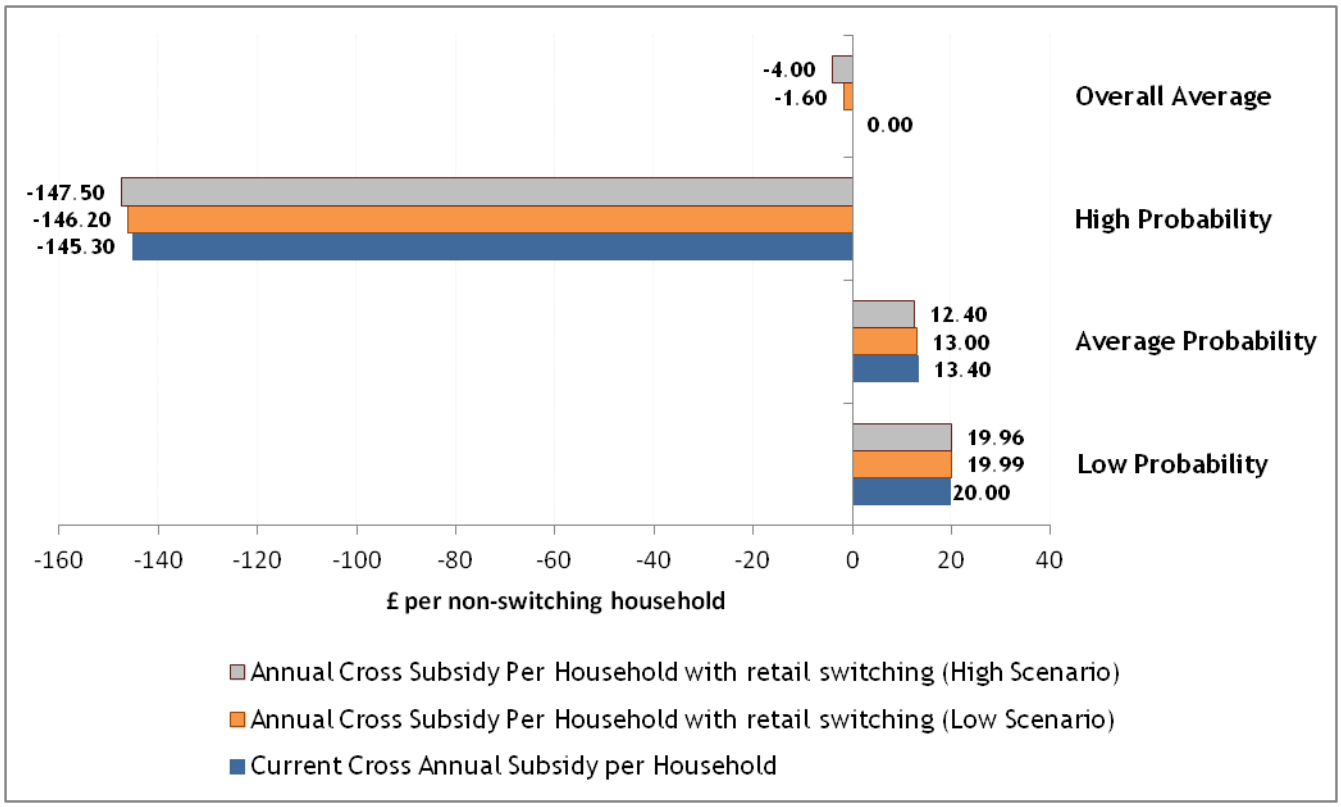
Source: ICS Calculations

4.3.2 Distributional impact on retail cross-subsidies

The distributional impacts under scenario C for the household segments are summarised in the graphics below. For brevity we only illustrate these impacts for the low and high versions of the £24 / year expected saving scenario. The level of switching under this scenario is at comparable levels to the low versions for Scenario A.

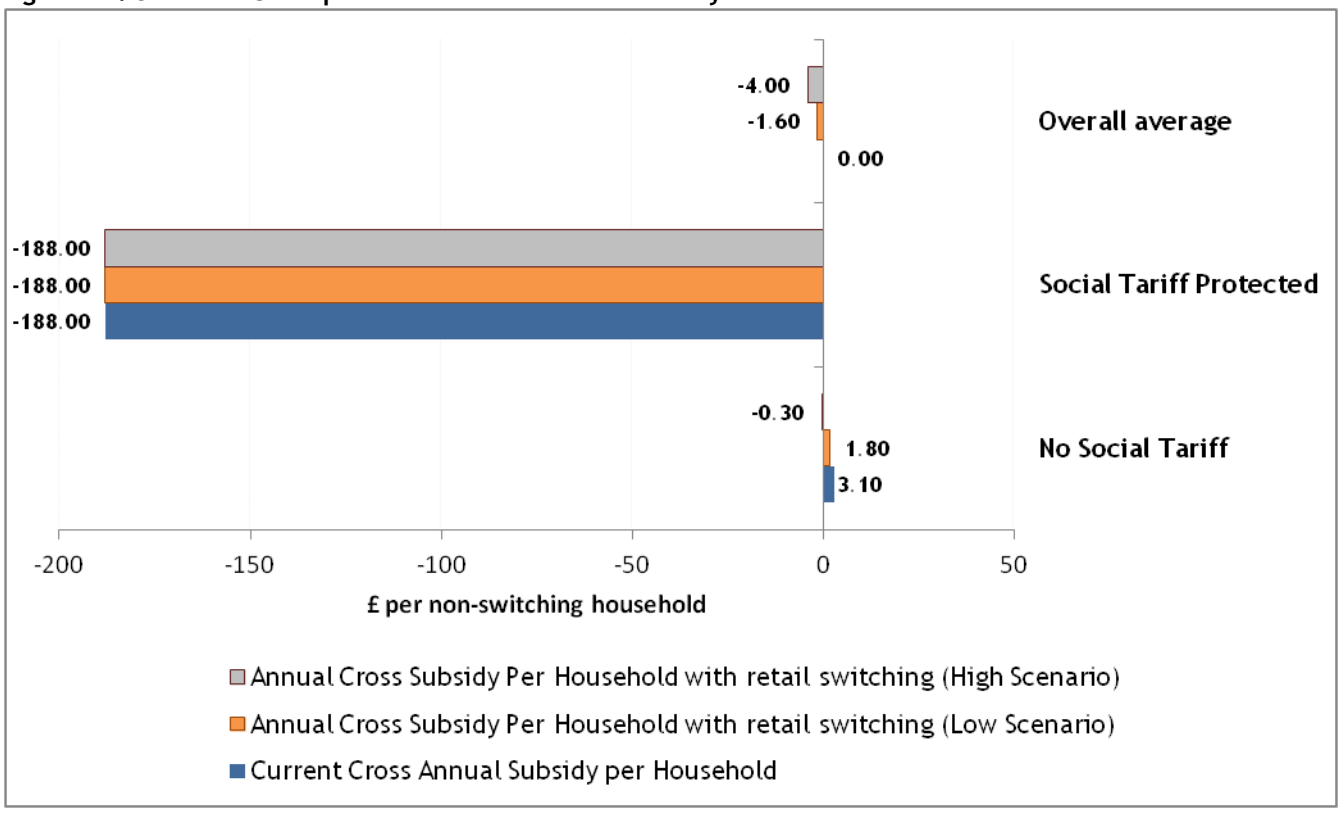
By Water Debt Status/Probability

Figure 45: Scenario C - Impact on retail cross-subsidies by water debt status



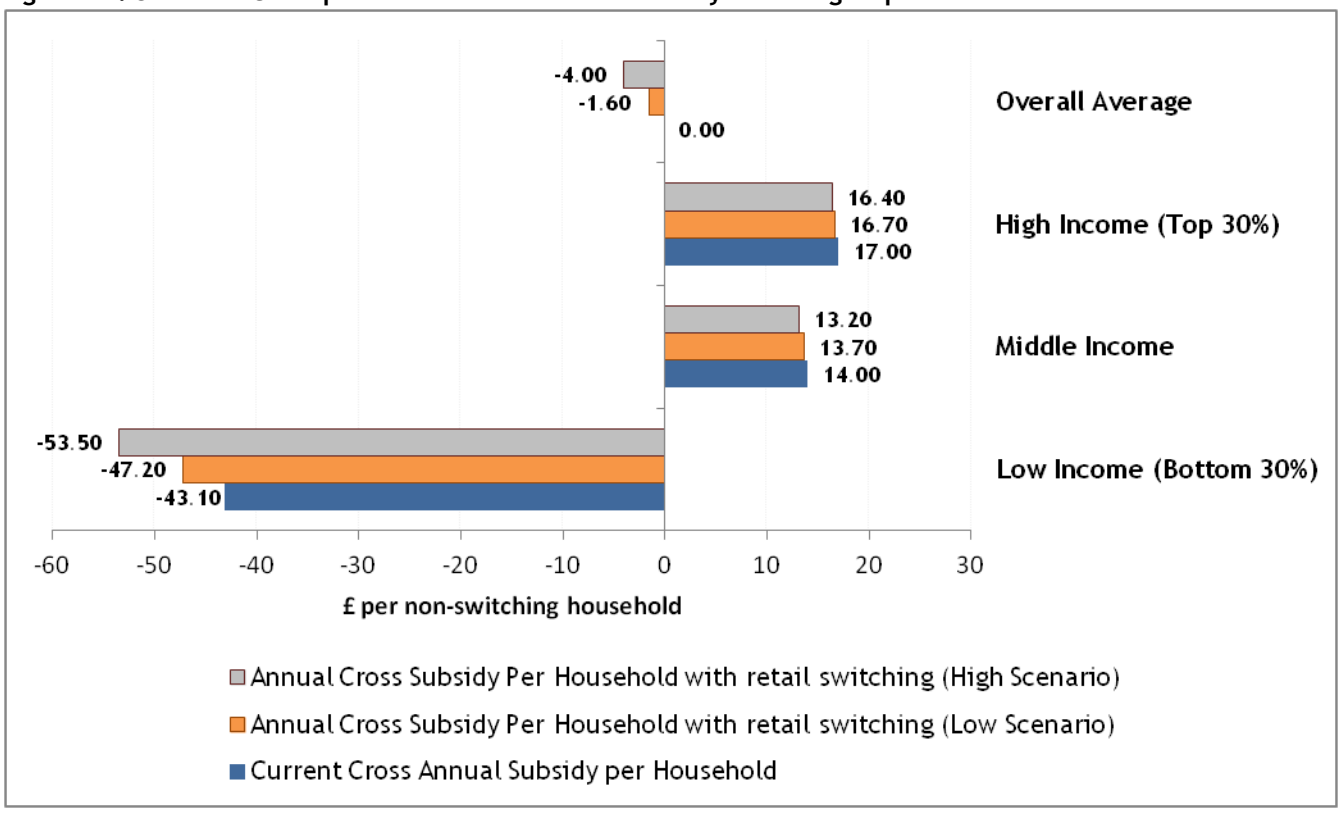
By Social Tariff Status

Figure 46: Scenario C - Impact on retail cross-subsidies by social tariff status



By Income Group

Figure 47: Scenario C - Impact on retail cross-subsidies by income group



By Household Type

Figure 48: Scenario C - Impact on retail cross-subsidies by household group (current vs. low scenario)

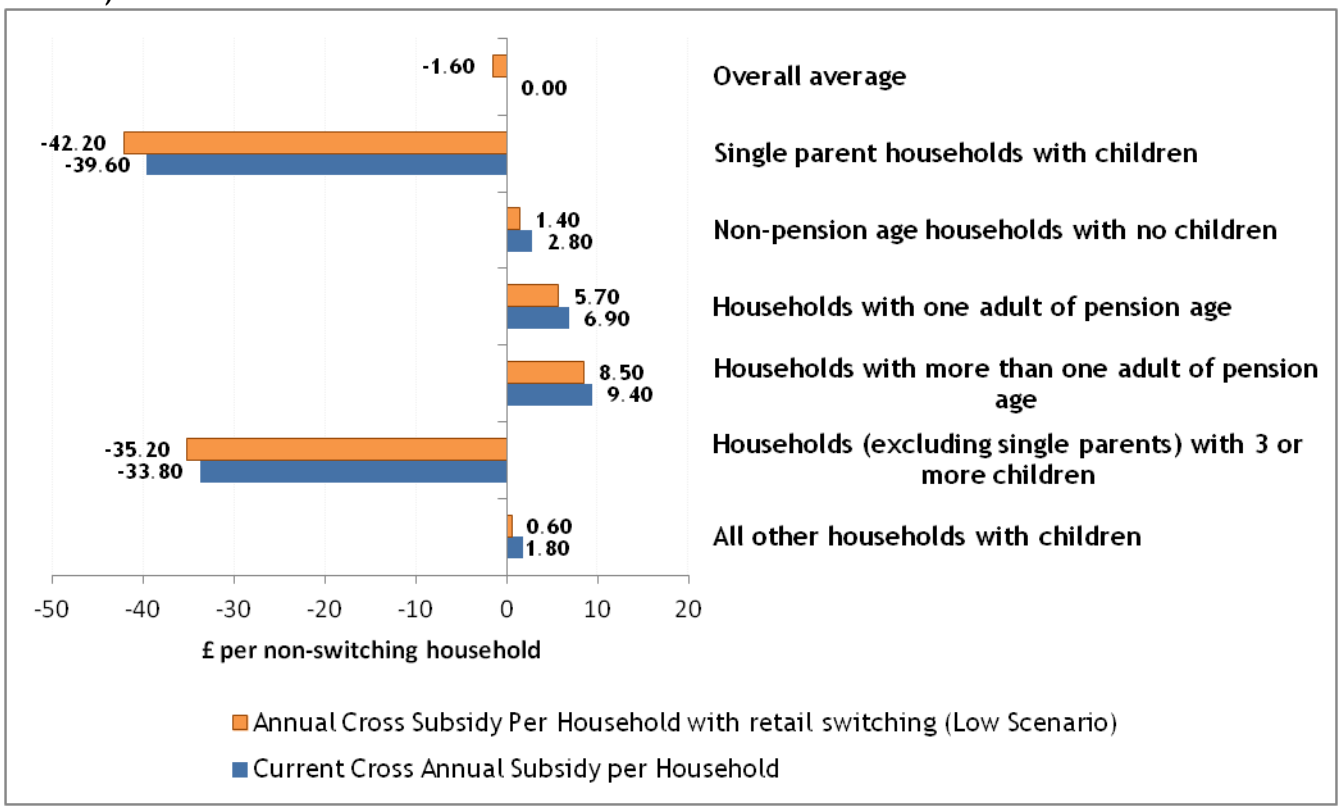
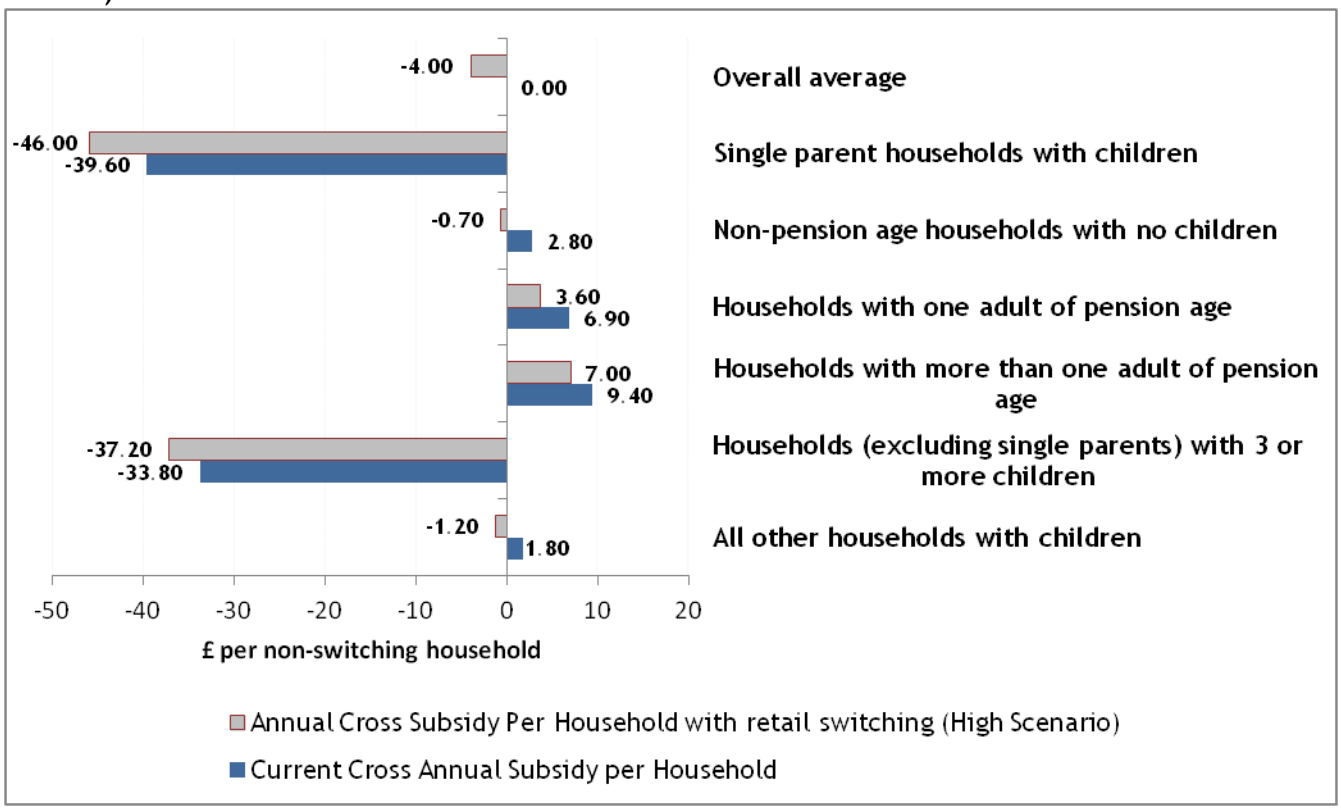
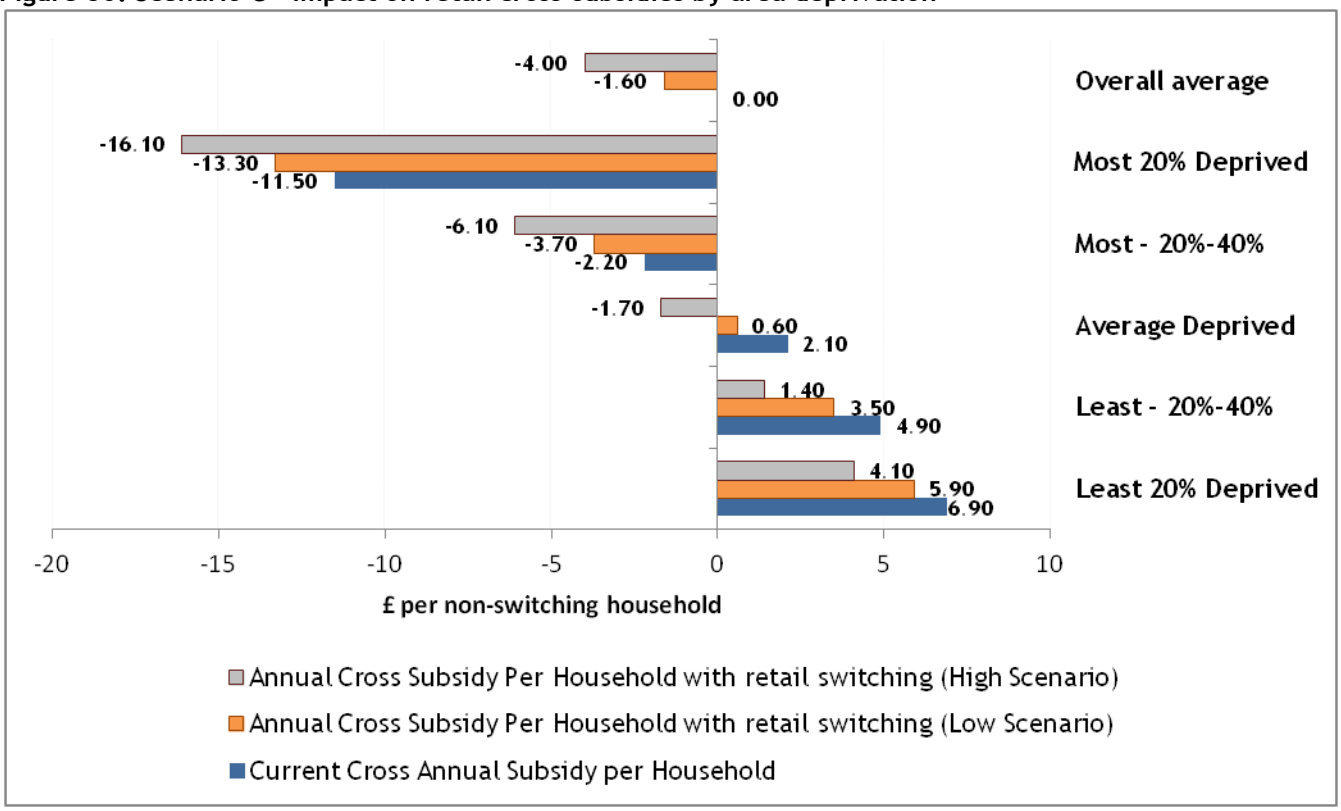


Figure 49: Scenario C - Impact on retail cross-subsidies by household group (current vs. high scenario)



By Area Deprivation

Figure 50: Scenario C - Impact on retail cross-subsidies by area deprivation



4.4 Scenario D: Retail competition for categories of unmetered households

This final set of scenarios considers the option of introducing retail competition to the unmetered household segment through the provision of retail alternatives for *blocks* of unmetered households. This would be an alternative approach to the pure retail switching for unmetered households modelled under Scenario A. In a sense these alternatives represent choice for retail suppliers rather than choice for unmetered water customers.

The groups of unmetered households considered under this category of scenario are:

- Unmetered households who currently pay their water bills by direct debit. Direct debit customers tend to be below the average retail cost to serve and competing retailers may find it attractive to serve blocks of these higher retail margin households.
- Unmetered customers who would benefit from a move to metered charging. Under this scenario, competing retailers would be exploiting the cross-subsidies that currently exist between unmetered and metered wholesale charges (dependent on household unmetered usage characteristics).

We have modelled these "block" unmetered household scenarios as additions to Scenario C (retail switching for metered households only).

4.4.1 Overall impact on retail cross-subsidies

Table 19: Scenario D - Estimated impact on total retail cross-subsidies

D - Competition for retailing to segments of unmetered households	Expected Additional Retail Switchers (% of total households)	Value of Additional Reduction in Retail Cross Subsidies (£m)
Scenario 1: Retail choice for unmetered households offered savings through switch to metered charge	6%	11.9
Scenario 2: Retail choice for unmetered households paying by direct debit	23%	41.0

Note: the estimated impacts on retail cross-subsidies are additional to the impacts reported for Scenario C (£24/year saving, Medium)
Source: ICS Calculations

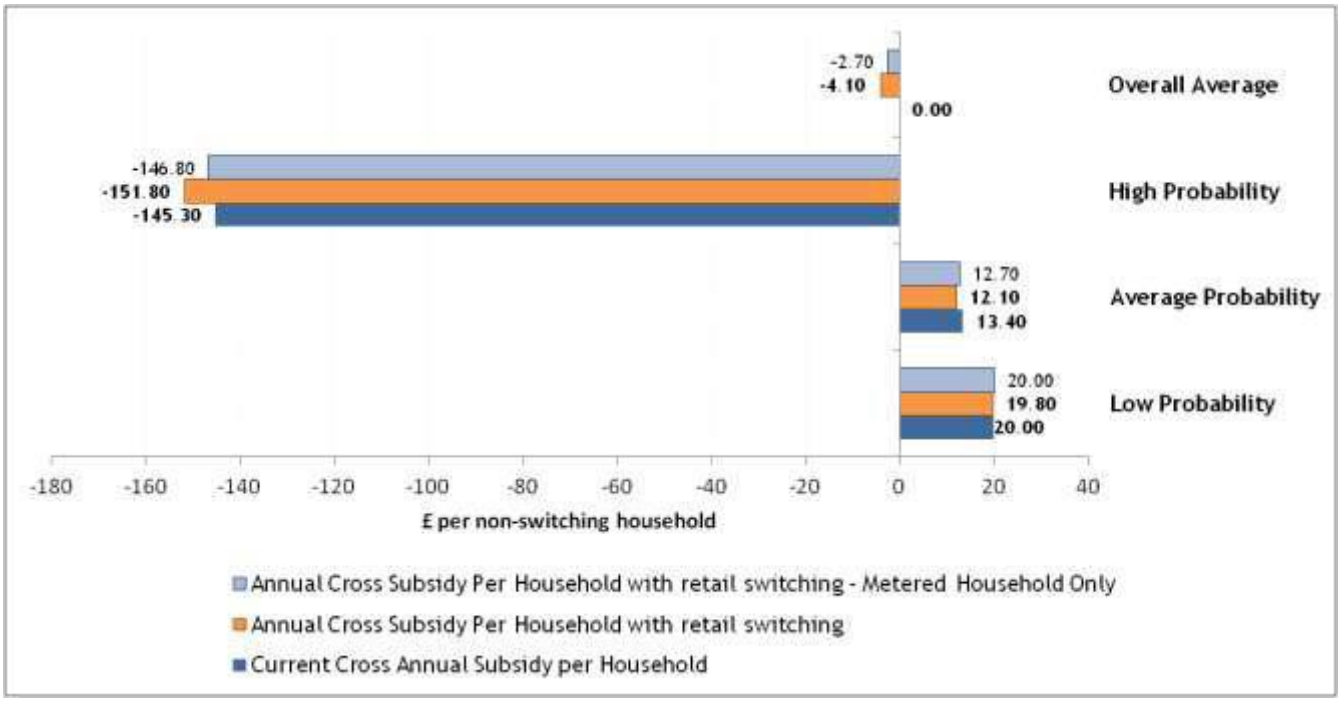
4.4.2 Distributional impact on retail cross-subsidies

The distributional impacts under these scenarios are presented below. The estimated impacts on the retail cross-subsidies are shown combined with the impacts estimated for Scenario C (£24/year saving, Medium). For reference, the graphics also show the impact estimated solely for this Scenario C in addition to the impact combined with Scenario D.

4.4.2.1 Scenario D1 (Unmetered Meter Choice)

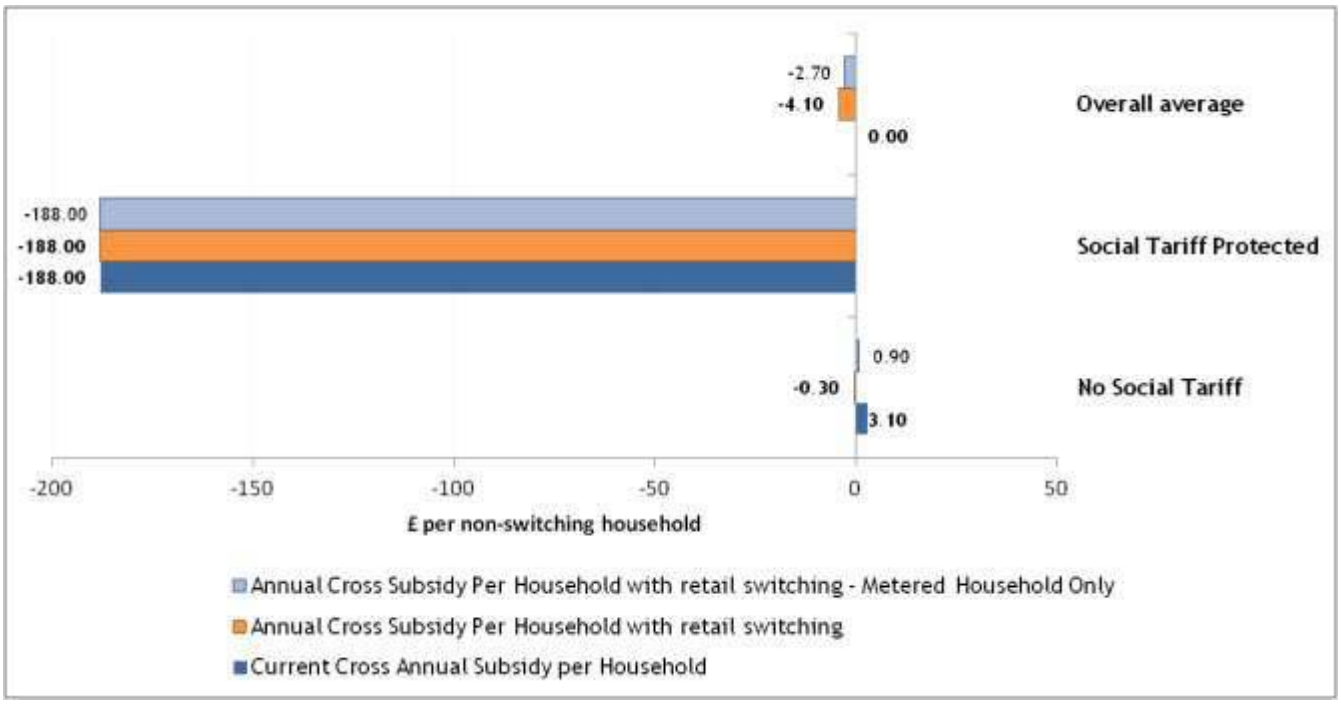
By Water Debt Status/Probability

Figure 51: Scenario D1 (Unmetered Meter Choice) - Impact on retail cross-subsidies by water debt status



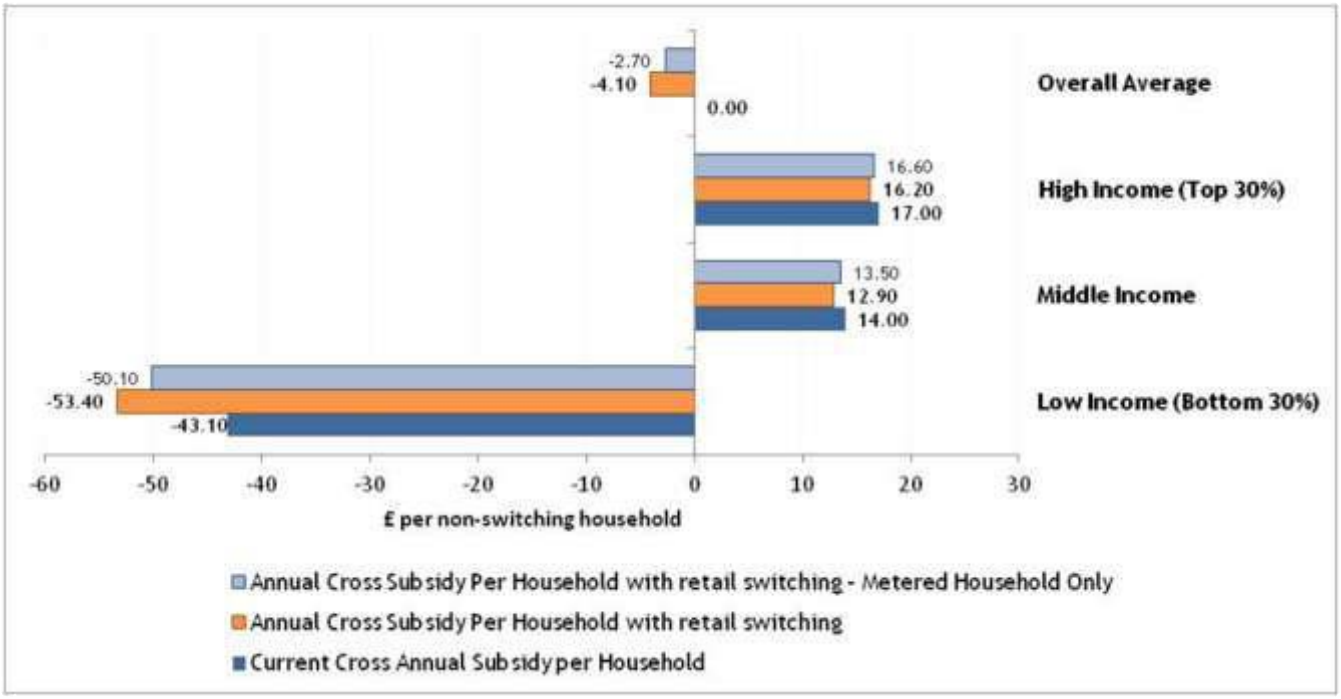
By Social Tariff Status

Figure 52: Scenario D1 (Unmetered Meter Choice) - Impact on retail cross-subsidies by social tariff status



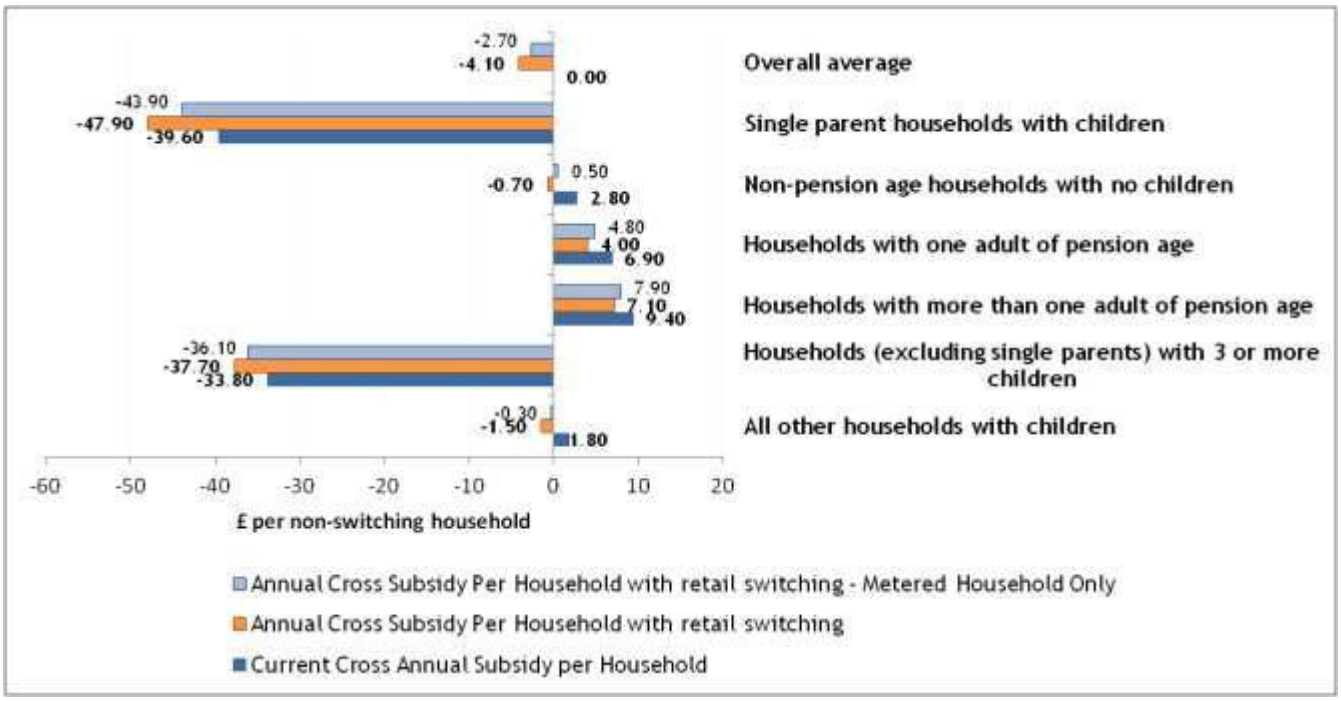
By Income Group

Figure 53: Scenario D1 (Unmetered Meter Choice) - Impact on retail cross-subsidies by income group



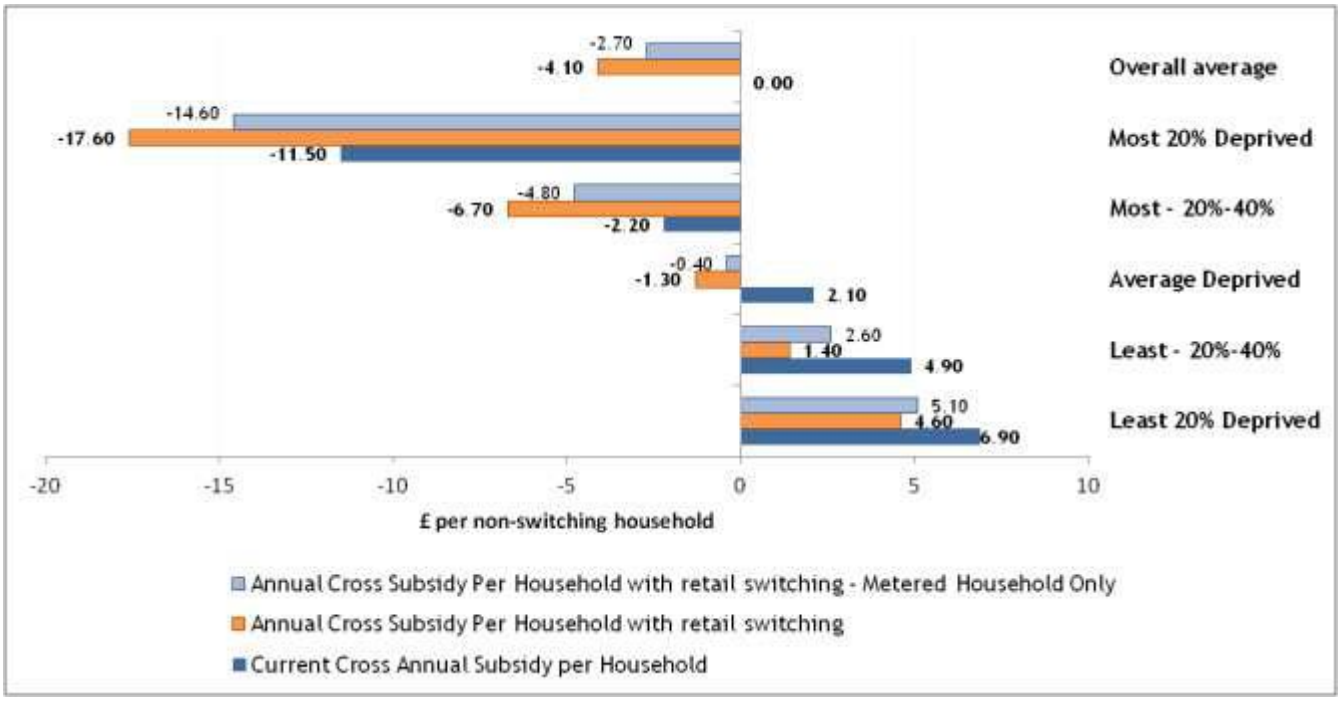
By Household Type

Figure 54: Scenario D1 (Unmetered Meter Choice) - Impact on retail cross-subsidies by household group



By Area Deprivation

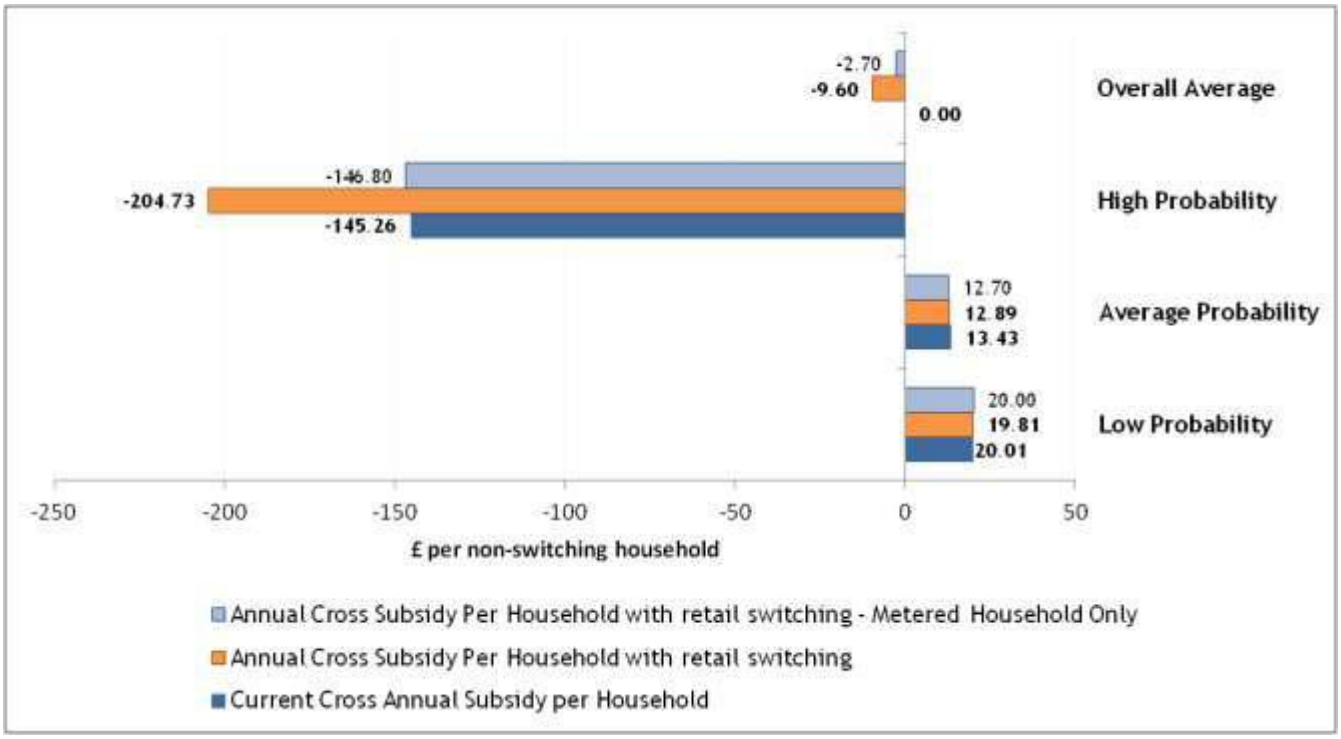
Figure 55: Scenario D1 (Unmetered Meter Choice) - Impact on retail cross-subsidies by area deprivation



4.4.2.2 Scenario D2: Unmetered Direct Debit households

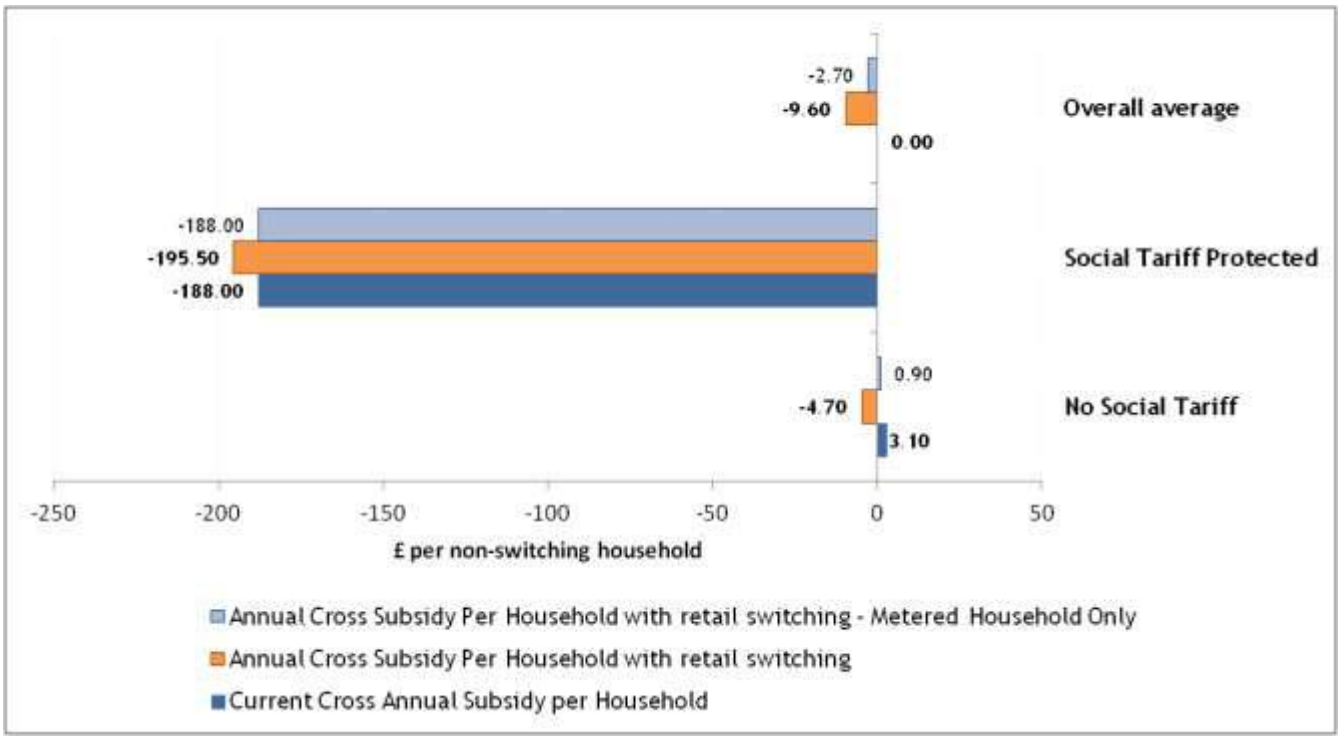
By Water Debt Status/Probability

Figure 56: Scenario D2 (Unmetered Direct Debit) - Impact on retail cross-subsidies by water debt status



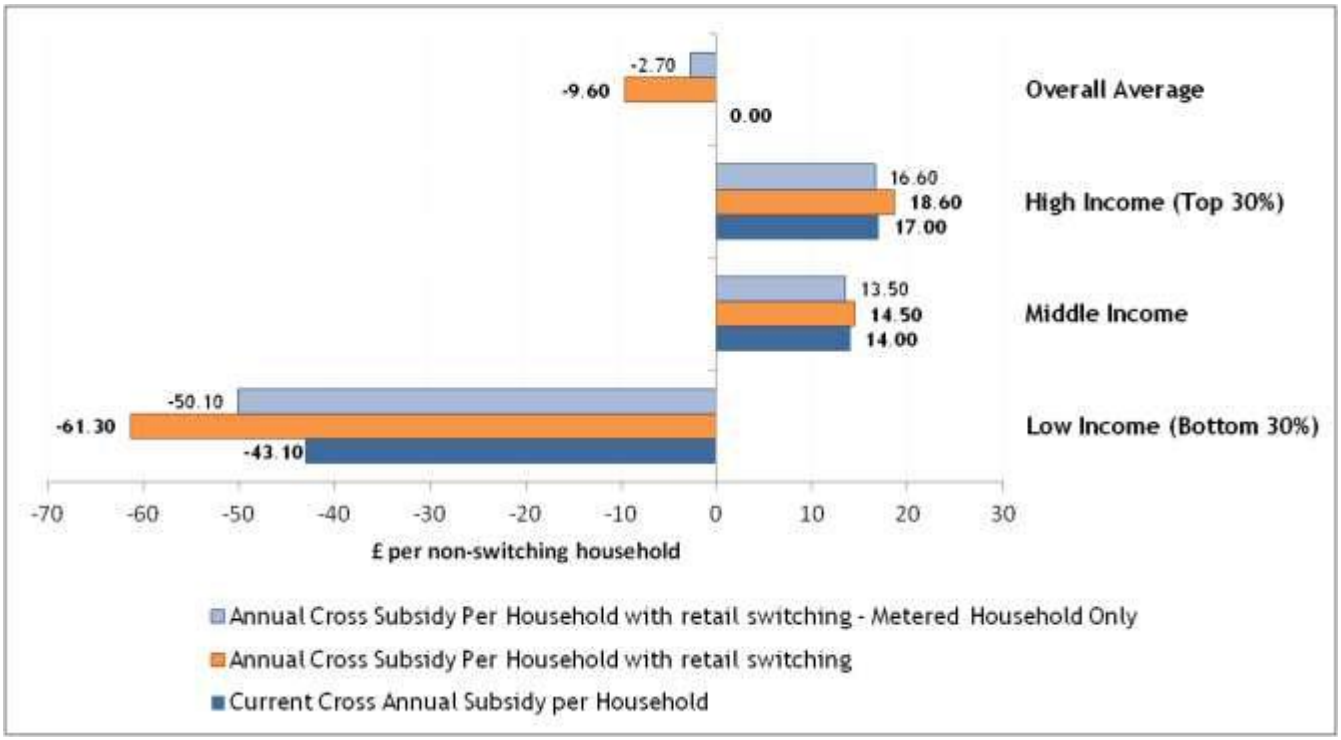
By Social Tariff Status

Figure 57: Scenario D2 (Unmetered Direct Debit) - Impact on retail cross-subsidies by social tariff status



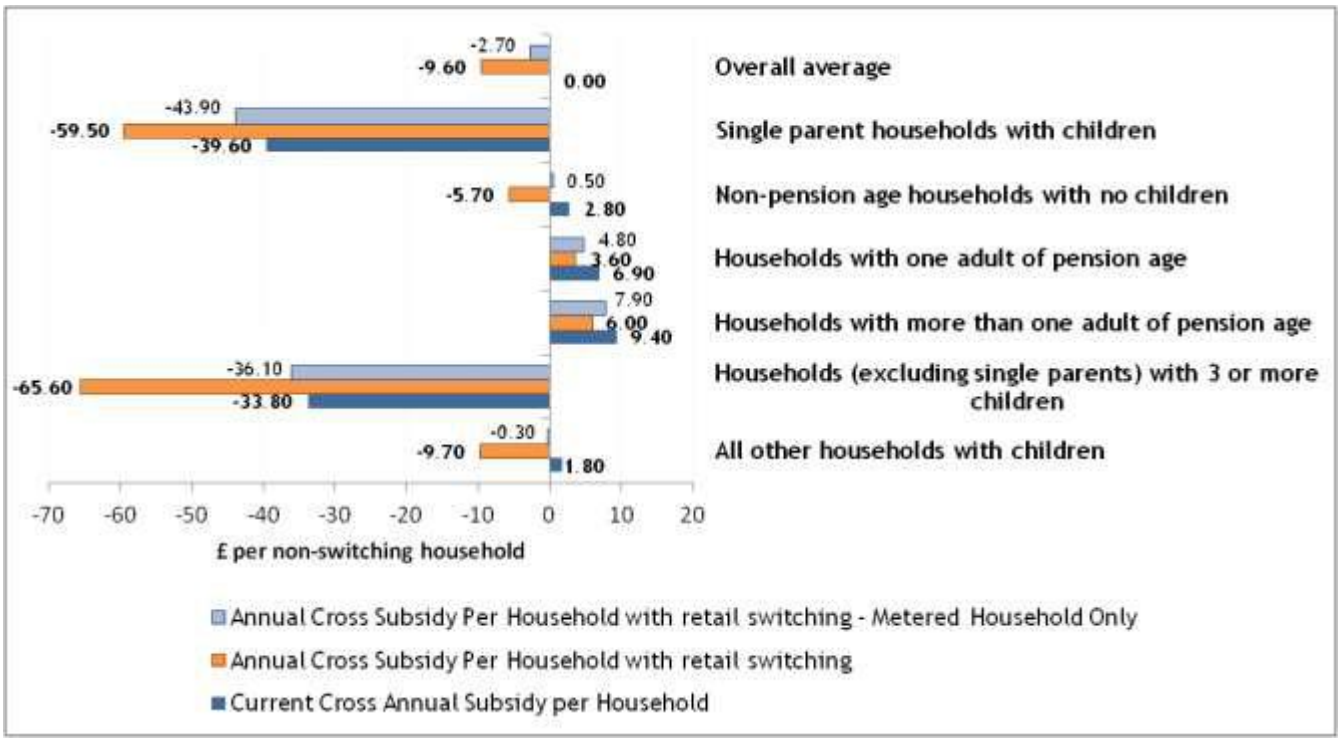
By Income Group

Figure 58: Scenario D2 (Unmetered Direct Debit) - Impact on retail cross-subsidies by income group



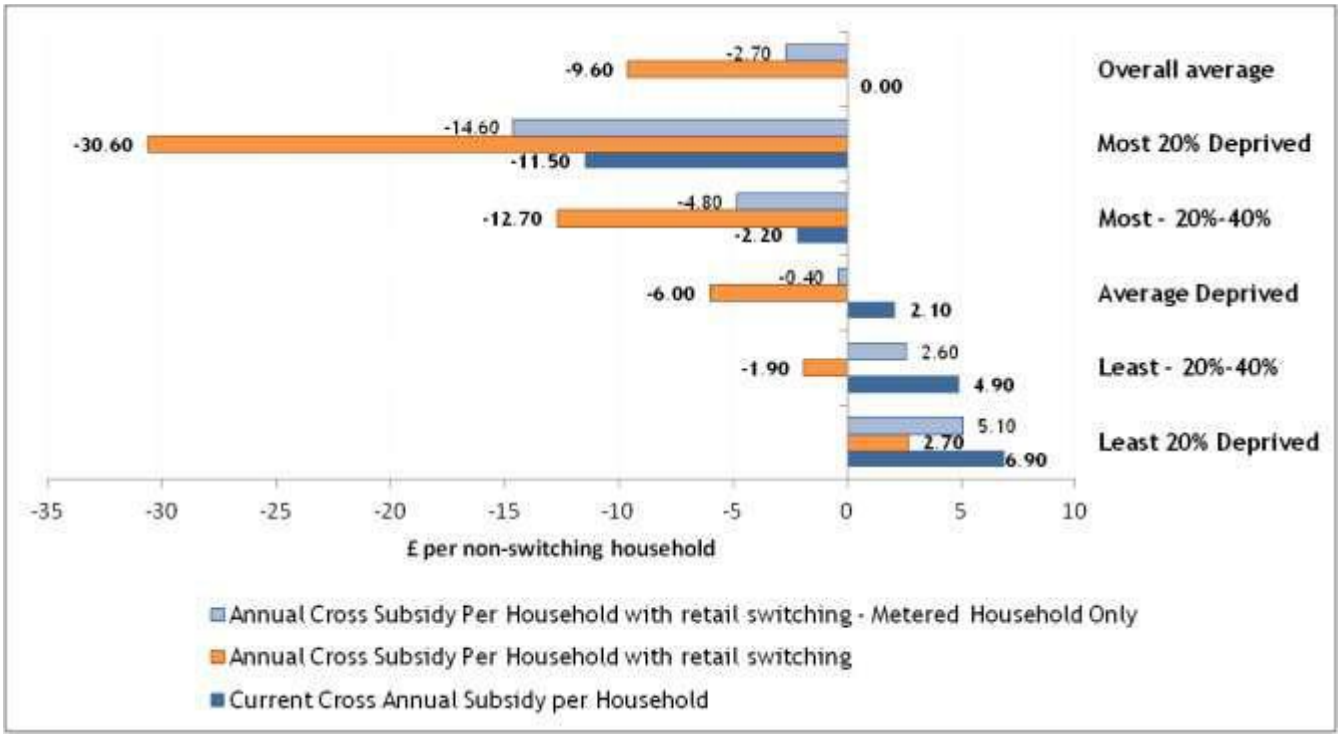
By Household Type

Figure 59: Scenario D2 (Unmetered Direct Debit) - Impact on retail cross-subsidies by household group



By Area Deprivation

Figure 60: Scenario D2 (Unmetered Direct Debit) - Impact on retail cross-subsidies by area deprivation



4.5 Summary assessment of scenarios

The main points to emerge from our modelling of different retail market scenarios can be summarised as follows:

- ***First, the extent to which current retail cross-subsidies could be put under pressure in competitive retail markets will clearly vary dependent on scope of any potential markets and also the strength of customer engagement with those markets.***
    - One driver for the strength of engagement will be the scale of savings in retail bills that are offered to households in retail markets, but this will clearly not be the only factor. In our main scenario A, a modest annual saving of £8 per year drives retail switching in the range 14 to 32% of all (metered and unmetered) households and higher savings in water retail bills will drive in turn relatively modest additions to these switching forecasts.
    - Significant increases in expected savings – and importantly savings significantly higher than current retail costs in water – would appear to be necessary to entice notably higher levels of switching behaviour. The much cited "tipping point" of £100 per year in the energy market literature would appear only feasible in the context of bundling bill savings across a number of product lines that included water and sewerage services. Our modelling of this approach with Scenario B sees switching increase to the range 25% to 50% of all households.
    - Any transition to full retail markets for all households is likely to require time and a progression in a number of steps would widen the scope for the mitigation of any potential for negative impacts. For example, as modelled under Scenario C a first step could be to extend retail choice to metered households only. This would constrain, we estimate, any initial market size to at most about 20% of all households. A further option as envisaged under our Scenario D options is that choice could be further progressed through competition *for* blocks of unmetered households. Our estimates suggest the market for unmetered direct debit households could alone represent a further 23% of all households.

- ***Secondly, the overall scale of switching will be a driver of the overall impact on current cross subsidies, but so importantly will be the type of household switcher.***

    - Across our scenarios, we estimate the incumbent water companies would experience a reduction in their ability to recover the same level of cross subsidy within their current charges for retail services. This consequence flows directly from the expectation that "high retail margin" households are most likely to switch to competing retailers under our scenarios. Furthermore, under the present regulatory controls for household retail there is no automatic mechanism for rebalancing these reductions.

- Under scenario A this reduction is estimated to be in the range £25 to £65 million per year (out of a total cross subsidy value of £184 million per year). With the higher switching envisaged under Scenario B this range increases further to £44 to £89 million per year.
- Scenarios C and D highlight how these reductions in the overall levels of cross-subsidy presently recovered could be impacted under alternative models for household retail markets. Limiting the retail market to metered households only (Scenario C) is estimated to result in cross subsidy reductions of between £16 million per year (lowest case) to £42 million per year (highest case).
- With the Scenario D options, the impact of extending choice through a meter option for unmetered households (who benefit from lower metered bills) is estimated to have the smallest impact on retail cross subsidies (an additional £12 million per year or about £1 per billed household).[19] The wider market for unmetered direct debit households is estimated to be associated with an overall cross subsidy reduction of £41 million per year.

- ***Finally, the evidence across the modelled scenarios is that two types of distributional impact could be observed. The average cross-subsidy benefit to recipients is estimated to increase, while the average cross subsidy contribution is estimated to decrease. Within each demographic category the switching of higher margin households will underlie these changes in the average net subsidy positions. Moreover, both of the changes indicate that an impact of retail switching could be a more acute distribution of cross subsidies and it is the combination of these two impacts that also drives the overall cross subsidy reductions/deficit.***
  - As noted elsewhere in this report (see section 3.4.2), with each household demographic segment there be a mix of "high margin" households who currently are positive contributors to retail cross subsidies and "low margin" household who are the recipients of those current retail cross subsidies.
  - This means the net position for each demographic category will be determined by the balance of these two types. As we have documented in this report the categories who are net recipients of cross subsidies appear to be the households most likely to be in vulnerable circumstances – households in the bottom 30% of incomes, households most likely to experience debt with their water bills, households currently protected by social tariffs and households who live in relatively deprived neighbourhoods.

[19] The overall impact on cross subsidies would be greater, estimated in our modelling to also include around £50 million of unmetered household wholesale cross subsidy being unwound via the switching of 0.7 million unmetered households to the metered charging base. This larger impact would in principle be rebalanced through the incumbent wholesale charges paid by all retailers.

5 Conclusions and recommendations

5.1 Key findings and conclusions

The findings of this study emphasise the importance of recognising in current policy debates the potential for distributional impacts arising from household retail competition.

A key factor that underlies these potential impacts is the assessment of the actual costs of providing retail services to different household groups. Understanding how these costs vary across household segments will be important to informing the consideration of overall costs and benefits, and the design of any potential household retail markets.

Any market design of household retail markets will also need to consider ways to mitigate the challenges of these potential distributional impacts. Managing any transition to household retail markets in the water sector could also have an important influence on the pace and scale of any unwinding of these cross-subsidies.

These challenges are similar to those observed in related utility markets and the experience of the recent reviews in the retail energy market will provide key learning points for policy makers. Understanding how these challenges can be managed across these markets as retail competition develops in water will be an important further consideration.

5.2 Recommendations for further work

The relatively short timescales available for this project mean inevitably that further review of key data and assumptions would be merited within the timeframe permitted for Ofwat's review. In particular we would highlight:

- Updates to the household data-sets with the latest FRS household datasets. Discussions with Ofwat to this end were initiated as part of this project. Ofwat currently holds a special licence to the 2013-14 FRS (the latest data available) and further analysis with this dataset should be feasible within the timescales for Ofwat's present review.
- Further company analysis of the de-averaged retail cost to serve. This has a key bearing on the measurement of current retail cross-subsidies.
- Inform and develop the analysis of switching behaviour with findings from research into water customer attitudes about retail switching and competition. This should include testing the strengths of attitudes to retail switching in other utility markets and their transferability to the water context.
- Identification and assessment of policy and market design options for the mitigation of the potential distributional impacts highlighted in this report. The analysis presented in this report has focused on unmitigated impacts with a view to informing policy makers where mitigation could be required.

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Annex 1 Literature Review

This section provides a summary of conclusions on factors and evidence used as part of developing scenarios for evaluation underpinning Table 4 in the main report. An analysis of key literature used to develop the mix of demographic characteristics and behavioural factors is presented to answer the vital question; ***who switches?*** The former can typically be modelled as explanatory variables using available data. The latter have informed assumptions made about switching behaviours we may observe based upon experience from similar markets.

Evidence on household switching behaviour

South West Water/Bournemouth Water

South West Water and Bournemouth Water have conducted two pieces of customer research providing information relevant to understanding switching possibilities in a household retail water market.

The SWW/ICS study

The first study canvassed opinion in relation to both future bill profiles along with customer attitudes and responses to the introduction of competition. Three samples were collected in total: National including and South West Water inclusive of Bournemouth Water. All three had target sample sizes and quotas set.

In all over a 1,000 households and businesses participated. Key findings relative to this study are summarised below.

- >70% respondents favour competition and would like to have the option to switch
- Overriding reason is to reduce bills, in line with literature
- Circa 40% of the national sample and c.50% of SWW/BW respondents said they would like to switch
    - Similar to engagement/apathy in energy
    - Shows regional variation likely to be driven by differences in savings as a proportion of income, proportion of bill and variation in service

The SWW/Turquoise study

This was an online survey with a sample over 1,400 respondents which built upon the ICS study and brought in comparisons to energy.

One point worth noting is the sample has an over-representation of AB SEG grouping which in the working paper has not yet been re-weighted. Evidence from the energy sector shows this group is more engaged in switching, so the results could therefore overstate potential engagement/switching behaviour.

Accepting the above caveat there are still some important lessons to be taken from the work:

- Size of savings – confirms £100 as a tipping point to encourage switching
    - 7 in 10 would consider switching for £100

  - 7 in 10 would not consider switching for £20
- Vulnerable customers are less likely to switch
- 4 in 10 said a bundled utility bill was appealing – suggesting the 'home services market' may drive more engagement
- Most significant concerns about switching raised were insufficient savings, price rises after a switch and lower service

Overall findings appear consistent with both energy and academic literature relating to switching patterns.

Ofgem and UK markets

Ofgem in conjunction with Ipsos MORI also run a tracking survey which also contains useful information.[20]

The 2015 tracking survey report primarily focuses on switching and shows a fairly stable pattern of switching behaviour over the 3 previous years.

The survey uses a four-fold classification of switching behaviour:

Table 20: Switching behaviours in energy 2014/15

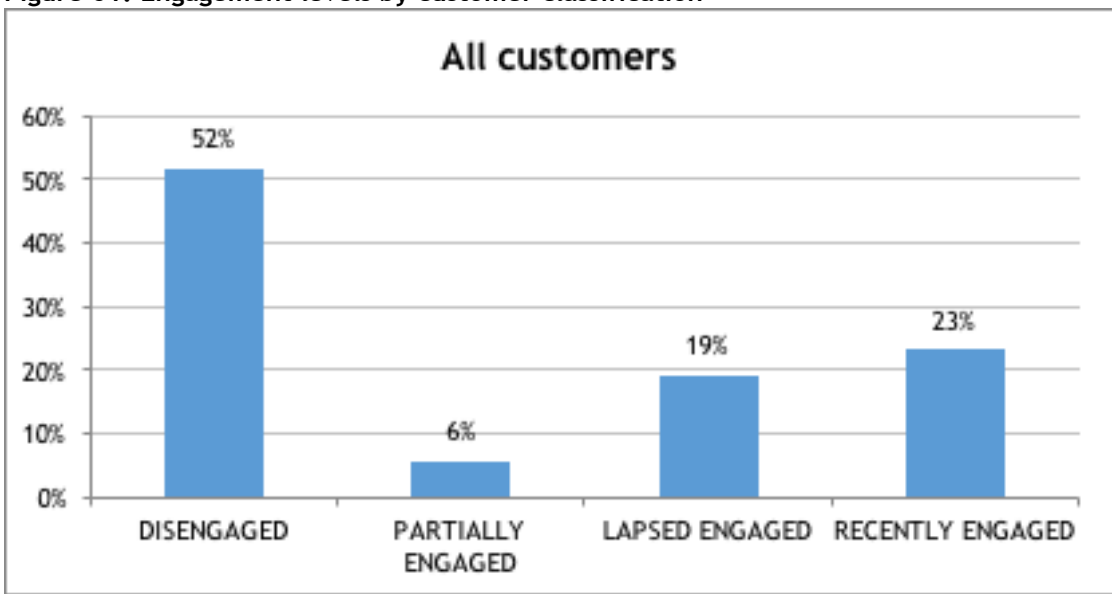
Disengaged	Never switched supplier and not switched tariff/payment method in 2014/2015 (either fuel)
Partially Engaged	Never switched supplier and switched tariff/payment method in 2014/2015 (either fuel)
Lapsed Engaged	Switched before 2014 and neither switched supplier in 2014/ 2015 nor switched tariff/payment method in 2014/2015 (either fuel)
Recently Engaged	Either switched supplier in 2014/2015 or (switched tariff/payment method in 2014/2015

Some key headline findings are summarised below:

[20] https://www.ofgem.gov.uk/sites/default/files/docs/2015/09/customerengagementreport2015_final_for_publication.pdf

1. Overall engagement with the market

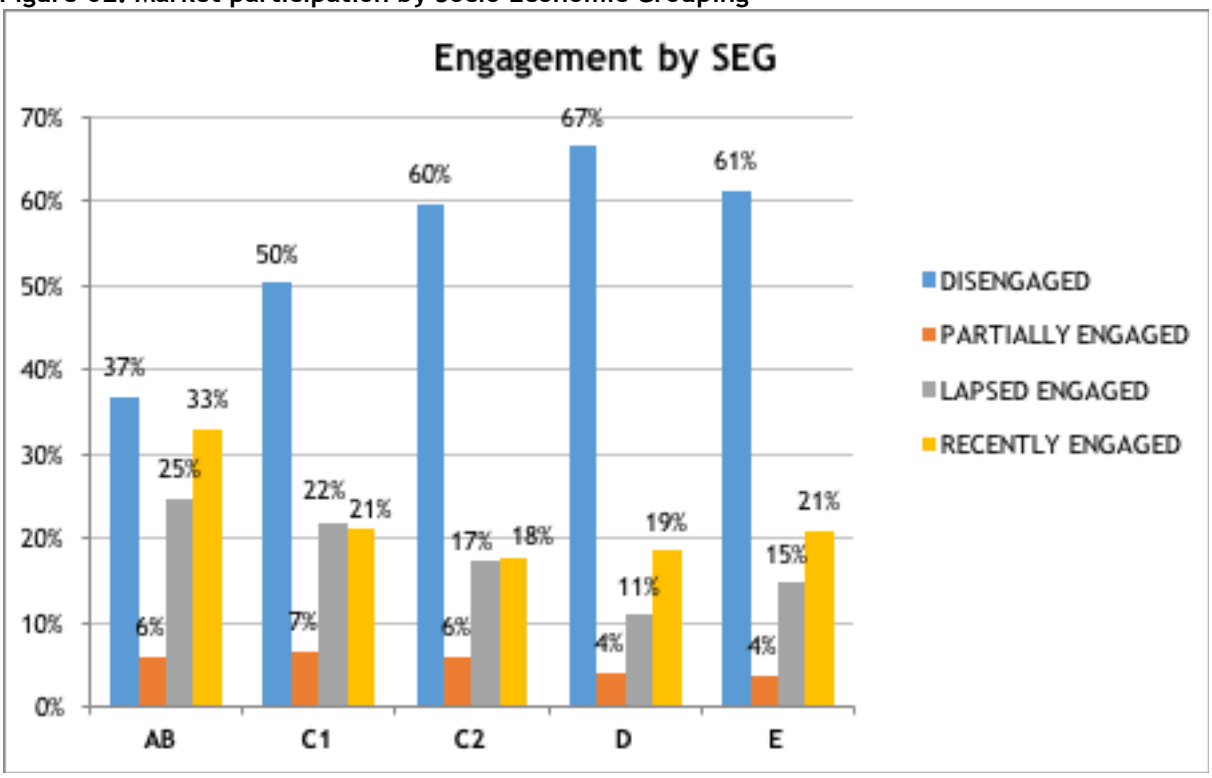
Figure 61: Engagement levels by customer classification



2. Engagement by SEG

There is evidence that disengagement aligns with lower Socio Economic Groupings despite the relatively larger marginal impacts a switch could have on disposable income.

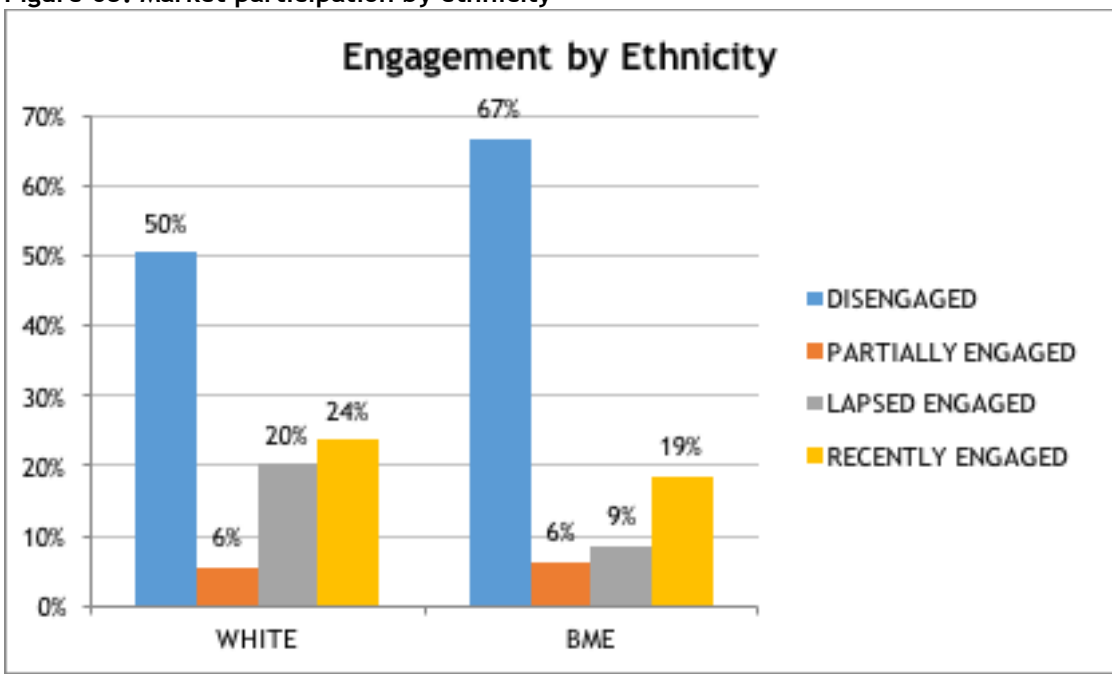
Figure 62: Market participation by Socio Economic Grouping



3. Engagement by Ethnicity

Respondents from non white British backgrounds were 17% more likely to be disengaged. This is likely to be driven in part by language barriers. BME (Black and Minority Ethnic) is a broad group so this effect could be more acutely felt in specific communities.

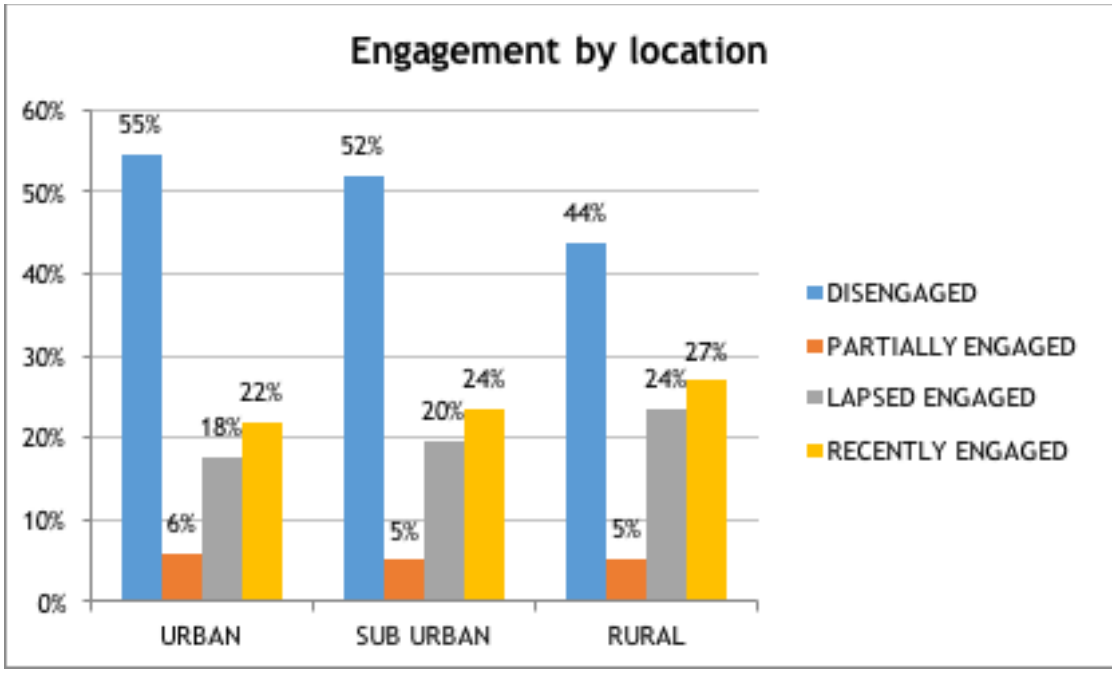
Figure 63: Market participation by ethnicity



4. Engagement by Location

Engagement appears to increase as homeowners become more rural. Customers may face different bills and incentives due to differences in fuels or housing stock. This correlation could also be explained by underlying income/SEG factors.

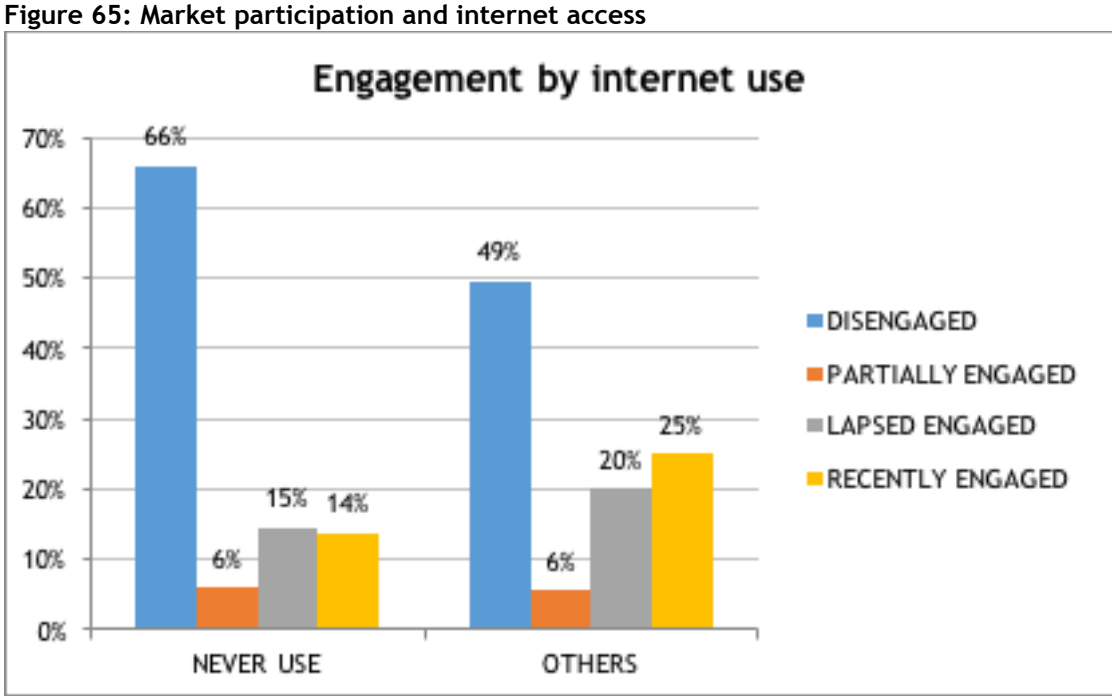
Figure 64: Market participation in rural and urban areas



5. Engagement by internet use

Responses to the Ofgem/Ipsos Mori tracking survey showed never using the internet is correlated with a lower degree of engagement. Not having access to price comparison websites may be a factor discouraging market participation.

Figure 65: Market participation and internet access



CMA evidence

The Competition and Markets Authority ("CMA") have produced a range of reports as part of the Energy Market Investigation covered directly by this literature review and indirectly through the academic literature below.

The final conclusions will run beyond the timelines of this report but the *Summary of provisional on remedies* (10 March 2016) provides an indication of forthcoming changes along with evidence to support policy decisions.

Overall, the CMA are looking to provide the market with greater access to customer switching data and freedom to create more tariffs. They hope competitive forces will outweigh risks of increased complexity to raise the level of switching. The key domestic remedies are as follows:

- An Ofgem-controlled database which will allow rival suppliers to contact domestic and microbusiness customers who have been stuck on their supplier's default tariff for 3 years or more with better deals. This will be subject to strict safeguards so that customers can opt out at any time and to ensure that communication meets strictly controlled criteria.
- A transitional price control for the 4 million households who are on prepayment meters, who face limited competition from suppliers and whose ability to switch and find better deals is far more limited than for credit and direct debit customers.

- Strengthening the ability and incentives for third party intermediaries such as price comparison websites (PCWs) to help customers find better deals by giving them access to relevant information like customer meter numbers and allowing them to negotiate exclusive deals with suppliers. This will be accompanied by a requirement for PCWs to be transparent about how they cover the market and the information on display.
- Removing the 4 tariff rule which limits competition and innovation. This will enable suppliers and PCWs to offer tariffs designed for certain customer groups.
- Removing restrictions on the ability of new suppliers to compete for prepayment customers and reduce barriers such as debt issues that make it difficult for such customers to switch.

Updated analysis of gains from switching

More relevant to this study is that the CMA have updated their gains from switching analysis, extending the period of the analysis from Q1 2012 to Q2 2015.

The gains available to customers differ quite substantially according to the scenario chosen and category of customer concerned (and in particular, the supplier they are with, the type of tariff they are on and the payment method they employ). Overall, the results demonstrate that:

a) there were material, persistent savings available to customers of the Six Large Energy Firms over the period;
b) the savings available to customers on standard variable tariffs were, on average, larger than savings available to non-standard tariff customers; and
c) the savings available to standard credit customers were, on average, higher than those available to customers on other payment methods.

The annual potential savings for dual fuel standard variable tariff customers (excluding those on prepayment meters) for each of the Six Large Energy Firms have risen substantially over the past two years, and have reached their highest level in the most recent period of the analysis, Q2 2015, reaching an equivalent of between £310 and £360. There is a similar trend for the standard variable tariff customers of the Mid-tier Suppliers, although there is a bigger disparity in the positions of individual suppliers.

The above could be relevant in light of recent headlines about increased numbers of customers switching. Have rewards rather than attitudes shifted?

Customers on prepayment meters

The proportion of customers on prepayment meters has increased steadily over the last 20 years, from 7% in 1996 to 16% currently, and this is generally not a customer choice.

These customers will benefit less from competition in part because of supplier misconceptions around costs. Additionally there are reduced chances of these customers completing a switch.

> *"We also provisionally found softened incentives for all suppliers, and in particular new entrants, to compete to*

> *acquire all prepayment customers...This was due to actual and perceived higher costs to engage with, and acquire, these customers compared with other customers, and the low prospect of successfully completing the switch of indebted customers (who represent about 15% of prepayment customers)." (P.10)*

Weak customer response amongst pre-payment meter customers is put down to a high prevalence of characteristics typical of lower engagement levels.

> *"Prepayment customers include higher proportions of individuals: with low levels of income; with low levels of education; living in social rented housing; and having a disability - demographic characteristics that we have found to be associated with low levels of engagement in retail energy markets." (P.11)*

This is in addition to information barriers coming from reduced access to the internet and lower confidence using price comparison websites.

Also of importance are the perceptions and attitudes of new entrants or incumbents towards this group of customers. It could provide insight into the appetite to court similar customers in a competitive water market, given the reduced interest witnessed in energy.

> *"We also provisionally found softened incentives for all suppliers, and in particular new entrants, to compete to acquire all prepayment customers, whether on smart or dumb prepayment meters. This was due to actual and perceived higher costs to engage with, and acquire, these customers compared with other customers, and the low prospect of successfully completing the switch of indebted…We found that entry and expansion by suppliers other than the Six Large Energy Firms in the prepayment segments is slower, and that entry is limited to fewer suppliers…"(P.10)*

Academic studies on the determinants of switching in energy markets

1. **He, X. and Reiner, D. (2015) *Why Do More British Consumers Not Switch Energy Suppliers? The Role of Individual Attitudes (September 2015)*[21]**

The study seeks to…"investigate how consumers' switching behaviour relates to psychological and economic factors and policy preferences…[and] to discover the key determinants for explaining consumer decision on switching energy provider, and reveal the role of non-price factors."

The study estimates a binary choice logistic model to estimate the contribution of various factors to the choice to switch energy supplier.

[21] http://www.eprg.group.cam.ac.uk/wp-content/uploads/2015/09/1515-PDF.pdf

The key findings are summarised as:

- The probability of switching energy providers increases with experience of switching in other markets, which confirms the findings of previous studies.
- The way households choose to pay their energy bills affects switching behaviour. Those paying by standard credit are most unlikely to switch whereas those paying by direct debit are most likely to switch.
- The results of the study differ from the results of some other studies insofar as age and gender tend to be irrelevant to switching behaviours. Education is found to have significant but relatively minor effect on switching behaviours.
- Higher education qualifications increase the level of household activity in the electricity market.
- A binary hardship indicator, as a proxy for income does not impact switching behaviours, and the only significant role of income is that the highest deciles tend to switch more and lowest deciles switch less

2. **Hortaçsu, A., Madanizadeh, S.A., and Puller, S.L. (2015)** ***Power to Choose? An Analysis of Consumer Inertia in the Residential Electricity Market (February 2015)***[22]

This paper investigates potential factors preventing switching focusing on the Texas electricity market post deregulation.

In the first four years after competition was introduced the incumbent held onto a large proportion of market share despite the financial incentives to switch and what appears to be a straight forward switching process.

> *"Switching to a new entrant retailer – a one-time action that would take approximately 15 minutes to complete – would reduce the average electricity bill by around $100 in the first year, which represents about 8 percent of electricity expenditures." (P.2)*

The approach seeks to divide non-switchers into two groups "Search frictions/inattention" and "Incumbent Brand Advantage/Product differentiation". The latter group carries the qualification that product differentiation can come about from technical misconceptions as well as real differences in service levels.

Inattention could be qualified as those customers who simply not interested in energy shopping, despite the potential gains and minimal transaction costs.[23] The paper emphasises the importance of perceptions. Some customers do not switch because they assume it will take more time and be more complex than it is in reality.

Engagement will not necessarily be continuous, and this is similar to some of the categories of switching behaviours observed by Ofgem e.g. 'Lapsed'.

[22] http://www.nber.org/papers/w20988#fromrss

[23] In 2011 the then Energy Secretary Mr Huhne claimed families could treat themselves to a £300 mini-break if they constantly bargain-hunted among energy companies: 'They do not bother. They frankly spend less time shopping around for a bill that's on average more than £1,000 a year than they would shop around for a £25 toaster'

> *"We estimate that the average customer of the incumbent only searches for other **retail options in about 2% of months, or approximately once every 4-5 years."** (P.3)*

The model and observed data has been used to provide further detail on the following:

> *"For many households, who by the market design of retail choice in Texas are defaulted to the incumbent, a search will not occur until many months into the new market. This probability can be used to calculate that only 19% of households have searched at least once within one year of market opening, 35% within two years, and 61% by the end of our sample over four years after retail choice begins." (P.23)*

Misconceptions also feed into switching behaviours relating to "Incumbent Brand Advantage/Product differentiation". Some non-switchers expected the physical electricity supply to be more reliable from their incumbent than a new entrant. This could be for instance that they incorrectly believe alternative suppliers to be vertically integrated.

Other factors which could contribute to "Incumbent Brand Advantage/Product differentiation" could be a fear new entrants may go bankrupt leaving them without supply. Customers may not be aware of arrangements in place to provide continuity of supply by switching to another supplier.

Finally the report also highlights trust as a reason for customers favouring the incumbent supplier. A level of cynicism assumes lower prices are only part of "bait and switch" tactics.

The model is estimated using household-level choice data from the first four years of retail choice in Texas.

In order to estimate the magnitude of each source of inertia, the study developed an econometric model of household choice that nests both types of inertia within a two-stage discrete choice framework. In each month, the household enters a two-stage model. In the first stage, the household decides whether to consider an alternative electric retailer. If the household does not consider alternatives, then the household stays with its current retailer for the following month. However, if it does consider alternatives, the household enters the second stage. In this stage, the household observes the retailers in the choice set (which are available on www.powertochoose.com) and chooses the retailer that maximises utility. In this second stage, the study allows for vertical product differentiation to enter the household's decision, thus capturing potential brand advantage by the incumbent. The first stage "decision" probabilities that capture inattention are separately identified from the second stage "choice" probabilities that capture incumbent brand advantage.

The counterfactual is modelled as increasing the probability that a household searches in a given month and reducing the relative size of the perceived incumbent brand effect. The study also had access to actual consumption and tariffs charged by incumbents and new entrants. This allowed exact quantification of the potential and actual savings made.

Modelled evidence throws up similar findings to those cited by the CMA in terms of customer groups potentially gaining less from competition.

> *"We find that more of the potential savings of switching is realized by households in neighborhoods that are wealthier, have higher education levels, and fewer senior citizens"*[24] *(P.26)*

The exact customer characteristics of those switching however is unknown so assumptions are made based upon demographics within zip codes. Percentages for the above groups are inferred but other UK sources would appear more reliable for quantification given the methodology.

In keeping with other literature reviewed, this study concludes factors other than price reduce the level of engagement significantly. This is despite a very simple (15 minute) switching process being in place.

> *"Our data reveals that even in a relatively homogeneous good market, factors other than price competition play a very important role in shaping market outcomes: after four years of deregulation, the incumbent still holds on to 60% of market share, despite the fact that some competitors have been consistently offering lower rates." (P.31)*

3. **Waddams, C. (2004)** ***Reforming Household Energy Markets: Some Welfare Effects in the United Kingdom (April 2004)***[25]

This study by Catherine Waddams Price summarises some early effects of deregulating the UK energy sector, focusing on the effects on consumers of changes in prices, quality and opportunities for switching supplier.

Whilst the study is quite old, it identifies (and quantifies) a negative relationship between OAP households and probability of market participation. Income and payment methods also feature in the modelling.

4. **Economic Insight (2016)** ***Competition in the energy retail market (February 2016)***

The paper notes CMA and Ofgem found the effectiveness of retail competition in energy to have been hampered by "weak customer engagement and response". The two main reasons for this are

- "the inherent characteristics of electricity and gas, such as their actual or perceived "homogenous" nature; and
- the behaviour of suppliers including the number and complexity of the tariffs they offer."[26]

The implications of the main findings for Ofwat fit well with the proposed methodological approach of the Water UK project. Understanding the benefits of competition will be underpinned by the likely level of customer engagement in the market. How many and who might switch?

[24] http://econweb.tamu.edu/puller/AcadDocs/HMP_retail_latest.pdf (P.26)

[25] http://competitionpolicy.ac.uk/documents/8158338/8199514/ccp4-2.pdf/9b053939-1661-4093-b3b3-47a7148bf56b

[26] *Competition in the energy retail market* (February 2016) Economic Insight (P.4)

Once this has been established, how will "switchers" and "non-switchers" fare given potential cross subsidies being unwound.

The report questions what level of savings might be needed to be offered by retailers in order to encourage switching behaviour. This could be a significant barrier.

The report asks to what extent will price discrimination (between regions and/or customers) be viewed as "ok"? Regulatory attitudes to this question could impact on the scope for cross subsidies and possible market structures.

The Energy Supply Probe (2008) found that customers often made poor decisions based on inadequate information.

"…around a third of switches not receiving a price reduction."

This was in part as a result of aggressive sales tactics employed at the time. Ofgem introduced measures to improve the information provided to customers along with voluntary Standards of Conduct.

Ofgem's Retail Market Review initiated in 2010 focused on delivering simplicity, clarity and fairness.

As well as limits on the number of tariffs Ofgem introduced communication tools to help consumers to navigate the market, for example, a Tariff Comparison Rate; personalised projections; tariff information label and regular prompts as to what the cheapest tariff is with your supplier; and new rules to oblige all energy suppliers to treat customers fairly through binding Standards of Conduct.

The State of Competition in the Energy Market (2014) looked to monitor the impacts of previous interventions. The assessment revealed that switching rates have shown a falling trend since 2008, which the report points out could be partially explained by the decline in hard doorstep selling.

Low customer trust is a factor reported as holding back market participation. Incumbents were able to benefit from market segmentation with disproportionate effects felt by vulnerable customers.

> *"The effect of sticky customers can allow suppliers to segment and charge them higher prices than switchers. The assessment found sticky customers (more likely to belong to vulnerable groups) pay higher prices for their energy than those active and willing to switch supplier for a better deal."(P.14)*

5. **Centre for Competition Policy University of East Anglia (2016)** ***Ofwat: Review of retail household markets in the water and wastewater sector - Call for evidence: Consultation response from the Centre for Competition Policy University of East Anglia (16 February 2016)***

The CCP have undertaken 'considerable research' inclusive of surveys and analysis of commercial data to understand consumer behaviour in regulated markets. They summarise the main findings of this work below:

1. *" The size of monetary savings is consistently a core driver of consumer switching, although, the presence of substantial monetary savings does not guarantee consumers will switch*

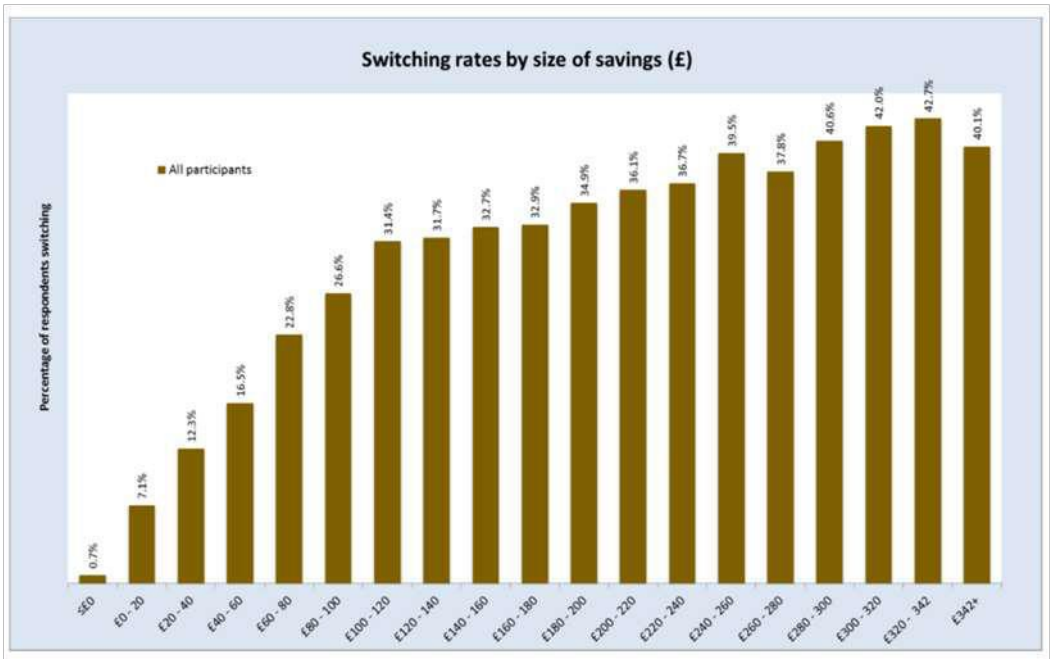
2. *The level of switching varies systematically across different types of consumers*
3. *Consumers may make 'mistakes' regarding the tariff they choose so they pay more than they have to, although, through learning, these mistakes tend to diminish through time."*

Monetary savings and switching behaviour

Waddams Price and Zhu (2016), Deller et al (2014), Flores and Waddams Price (2013) and Giulietti, Waddams Price and Waterson (2005) evidence monetary savings as a central driver of switching. Banking and energy have 'worringly low switching rates'. Evidence from these markets suggests a £100 saving is needed to generate customer switching but the CCP believe an upper bound estimate of savings for household water would be £40.

Deller et al (2014) studied a collective switching event "The Big Switch" which was linked to the consumer organisation Which?. The maximum switching rate for customers offered savings of >£300 was 43%. Where savings were 20-25% of total bill the maximum switching rate was 41% as shown below. Money is clearly not the only driver and we can assume these customers should be more engaged than a typical customer given their affiliations to Which?.

Figure 66: Switching rates in TBS by bill reduction



The response gives the expected costs of switching for consumers as:

(i) "the opportunity cost of time spent searching for cheaper tariffs and actually completing a switch;

(ii) contractual terms, such as exit fees, that impose costs; and

(iii) uncertainty regarding the quality of the new supplier. "

Further confirmation is provided of engagement in one market being an indicator for engagement in another:

> *"The research of Waddams Price and Zhu (2016) and Flores and Waddams Price (2013) find a positive association between switching in different sectors, i.e. if a consumer switches*

> *supplier in one market it is associated with the consumer being more likely to switch in other markets as well." (P.12)*

Barriers to switching for rental properties (based on CMA)

The response also summarises a number of reasons the CMA provide for lower participation amongst renting households:

(i) "a limited time period in a particular property (thereby limiting the expected gains from switching);

(ii) difficulties identifying where the meter is located in a property;

(iii) responsibility for utility bills resting with the landlord (an agency problem); and

(iv) multiple tenants sharing joint responsibility for dealing with utility bills (a public good problem)."

Differences between consumers

A complex relationship between income, education and search costs is also analysed providing useful insight.

> *"…those on lower incomes were found to be less responsive to monetary gains, but more sensitive to the time spent on the process than higher income households. Similarly, those from lower educational backgrounds were found to be more responsive to expected monetary gains, and the time taken to switch was a greater deterrent to searching, than for higher educational groups." (P.9)*

After controlling for a full range of factors, Waddams Price and Zhu (2016) find a U-shaped relationship between age and propensity to switch, with the middle aged being least active. They also show that those on lower incomes are more likely to switch than those on higher incomes after controlling for other factors. The CCP note that if the expected savings presented to lower income groups are smaller, then this could explain lower 'raw switching rates' amongst vulnerable groups.

Consumer Choice and 'Mistakes' – Mixed evidence

The response notes that rational responses cannot always be expected. Economists may behave like economists, but they need to allow for consumers who are not.

> *"Wilson and Waddams Price (2010) report that among those UK energy consumers who switched exclusively for price reasons less than half of the total gains available were actually captured by switching consumers. Even more significantly, at least 17% of consumers actually reduced their monetary surplus after switching supplier."[27] (P.10)*

[27] Calculations ruled out the possibilities of these findings resulting from consumers changing their beliefs about expected consumption or having a preference for particular types of tariffs.

Whereas Ketcham et al (2012) and Miravete and Palacios-Huerta (2014) suggest that customers learn and examples such as those above reduce beyond market opening with participation.

Evidence on switching behaviour in other sectors

6. ***Telecoms* : Ofcom (2015) *The Consumer Experience of 2014, Research Report***

This Ofcom report looks at market trends and experience over a three year context have changed. As such it provides a useful comparator to the energy market to observe how customers behave when purchasing a range of utility services. Specifically it covers:

- Key trends (switching levels have declined since 2013)
- Consumer participation in communications markets
- Switching levels in communications markets
- Ease of switching
- Comparison with switching in other markets
- Satisfaction with providers
- Sources of market information

Many of the reasons for and against switching revealed by the report's surveys were similar to energy. A higher importance was placed on customer service was given in mobile and broadband markets.

Reviewing finances, poor service and seeing better deals are the main triggers that prompted consumers to review their choice of provider. In the fixed-line and digital TV markets the main trigger that prompted switchers to start looking for a new provider was a general review of finances (39% and 42% respectively). Poor service from current provider was the main stated trigger for engaging in each of the mobile (35%) and fixed broadband markets (36%).

Reasons for considering, but not switching provider vary by market. In the broadband market 'perceived hassle' was the main reason for not switching (28%).

Around a fifth of consumers consider it difficult to compare the costs of bundles of communications services and stand-alone fixed-line services. Twenty-one per cent stated that it is, or would be, 'difficult' to compare the costs of stand-alone fixed-line services and 19% said this about bundled services.

This latter point could be an important consideration for bundled market scenarios including water.

The levels of engagement across all markets in 2014 were higher than energy with only between 32% and 38% of respondents being 'inactive'. Overall market participation in fixed line, mobile, broadband and digital tv is higher. With greater product differentiation in these markets perhaps this is to be expected. We cannot live without water, but consumers perceive they cannot live without their phone or broadband. Energy broadly speaking therefore could be a better comparator.