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Water Tariffs and Consumers' Inaction

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Abstract

We study adoption by more than 150,000 households of an optional transitional water tariff implemented in the South-East of England in conjunction with an universal metering programme. We document how inertia leads customers to relinquish substantial financial gains, with less than a third of customers who would benefit from adopting the transitional tariff actually doing so. We also show how households responds not only to overall gains, but also to more short-term gains from adopting the tariff. Households in high income/high education neighbourhoods display a higher responsiveness to potential savings, as do households where the contract holder is of prime age instead of being more senior or junior. Finally, the probability of adoption is positively impacted by adoption by neighbours, thus suggesting the presence of peer effects. We also look at the timing of the call, showing how most customers choose to call early on, when less information is available, but the issue is more prominent. The choice of when to call is consistent with customers taking into account the option value of waiting, as well as future consumption patterns.

Keywords: inertia, tariffs, water

JEL: D12, L95, Q25

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1 Introduction

A central tenet of economic theory is that consumers pursue the course of action that maximize their utility given the constraints they face. Policies aimed at increasing consumers' choice have been implemented in a variety of realms where markets are not perfectly competitive (e.g. schools, health care, utilities), with the idea that consumers will take advantage of increased choice to improve their welfare. There is, however, growing evidence that consumers may fail to do so, either because they face constraints (e.g. in terms of time) that limit their ability to evaluate alternatives (Sallee, 2014), or because they are not fully rational, for instance using heuristics rather than "rational calculus" to determine the course of action. A recent example of such failure is Keys et al. (2016), who find that approximately 20% of U.S. households failed to take advantage of lower rates by refinancing their mortgage, with a median present-discounted cost of $11,500. Clerides and Courty (2015) find evidence that consumers purchase a dominated option using Dutch and American scanner data from grocery stores, while Lacetera et al. (2012) find evidence of information-processing heuristics in the used-car market.

In this paper we examine the choice of water tariff among more than 150,000 households in the South-East of England. They could choose, after the installation of water meters due to a compulsory metering programme, whether to pay according to a standard tariff based on consumption, or to pay for up to two years according to a transitional tariff, called "changeover" tariff, that is a combination of the standard tariff and the "old" unmetered tariff, based solely on the characteristics of the house. What we uncover is massive inaction by consumers, who for the most part fail to take advantage of the option and, as a result, end up paying higher water bills, losing on average more than £120 (median £80). We also show how households respond not only to overall gains, that is to gains over the whole two-years period, but also to more short-term gains from adopting the tariff, that is to gains arising in the most recent billing period. Households in high income/high education neighbourhoods display a higher responsiveness to potential savings, as do households where the contract holder is of prime age instead of being more senior or junior. Finally, we find evidence consistent with peer-effects, with the likelihood of taking (advantageous) action increasing if the house neighbours call or if there is a higher number of street neighbours doing so. We also look at the timing of the call over the two-years transitional period, showing how most customers choose to call early on, when less information is available, but the issue is more prominent. The choice of when to call is consistent with customers taking into account the option value of waiting, as well as future consumption patterns.

Several aspects of our setting make consumers' inertia less likely to be observed compared to other contexts. First, the choice we study is not a routine choice that, as such, can be easily overlooked or postponed indefinitely. Instead, it is part of a considerable change in the way water is paid, the installation of a meter, that is therefore likely to focus attention on water consumption (see, for instance, Chetty et al., 2009 on the importance of salience). Moreover, it is time limited, as

the option needs to be exercised within two-years after the installation of the meter, so it cannot be postponed indefinitely. Second, customers who should opt for the changeover tariff experience by definition higher bills compared to what they used to pay. Therefore, loss aversion, documented, for instance, by Genakos et al. (2015) in the case of telephone bills, should make them more likely to act. Related to this, numerous studies have documented what has been called a "flat-rate bias", that is, a preference for payment plans that are less sensitive to actual consumption (e.g. Della Vigna and Malmendier, 2006; Lambrecht and Skiera, 2006; Ater and Landsman, 2013; see, however, on the opposite Miravete, 2003). In our context, this should induce people to opt for the tariff with a lower marginal price and higher fixed payment, that is, it should make it more likely to choose the changeover tariff. Third, in our context there are no search costs. Customers have simply to choose how to pay the very same product. The switching cost is non-zero, but minimal, simply involving a telephone call. Relatedly and differently from many other studies in which consumers inertia has been documented, there is no need to change company, so no true or perceived brand effect, as documented in the case of electricity markets by Hortaçsu et al. (2017), can be at play. The fact that we find inertia in such a context is therefore of particular interest.

This paper contributes to a growing literature on choice architecture and, in particular, on the role of consumers' inertia. This has been documented in a variety of settings, including health insurance markets (Handel and Kolstad, 2015), retirement plans (Benartzi and Thaler, 2007; Madrian and Shea, 2001), and electricity (Fowlie et al., 2017).[1] Beside documenting the role of consumers' inertia in a new context,[2] we also explore how different demographic characteristics are associated with inertia, a topic of high relevance for policy-making, because of its equity implications. This is also investigated in a recent contribution by Letzler et al. (2017), where they exploit a natural experiment about a fraudolent subscription programme and the sending of letters asking consumers to cancel them by taking action. They find that "[c]onsumers from low socio-economic status (SES) neighbourhoods and racial and ethnic minorities were even less likely to respond to the notification letters than consumers from higher SES communities and consumers who were likely to be white". Beshears et al. (2015) study 401(k) plans and find lower opt-out odds for the low-income group, as well as for younger employees. Also Hortaçsu et al. (2017) find evidence of inertia being larger in "neighbourhoods with lower income, lower education, and more senior citizens". Given that the promotion of an increase in competition among suppliers is a centrepiece of market regulation, in particular for utilities, and that, to be effective, this needs active consumers, our findings bear important implications for policy makers that we discuss in the conclusions.

The next section describes the institutional setting, providing details regarding the tariff, the timing of the choice and the information provided to customers. Section 3 gives some descriptive

[1] The vast literature on behavioural inattention is summarized by Gabaix (2017), while Handel and Schwartzstein (2018) have reviewed the literature on information acquisition and processing.

[2] Also regarding water consumption, Ito (2013) provides evidence that consumers respond to average rather than marginal price.

statistics, while in the following section we present the results. We first investigate the decision of whether or not to call, then look at the timing of the call within the two-years period. The last section concludes.

2 Institutional Setting

In this section we describe in detail what a changeover tariff is, the choices customers can take regarding it and the information provided to customers through the different stages of the metering process. This section is based on documentation sent by the water utility to its customers. See Ornaghi and Tonin (2018) for additional information on the metering programme.

2.1 The changeover tariff

The metered tariff consists of a standing charge and a volume charge. The standing charge is a fixed charge based on the size of the meter fitted to the water supply and covers the costs of maintaining the water services account. The volume charge is based on the amount of water supplied to the home, that is, the volume of water recorded on the meter in each billing period.

The unmetered tariff does not depend on water consumption and consists of a standing charge and a rateable value charge. The standing charge is a fixed amount for all properties and covers the costs of maintaining the water services account. The rateable value charge is based on the rateable value of the house. The rateable value was used as the basis for local authority taxation prior to 1990. Rateable values were set by the Valuation Office (part of HM Revenue and Customs) to reflect the rental value of the property. The rateable value is no longer used for taxation and no longer updated. The water company normally use the rateable value quoted in the Valuation List in force on 31 March 1990.

The changeover tariff consists of a weighted average of the metered and unmetered tariffs described above. The weight of these two elements depends on how much time has gone by since the switch to metered charges. In particular, during the first year after the switch, the bill is 1/3 of the metered tariff and 2/3 of the unmetered tariff, while during the second year the bill is 2/3 of the metered tariff and 1/3 of the unmetered tariff.

2.2 Timing

Approximately three months after meter installation, customers automatically switch from paying unmetered charges to paying metered charges. Starting from this moment, customers, however, may opt for the changeover tariff simply by calling the water company.

There is flexibility regarding the period of application of the changeover tariff. In particular, customers may choose whether to have the changeover tariff applied from the date they switched

to metered charges, or from the start date of a later billing period within the first 24 months of metered charging.

This choice is reversible. Customers who are on the changeover tariff can choose at any time to switch to the normal metered tariff. If they do so, they can choose whether to have the normal metered tariff applied from the date when they switched to the changeover tariff, or from the start date of a later billing period. This choice is then irreversible, in that customers who choose to switch from the changeover tariff to the normal metered tariff cannot switch back to the changeover tariff at a later date.

Given these rules, over the 24 months after the switch of contract, customers can switch tariff at most twice. If customers could freely choose whether to apply the changeover tariff or the metered tariff in each of the four billing periods over this interval, then we would have 16 possible tariff combinations. Given the restrictions described above, however, only 11 of these 16 possible combinations are admissible (e.g. it is not possible to pay the changeover tariff in the first period, then the metered tariff in the second period and switch back to the changover tariff for the remaining two periods). In practice, as we will see in section 3, multiple switches are very rare and customers tend to adopt the metered tariff or the changeover tariff for the whole period.

2.3 Information

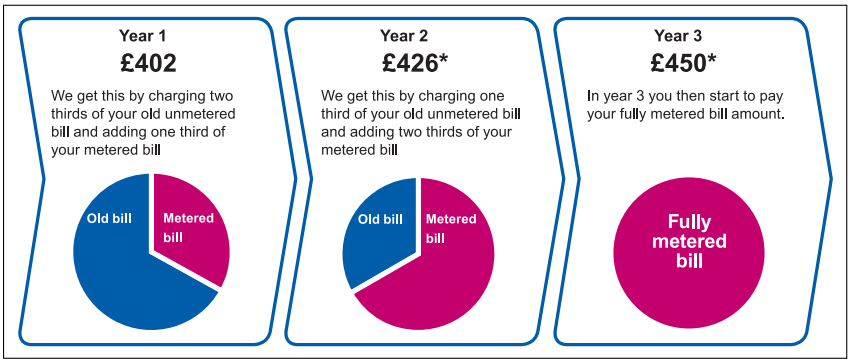
Customers receive information about the changeover tariff at different stages. Approximately four to six weeks before installation they receive a booklet titled "Your water meter is coming - part 1 of 2", where the changeover tariff is mentioned.[3] A brief mention to a changeover period is also present in the leaflet titled "Southern Water's metering programme" that customers receive approximately three weeks before installation and that is also distributed at key locations within the installation area (e.g. post offices, libraries, ect..) On the day of installation, customers receive a leaflet titled "Your water meter is here - part 2 of 2". Here the changeover tariff is explained in more details. In particular, customers are informed that about six months after installation, they will receive the so-called 3-Months letter "explaining how much water you have used and how much your first metered bill is likely to be if you keep using the same amount of water. You will also be given the choice to opt for our changeover period of payment". Then, they are informed that about nine months after installation, they will receive "your first metered bill and be given a second, and final opportunity, to opt for our changeover period of payment." Finally, the leaflet explains the changeover period[4] and provides an example based on a rateable value bill of £378 and a would-be

[3]The document reads as follows: "All our customers will be given the opportunity to choose a changeover tariff for paying their water bills. This means that if your metered bill is higher than your old bill, we will reduce your bill for the first two years and you do not have to pay the difference. This is to help you adjust to paying for your water when you are paying for what you use. Please be aware that you cannot opt for our Changeover tariff until your meter charges start."

[4]"We want to help our customers adjust to paying for the water they use once they have been converted to metered billing. Based on the information you will receive at around 6 months after installation explaining how much water

fully metered bill of £450. The example is illustrated through a pie chart (see Figure 1).

Figure 1: Pie chart on changeover tariff



Such a pie chart is also present in the 3-Months letter, informing customers of their water usage in the first three months after the meter has been turned on. In this case, the pie chart is personalised, in that calculations are based on the actual unmetered charges applying to the customers and on a projection about metered charges based on the observed consumption in the three months period. The first bill, sent after a further three months, also includes a personalised pie chart, and highlights both the yearly fully metered charge and the changeover charge under the assumption that the customer keeps using the same amount of water. The changeover tariff is not mentioned in the remaining three bills in which customers could potentially decide to switch if they have not done so. For customer who have decided to switch and are on the changeover tariff, the first two bills include the pie chart and a notice indicating the number to call in case the customer wants to come off the changeover tariff and pay the fully metered bill amount instead. All the first four bills contains detailed calculation of the changeover tariff, separately indicating the "old unmetered bill calculation" and the "new metered bill calculation", as well as the "changeover tariff calculation". After the fourth bill, of course, the changeover tariff no longer applies. Southern Water also produces detailed guides about applicable charges, available on its website[5]. Figure 2 summarizes the typical customer journey with the information received during this journey.

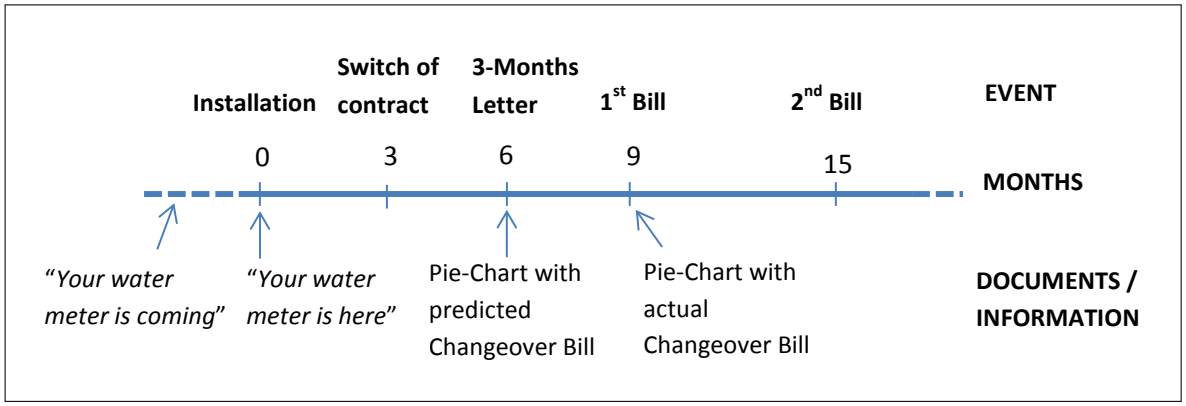
3 Descriptives

In the previous section, we have described the formal rules concerning the adoption of the changeover tariff. While customers could not pick the most advantageous tariff in each of the four billing periods, it was theoretically possible to switch twice, with many possible combinations of tariffs over the

you have used, and you think your bill is going to be higher when you start receiving your metered bill, we can help ease you in to your new bill with our changeover period. This means that if your metered bill is higher than your old bill, we will reduce your bills for the first two years and you do not have to pay us back the difference at the end."

[5] www.southernwater.co.uk/our-charges

Figure 2: Typical customer journey



two-years period. Looking at the realised payment combinations, however, it is evident how only very few customers (less than 0.05%) ended up paying part of the bills according to the metered tariff and part of the bills according to the changeover tariff. The vast majority of households paid over the two-years transition period always the metered tariff or always the changeover tariff. This is the case even if we observe many customers who opted for the changeover tariff not immediately, thus having initial bills issued according to the metered tariff. For the vast majority of these customers, previous bills were reissued according to the changeover tariff once they decided to switch. For this reason, in what follows we will consider as if the choice was between the changeover or the metered tariff for the whole period, without the possibility of alternating between them.

We combine our consumption data with data coming from Neighbourhood statistics at Output Areas (OA) level. OA is the lowest geographical level at which census estimates are provided. These were built from clusters of adjacent unit postcodes and, in 2011, had an average population of 309.[6] In Table 1, we report some descriptive statistics. Out of a sample of more than 150,000 households, around 10% called to take advantage of the changeover tariff. For the sample as a whole, the average sum of metered bills over the two-years period is around £822 (median: £780), while the average for the changeover bills is higher at £869 (median: £862), so indeed it makes sense for most customers not to call. For more than 50,000 households, however, the changeover bill would actually be lower than the metered bill, with an average gain over the two-years period of £146 (median: £100). To provide a term of comparison, according to the Office of National Statistics, the average household consumption in the South-East was, for the years 2012-2014, approximately £2,600 per month. This means that water represents approximately between 1 and 2 % of households' expenditures.

As the last bill received may be particularly prominent in people's mind, Table 1 shows descriptive statistics of this variable too. For those who indeed opt for the changeover tariff, we report the

[6]For details, see:http://www.ons.gov.uk/methodology/geography/ukgeographies/

Table 1: Summary Statistics

Variables	**Obs**	**Mean**	**Median**	**SD**	**Min**	**Max**
Call indicator	156193	0.104	0	0.305	0	1
Metered Bill (M)	156193	822	780	402.5	48	12589
Changeover Bill (C)	156193	868.6	862	306.7	113	7860
C-M (all bills)	156193	-46.6	-55.8	196.6	-1879	4999
C-M if C>M (all bills)	55832	146	100.6	157.9	0.001	4999
C-M (last bill)	156193	-9	-11.6	60.1	-757	6815
C-M if C>M (last bill)	58388	41.5	26.5	59.9	0.001	6815
Education Score	154524	-0.241	-0.198	0.174	-0.94	-0.001
Income Score	154524	-0.126	-0.11	7.9	-0.53	-0.01
Age	116822	56.5	55	15.1	17	105
House Neighbour	156193	0.09	0	0.285	0	1
N of Callers	156193	1.38	1	1.72	0	16

Notes: Call indicator is a dummy taking the value of 1 for customers calling to adopt the changeover tariff. Metered Bill indicates for each customer the sum of all four metered bills over the two-year period. Changeover Bill indicates for each customer the sum of all four changeover bills over the two-year period. C-M is the difference between the sum of changeover bills and metered bills. C-M (last bill) considers only the last bill before calling or a randomly selected bill if the customer never calls. Education Score measures the extent of deprivation in terms of education, skills and training in an Output Area. Income Score measures the extent of deprivation in terms of low income in an Output Area. Age is the age of the contract holder.

actual bill they received before calling [7], while, for those who did not call, we report a randomly selected bill among the four they receive over the two-year period, making sure that the distribution in terms of bill number is the same as for the optants.[8] Savings for the last bill are negative for the sample as a whole, with an average difference between metered and changeover bill of -£9 (median -£12), but there is a large share of households for whom the last bill is lower under the changeover tariff compared to the metered tariff, with an average gain of £42 (median: £27).

As we will use these variables in the analysis, Table 1 reports the educational and income score, as well as age. The education score measures the extent of deprivation in terms of education, skills and training in an area.[9] The income score is based on the proportion of the population in an area experiencing deprivation related to low income.[10] Education and income score are calculated at the Output Areas level and, originally, they are between 0 and 1, with an higher index indicating more deprived areas. We transform these variables by multiplying them by -1, so that a lower index is associated with more deprivation. From the table it emerges how in our sample there is

[7] For those calling before the first bill, we report the bill implied by the three-months letter.

[8] This means that, for instance, we undersample the third and fourth bill, given that few people call after these.

[9] It is based on a series of indicators like, for instance, the proportion of adults aged 25-54 with no or low qualifications or the proportion of young people not staying on in school or non-advanced education above age 16.

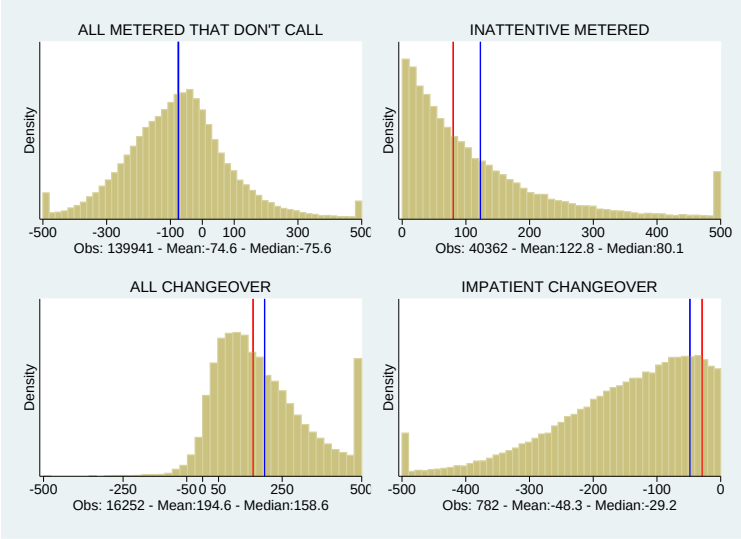
[10] It is based on a series of indicators such as adults and children in Income Support families or adults and children in Income-Based Jobseekers Allowance families.

a higher variation in the education score rather than the income score. Notice that, as could be expected, the correlation between the two scores is rather high, at 0.84.[11] For most households, we also observe the age of the contract holder, which is on average 57 (median 55).

Finally, to investigate possible peer effects, we use the following two variables: *House Neighbour* is a dummy taking the value of one if at least one of the next-door neighbours has adopted the changeover tariff; *Number of Callers* is the number of UMP customers adopting the changeover tariff in the postcode. This last variable goes between 0 and 16, with a mean of 1.4 (median 1). In our sample, we have more than 20,000 full postcodes, with an average of 7.5 (median 5) households affected by the UMP.

The economic incentives to call and adopt the switchover tariff are represented by the difference in the total water bills when applying the changeover tariff and the metered tariff for the whole two-years period. We plot this quantity in Figure 3, where the upper part refers to customers who did not call to have the changeover tariff, while the lower part is about those who, at some point within the two-years period, did call to apply the changeover tariff.

Figure 3: Distribution of savings



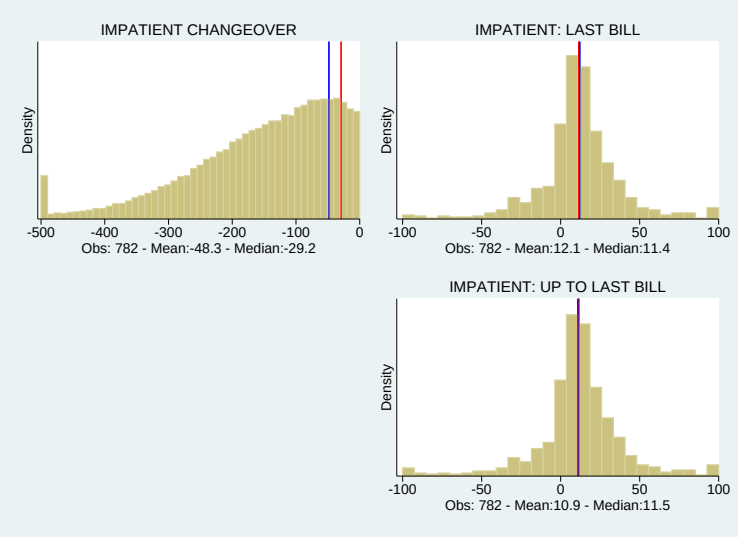
Notes: The figure plots the distribution of the difference in payments when applying the metered tariff versus the changeover tariff over two-years. The blue (red) lines indicate the mean (median) of the distribution. We windsorized the distribution at £-500 and £500.

Overall, customers who stayed with the metered tariff mostly did the correct choice, as they would have lost on average around £75 by applying the changeover tariff for the four billing periods. It is also evident, however, how many of those who did not call would have gained from switching to

[11] For around 1,600 households we could not match the reported postcode to any OA, so these variables are missing.

the changeover tariff. The right panel in the upper part zooms in on these customers by plotting the distribution only on the positive domain. Of the almost 140,000 customers that did not call, more than 40,000 would have gained by calling, with a average gain of £123 (median £80), compared to an average total payments for water over the two years of £1055 (median £1032).[12] The distribution of individual savings over total payments shows that the average potential saving among these customers is 10%, while the median customer could have saved 9%. By comparison, the average gain of the more than 16,000 customers who did actually call (bottom left quadrant) is almost double, at £195 (median £159). In this case, the distribution of individual savings over payments implied by the metered bill has an average and a median of 14%. There is also a small group of customers (bottom right quadrant) who called and have had the changeover tariff applied for the two-years transitional period, while they would have been better off with the metered tariff. These are just few, less than 800 out of the more than 16,000 who call, and the average loss is less than £50 (median £29).

Figure 4: Difference in bills for impatients



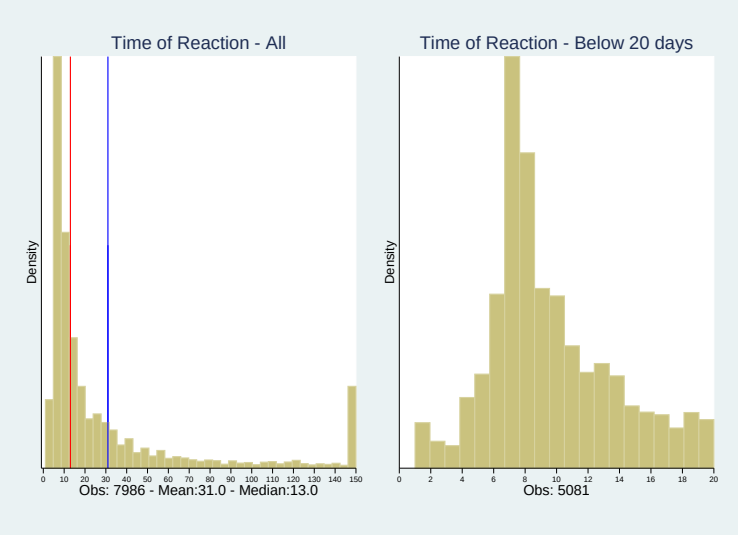
Notes: The figure plots the distribution of the difference in payments when applying the metered tariff versus the changeover tariff over two-years (top-left), for the last bill before calling (top-right) or for all the bills up to the time of calling (bottom-right). The blue (red) lines indicate the mean (median) of the distribution. We windsorized the distributions at £-500 and £500 (top-left) or £-100 and £100.

Zooming in on the behaviour of these customers who lose money as a consequence of their action, rather than inaction, it is useful to look at the moment when they actually did take action. From figure 4, it is evident how, for most of them, the changeover tariff was more convenient than

[12] We consider the metered tariff, as this is the amount effectively paid by these customers.

the metered tariff in the last bill they received before switching (upper right quadrant) or adding up all the bills up to the call (lower right quadrant), with an average gain above £10. Thus, most of these customers acted too hastily, but for most of them the changeover tariff looked convenient when they took action.

Figure 5: Call reaction time



Notes: The figure plots the distribution of days passed from posting the metered bill to posting the changeover bill for households calling to adopt the changeover tariff at least after bill 1. The right hand side zooms in the period between 0 and 20 days

It is also of interest to look at the timing of the changeover call. In particular, it seems plausible that receiving a bill focuses people's attention on water consumption and, therefore, that people tend to call shortly after receiving a bill. We do not know the exact date when people make the telephone call. For most of those calling after having received the fist bill, we can, however, exploit the fact that the water company reissues the bill calculated according to the changeover tariff when people opt for it. We can then look at the number of days that passes between the posting of the last bill before the call and the posting of the new changeover bill. This overestimates the days passing between receiving a bill and making the call, as some time naturally incurs between posting the bill and its reception by the customer, as well as between making the call and posting the new bill. Figure 5 shows that, within the 6-months billing cycle, there is indeed a tendency to call just after having received a bill, with just 13 days passing at the median between posting the last bill and posting the new bill.

4 Results

In this section, we first consider the decision of whether or not to call considering the two-year period as a whole, then we delve deeper into the issue of when people call within the allowed time frame.

4.1 Calling or not calling

From the figures presented above, it appears that customers respond to economic incentives, albeit imperfectly, in the sense that they do not fully exploit the opportunity to save on their bill. To understand in more detail what drives customers' decision to adopt or not the optional tariff, we now conduct some regression analysis. The first factor we consider is economic incentives. The hypothesis is that customers' are more likely to call as the amount they save thanks to the changeover tariff grows. While they may easily forego a few pounds, customers should be more inclined to take action when savings become sizeable. It is also of interest to check how savings over different time horizons affect the likelihood of calling. In particular, the most relevant savings should be those over the whole two years period, as these represent the overall gain of adopting the changeover tariff. It is also plausible, however, that the latest bill is very salient, so that savings arising in the last billing period before making the call could also be of special relevance.

Beyond economic incentives, there are of course other factors that could influence the likelihood of calling. First, we consider peer effects, in particular we check whether having neighbours (defined as someone with the same full postcode) or a close neighbour (defined as someone living next door, as identified through the house number) who have opted for the changeover tariff increases the likelihood of opting as well. We also use the indicators of income and education at the output area level discussed before, as well as age of the contract holder. Heterogeneity along the age dimension could arise because of time availability, e.g. retirees may have more time compared to working people to read the relevant information and take action. Income may matter as it is reasonable to assume that a given saving in pounds matters more for low-income households than for high-income ones, while the opportunity cost of time may also be higher for high-income people. On the other hand, there is evidence of how concerns related to poverty consume mental resources (Mani et al., 2013), thus reducing the ability to take the proper decision. Regarding education, more educated people may find it easier to process the information about the changeover tariff and, thus, are more likely to take appropriate action. In particular, in the econometric analysis we discretize income and education scores splitting the distribution in three groups, group 1 (Low) up to first quartile, group 2 (Medium) between the first and third quartile, and group 3 (High) above the third quartile. We also create three groups for age, distinguishing between below 35, between 35 and 65, and above 65.[13]

[13]For some households for which age is missing, we impute age based on the Mosaic customer classification provided by Experian at the individual level, so that households described with terms like "retired", "senior" or similar are

Table 2: Probability of Calling

	(1) ALL	(2) ALL	(3) ALL	(3) LAST	(4) ALL	(4) LAST
$Money - £$						
>0 & <=5	0.151**	0.150**	0.047**	0.137**	0.047**	0.136**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
>5 & <=10	0.168**	0.167**	0.056**	0.187**	0.056**	0.185**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
>10 & <=20	0.178**	0.178**	0.051**	0.222**	0.052**	0.221**
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
>20 & <=30	0.200**	0.199**	0.060**	0.244**	0.060**	0.243**
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
>30 & <=50	0.217**	0.217**	0.061**	0.259**	0.062**	0.258**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>50 & <=70	0.242**	0.242**	0.069**	0.274**	0.069**	0.274**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>70 & <=90	0.256**	0.257**	0.071**	0.280**	0.073**	0.280**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>90 & <=120	0.272**	0.272**	0.078**	0.281**	0.077**	0.281**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>120 & <=150	0.285**	0.286**	0.080**	0.286**	0.081**	0.287**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>150	0.322**	0.323**	0.099**	0.279**	0.099**	0.281**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
House Neighbour		0.007**			0.006**	
		(0.00)			(0.00)	
Proportion of Callers		0.002**			0.002**	
		(0.00)			(0.00)	
Income Score- Medium		0.005*			0.005**	
		(0.00)			(0.00)	
Income Score - High		0.011**			0.010**	
		(0.00)			(0.00)	
Edu Score - Medium		0.005*			0.006**	
		(0.00)			(0.00)	
Edu Score - High		0.006*			0.008**	
		(0.00)			(0.00)	
Age (>=35 and <65)		0.024**			0.021**	
		(0.00)			(0.00)	
Age (>=65)		0.014**			0.012**	
		(0.00)			(0.00)	
N	156193	143361	156193		143361	

Notes: Standard errors in parentheses. ** significant at 1%, * significant at 5%.

Tables 2 and 3 show the results of a logit estimation in which the outcome variable is whether or not the customer called to adopt the changeover tariff. We split the positive domain of the distribution of total gains from adopting the changeover tariff over the two-years period into ten different groups and create a dummy for each of them, plus a dummy for the negative domain that represents the base group. We do the same for the distribution of gains arising from the last bill. In table 2 the ten groups refer to absolute amounts of money (e.g. between £10 and £20), while in table 3 the ten groups are based on the position in the distribution (e.g. between 20-35 centiles).

In particular, column 1 of Table 2 shows how, compared to the omitted category, those who over the two-years period lose money if adopting the changeover tariff, the likelihood of calling increases

classified as being above 65.

Table 3: Probability of Calling

	(1) ALL	(2) ALL	(3) ALL	(3) LAST	(4) ALL	(4) LAST
Percentile						
<=5	0.161**	0.160**	0.055**	0.090**	0.056**	0.089**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
>5 & <=10	0.166**	0.166**	0.044**	0.147**	0.043**	0.145**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
>10 & <=20	0.198**	0.198**	0.059**	0.180**	0.059**	0.179**
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
>20 & <=35	0.226**	0.226**	0.062**	0.216**	0.062**	0.214**
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
>35 & <=50	0.256**	0.256**	0.070**	0.238**	0.070**	0.237**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>50 & <=65	0.280**	0.280**	0.078**	0.255**	0.078**	0.254**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>65 & <=80	0.303**	0.302**	0.088**	0.270**	0.087**	0.270**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>80 & <=90	0.330**	0.331**	0.107**	0.278**	0.108**	0.278**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>90 & <=95	0.343**	0.342**	0.118**	0.270**	0.116**	0.270**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
>95 & <=100	0.332**	0.336**	0.111**	0.270**	0.112**	0.272**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
House Neighbour		0.007**			0.006**	
		(0.00)			(0.00)	
Proportion of Callers		0.002**			0.002**	
		(0.00)			(0.00)	
Income Score- Medium		0.006**			0.006**	
		(0.00)			(0.00)	
Income Score - High		0.012**			0.010**	
		(0.00)			(0.00)	
Edu Score - Medium		0.005*			0.006**	
		(0.00)			(0.00)	
Edu Score - High		0.006*			0.008**	
		(0.00)			(0.00)	
Age (>=35 and <65)		0.024**			0.021**	
		(0.00)			(0.00)	
Age (>=65)		0.015**			0.013**	
		(0.00)			(0.00)	
N	156193	143361	156193		143361	

Notes: Standard errors in parentheses. ** significant at 1%, * significant at 5%.

as gains increase. The relationship is monotonic, with a coefficient of 0.15 for very small gains, below £5, increasing to 0.32 for very large gains, over £150. Adding controls, in column 2, does not change the overall picture. Regarding peer effects, it appears that having a close neighbour who called increases the likelihood of calling by 0.7%. The impact of neighbours overall, measured through the number of callers in the postcode, is also positive, with one additional caller associated with an increase in the probability of calling of 0.2%. This is suggestive of peer effects being relevant for the decision on whether or not to call. It may well be the case that customers who adopted the changeover tariff talk about this to their neighbours, thus providing information or increasing its salience and, therefore, increasing the likelihood of them calling. Income, measured at the output area level using the income score, shows a positive relationship with the likelihood of calling, with

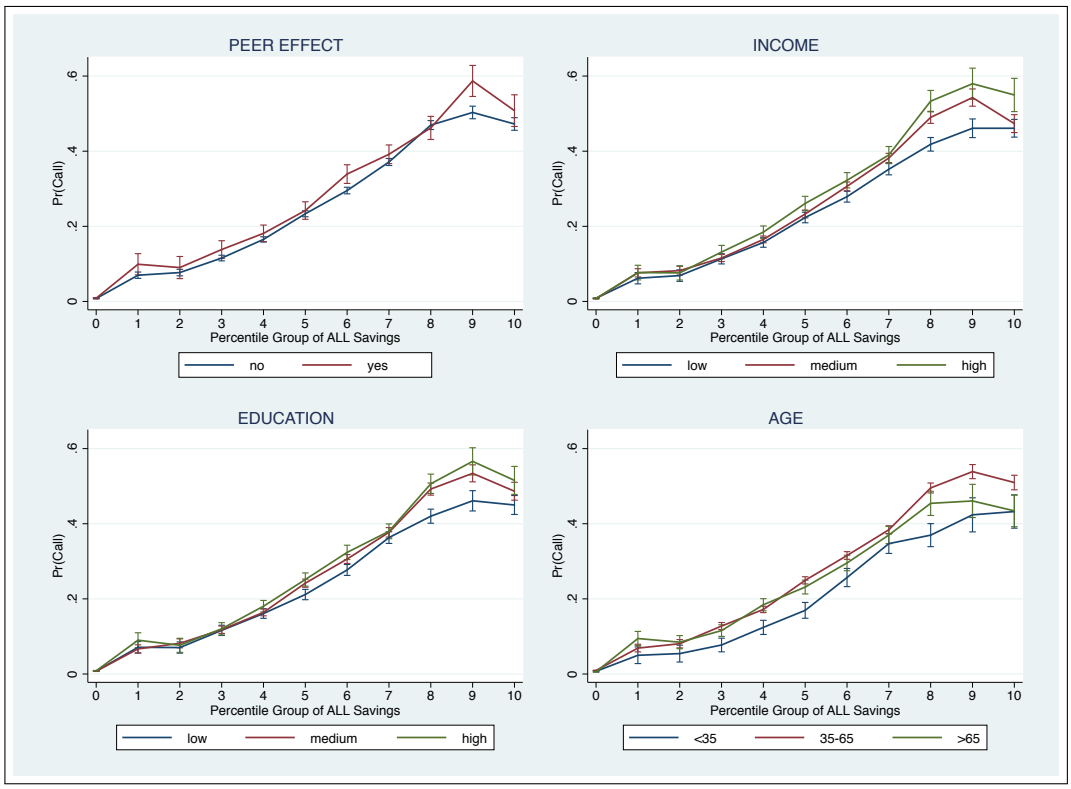
people living in medium and high income neighbourhoods more likely to call, other things being equal, than customers from poorer areas. Also education displays a positive relationship, with people more likely to call in areas characterised by higher educational achievements. Regarding age, there seems to be a hump-shaped relationship, with households where the contract holder is of middle age more likely to call than younger and older households (but younger households being the least likely to call).

To check whether what matters is only the overall amount of savings or also the dynamics of when they are realized, we then control, beyond overall gains, also for gains arising specifically from the last bill before calling, without (column 3) and with (column 4) additional controls. In this case, for customers who do not make a telephone call, as there is no last bill, we pick a random billing period instead, with the probability of picking one of the four billing periods reflecting the distribution of last bills for those calling. The coefficients on the last bill are significant and of greater magnitude than the coefficients for the overall savings. Thus, having overall savings between £10-20 increases the likelihood of calling by 5%, after controlling for savings associated with the last bill. On the other hand, having savings associated with the last bill between £10-20 increases the likelihood of calling by a much larger 22%, after controlling for overall savings. Adding control variables in column 4 does not change the overall picture.

Comparing overall gains to gains in the last bill in terms of their position in their own distribution, as done in Table 3, confirms the message. For instance, realising overall gains that are in the 36-50 percentile of the overall gain distribution is associated with a coefficient of 0.07, while having gains in the last bill in the 36-50 percentile of the last bill distribution has a much larger coefficient of 0.24. This despite the fact that savings in absolute amounts are larger for overall savings than for last bill savings. This shows that overall savings are not the main factor taken into account when deciding whether or not to call, as the timing of when these savings are realized also matters. In the next section, we will delve deeper into the timing of calling.

To better understand the effect of income, age and education, as well as peer effects, in four different regressions we run the model reported in column 2 of Table 3, with the difference that we interact the dummies for total savings with one of the control variables, thus documenting the heterogeneuos effect of total savings. In Figure 6 we displays the coefficients. The top-left panel displays the interaction with the dummy indicating the presence of a next-door neighbour who calls. The red line, when such a neighbour is present, is always above the blue one, confirming the positive peer effect discussed above. The effect appears to be significant only for some categories in the medium and large amounts of savings (between 50-65 and 90-95 percentiles). Looking at income levels (top-right) and educations levels (bottom-left), while the three curves overlap at low categories, for higher levels of savings there is generally a clear difference between the curves for low and high levels of income and education, with the medium category being instead in between and quite close to the high category. Considering age (bottom-right panel), we see how the young

Figure 6: Heterogeneous effect of some control variables



Notes: The percentile groups are 1: [0,5], 2: (5,10], 3: (10,20], 4: (20,35], 5: (35, 50], 6: (50, 65], 7: (65, 80], 8: (80, 90], 9: (90, 95], 10: (95, 100]. The 0 categort includes those with negative savings.

are consistently below the other two categories, across the whole distribution of savings, while middle-age customers are significantly more responsive compared to elderly ones only for the top categories.

To summarise, while for low levels of overall savings there is very low heterogeneity in terms of responsiveness, this emerges for more sizeable amounts. The fact that high income/high education are associated with a higher level of responsiveness may be due to the interaction between a higher ability to understand the structure of the tariff and its implications (which should lead to an upward shift of the curve compared to the low category) with higher opportunity costs of time, that induce households in higher income neighbourhoods not to be particularly responsive to small amounts of savings. The result for age may be explained by low time availability for younger households, perhaps due to the presence of young kids.

4.2 Calling now or calling later

This section explores the issue of when customers call within the two-years transition period. Waiting until the end of the period would allow customers to observe the actual savings from a switch to the changeover tariff, without incurring the risk of being worse off with the optional tariff due to lower than expected consumption over the relevant time period. On the other hand, by exercising their choice at the end of the period, customers have to wait for up to 18 months before realizing their gains and this may induce impatient or credit-constrained households to anticipate their choice. Also, customers may worry that they may forget to exercise their option once the two-years period is over, and thus forgo their gains, preferring instead to opt for the changeover tariff when the issue is salient in their mind due to the attention that the implementation of the program gets. Finally, as detailed in section 2.3, the information customers receive mentions (incorrectly) a "final opportunity" to opt for the changeover period after the first bill. For these reasons, it is of interest to investigate when, throughout the two-years period, customers exercise their option.

We distinguish between customers that call even before receiving the first bill (who may, nevertheless, have some information due to the three-months letter)[14] and customers calling after receiving the first bill or even later. Table 4 shows how more than half (8,266 out of 16,252) of those calling do it before receiving the first bill, while most of the remaining (6,114) do it after bill 1, with only a minority waiting for later bills.

Table 4: Time of Calling

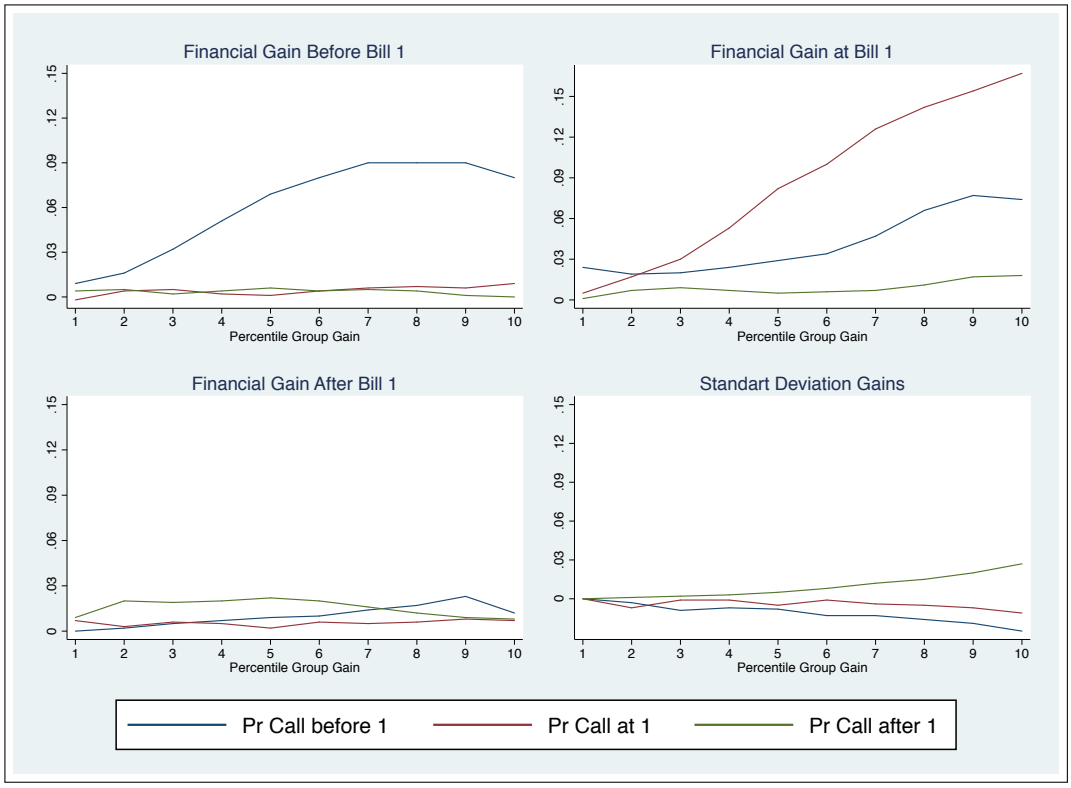
	Before Bill 1	**At Bill 1**	**After Bill 1**	**Never**
Number of People	8266	6114	1872	139941

It seems natural to think that those who have higher savings early on are more likely to call sooner. Also, as there is an option value of waiting, we would expect those who have a higher variability of their bill to be more likely to wait. Accordingly, we estimate a multinomial logit relating the timing of calling to the financial gains arising at different bills and their standard deviation over the two-year period. More specifically, the dependent variable takes the following values: 1 for those calling before the first bill, 2 at the first bill, 3 after the first bill, with 0 indicating those never calling. The explanatory variables are the financial gains at the three-months letter, at the first bill and after the first bill, each of them represented through ten dummies capturing the centiles groups used in the previous section, for a total of 30 dummies (plus three dummies when there are instead losses). Moreover, we include the standard deviation of financial gains through ten dummies, using the very same centiles groups.

[14] Due to the data structure, we cannot distinguish between those calling before or after the three-months letter.

In Fig 7 we report the estimated marginal effects of this multinomial logit (for details see Table A1 in the Appendix). Starting with those calling already before bill 1 (blue line), we see how they are very responsive to potential savings indicated in the three-months letter, as seen by the steep blue line in the top-left panel. They also seem to respond to future gains arising at the first bill (top-right panel) and, to a much lesser extent, in subsequent bills (bottom panel). The declining blue line in the bottom-right panel shows how, in line with expectations, the likelihood of calling before bill 1 decreases as the standard deviation of gains increases. Customers calling at bill 1 (red line) are instead substantially responsive only to potential gains at bill 1. Finally, for customers calling later (green line) the likelihood of calling is increasing with high potential gains at bill 1, while it is positive but rather flat for potential gains in later bills. Again in line with expectations, the likelihood of calling after bill 1 increases as the standard deviation of gains increases.

Figure 7



The results show that customers calling immediately, that is, before receiving the first bill, respond to gains arising in the future, thus showing a behaviour compatible with a forward looking attitude and an ability to forecast to some degree future consumption patterns. This seems not to be the case, instead, for customers calling at the first bill, who are instead highly responsive only to contemporaneous gains, that is, gains arising in the first bill. Finally, the few customers calling later on do not seem to take advantage of the additional information that is available to them, as

their reaction to potential gains in bills after the first one does not have a positive slope. This may be related to the information provided that, as explained in section 2, stops giving straightforward comparisons between changeover and metered tariff after the first bill. The analysis is also in line with customers taking into consideration the option value of waiting, as the likelihood of calling early (respectively, late) declines (respectively, increases) with the variability of gains.

5 Conclusion

This paper shows how consumers fail to choose the most convenient option in terms of water tariff, in a setting where water tariffs should be very salient and the presence of a deadline should discourage procrastination. This finding has important implication for current policies concerning market regulation, where consumer choice is a centrepiece of a policy package promoting an increase in competition among suppliers. For instance, the ability for consumers to "have a better choice of supply" and "access to reliable energy price comparison tools" feature prominently in the recent EU proposal for Clean Energy for All Europeans (EuropeanCommission, 2016). As has long been underlined by the literature (Waterson, 2003), the impact of such measures is of course greatly diminished if consumers display a high degree of passivity, as documented in this paper. Our finding that low income/low education is associated with lower responsiveness raises distributional issues, as people from low socio-economic background appear to be the least likely to benefit from increased choice. In the specific context of the optional tariff we examine, this was introduced to ease the transition from unmetered bills to metered bills for vulnerable customers. Our results suggest that this aim may not have been reached, as the transitional tariff benefitted more customers in well-off neighbourhoods. An alternative would have been an automatic application of the best tariff. This would of course have been more costly in terms of lost revenues, but at least it would have avoided the regressive outcome that we document.[15] This is indeed what the water company did for a minority of customers for which it was not technically feasible to install a meter. For these customers the water bill remained independent of actual consumption, but changed from being based on the so-called rateable value (based on the rental value of the property as of 1990) to assessed charges (based on the number of bedrooms). The water company automatically placed customers that were going to be worse off due to the new system under the changeover tariff.

The issue of customers' inertia has recently entered the policy debate in the UK, with reference to energy prices. The fact that "[a]bout a third of households are charged a variable price for their energy at a default rate set by their energy company, because they have not chosen to shop around

[15] Lost revenues would be paid by customers through higher prices given that the water regulator, Ofwat, operates a revenue correction mechanism, which means that, over the course of each five year price control period, water companies ultimately only recover the amount of revenue allowed by Ofwat in their so-called final determinations made prior to the start of that period. This means that, if a company exceeds (under recovers) the amount of revenue allowed by Ofwat during the five year period, then this is returned to (recovered from) customers on a net-present-value-neutral basis in the form of lower (higher) prices in future years.

for a cheaper fixed-price deal", led Prime Minister Theresa May to declare, referring to recently introduced legislation aimed at capping standard variable tariffs, "[i]t's often older people or those on low incomes who are stuck on rip-off energy tariffs, so today we are introducing legislation to force energy companies to change their ways."[16] Beyond this type of regulation, the finding that peer pressure can be effective in counteracting inertia suggests that tools such as "word-of-mouth" incentives, increasingly used by firms in their marketing campaigns (Kumar et al., 2007), could also be deployed by regulators to leverage the effectiveness of consumer choice.

[16] www.bbc.com/news/business-43192583

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Table A1: Probability of Calling at Different Bill

	Gain Before Bill 1			Gain At Bill 1			Gain After Bill 1			SD Gain All Bills		
Probability of Calling	**Before Bill 1**	**At Bill 1**	**After Bill 1**	**Before Bill 1**	**At Bill 1**	**After Bill 1**	**Before Bill 1**	**At Bill 1**	**After Bill 1**	**Before Bill 1**	**At Bill 1**	**After Bill 1**
Percentile												
<=5	0.009***	-0.002	0.004	0.024***	0.005***	0.001	-0.000	0.007	0.009***			
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
>5 & <=10	0.016***	0.004	0.005*	0.019***	0.017***	0.007**	0.002	0.003	0.020***	-0.003	-0.007	0.001
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
>10 & <=20	0.032***	0.005	0.002	0.020***	0.030***	0.009***	0.005*	0.006**	0.019***	-0.009*	-0.001	0.002***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
>20 & <=35	0.051***	0.002	0.004**	0.024***	0.053***	0.007***	0.007***	0.005**	0.020***	-0.007	-0.001	0.003***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
>35 & <=50	0.069***	0.001	0.006***	0.029***	0.082***	0.005***	0.009***	0.002	0.022***	-0.008	-0.005	0.005***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
>50 & <=65	0.079***	0.004	0.004**	0.034***	0.100***	0.006***	0.010***	0.006***	0.020***	-0.013**	-0.001	0.008***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
>65 & <=80	0.085***	0.006	0.005**	0.047***	0.126***	0.007***	0.014***	0.005**	0.016***	-0.013**	-0.004	0.012***
	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
>80 & <=90	0.087***	0.007	0.004*	0.066***	0.142***	0.011***	0.017***	0.006***	0.012***	-0.016***	-0.005	0.015***
	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
>90 & <=95	0.094***	0.006	0.001	0.077***	0.154***	0.017***	0.023***	0.008***	0.009***	-0.019***	-0.007	0.020***
	(0.01)	(0.00)	(0.00)	(0.01)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
>95 & <=100	0.084***	0.009*	0.000	0.074***	0.167***	0.018***	0.012***	0.007**	0.008***	-0.025***	-0.011**	0.027***
	(0.01)	(0.01)	(0.00)	(0.01)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)

Notes: Number of Observations: 154457. Standard errors in parentheses. ** significant at 1%, * significant at 5%.