Do Consumers Switch to the Best Supplier?

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Abstract:

This paper attempts to measure the capacity of consumers to efficiently choose between alternative suppliers. Across two independent datasets from the UK electricity market we find that the subsets of consumers who claimed to be switching exclusively for price reasons appropriated only between 26-39% of the maximum gains available through their choice of new supplier. While such behaviour can be explained by the existence of high search costs, the observation that 27-38% of the consumers actually *reduced* their surplus as a result of switching cannot. A brief analysis appears to reject an explanation involving the suppliers' use of mis-selling tactics.

Keywords: Search Costs, Switching Costs, Decision Errors, Mis-selling

JEL Classification:

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1. Introduction

Previous analyses of consumers' switching decisions have studied the effects of switching costs on reducing consumers' willingness to change suppliers (see Klemperer 1995 or Farrell and Klemperer 2004 for a review). While switching costs have important implications for market power, so too, do other costs that act to inhibit the ability of switching consumers to accurately compare and choose between firms' surplus offers[1]. Indeed, market power can also arise from the existence of search costs which make it costly for consumers to be aware of all firms' offers (see Baye et al forthcoming for a review) or due to the existence of decision-making costs that make it difficult for consumers to correctly evaluate and rank firms' offers (Perloff and Salop 1985, Gabaix et al 2005).

Rather than focussing on consumers' decisions to switch suppliers, this paper investigates the accuracy with which switching consumers are able to choose the best alternative supplier. To overcome the many measurement difficulties that may have limited such research in the past we exploit some useful features of two datasets from the UK electricity market. Across two (non-representative) subsets of this data and under a range of differing assumptions, only 8-11% of consumers switched to the firm offering the highest surplus and in aggregate, switching consumers only appropriated between 26% and 39% of the maximum available gains through their choice of new supplier. Such behaviour is wholly consistent with an explanation of high search costs or with the laboratory and natural experimental evidence that proposes consumers often search too little relative to the optimum (Sonnemans 1998 and Tenorio and Cason 2002). However, inconsistent with such explanations, the paper also indicates that 27-38% of switching consumers appear to have *lost* surplus through their choice of supplier. Such consumers lost an average amount of between approximately thirteen and

[1] Throughout the paper, we shall refer to the 'surplus' offered by a firm, as the net utility derived from the firm's chosen price-product combination, as valued by any individual consumer.

twenty-five pounds per year, even when any additional switching costs are excluded.

This latter finding is particularly challenging, given that in making the measurements, several controls are taken to rule out most conventional explanations. The findings are not consistent with consumers' having unmeasured heterogeneous preferences between firms as the measurements are restricted to only those consumers that, when asked, indicated that they had switched suppliers only to gain a lower price. Neither are the findings consistent with the possibility that consumers were making their decisions with respect to an incorrect estimate of their own consumption, as all measurements are calculated using consumers' beliefs about their own expenditure, not their true level of consumption. Finally, after a brief analysis, the paper also rejects an explanation that suggests that consumers' inefficient choices may have resulted from the pressurising or misleading influence of suppliers' sales activity. The accuracy of consumers' choices is reported to be insignificantly related to the self-reported influence of a sales agent or to the increased sales activity that may result from an increased number of regional competitors. Instead, the findings appear most consistent with pure consumer decision error that could in part, result from the difficulties involved in comparing highly complex non-linear tariffs.

Only Economides et al (2005) have previously attempted to measure the accuracy of switching decisions. As part of a much wider investigation into the effects of entry in the New York State telephone market, and without being able to reject the conventional explanations listed above, they suggest that from a sample of 810 consumer's switching decisions, 42% of consumers appear to have switched to a more expensive supplier, resulting in an average loss of $4.32 per month. However, a much larger, related literature has measured the ability with which consumers can pick the cost-minimising tariff from a menu of tariffs offered by the *same* firm. A review of these studies by Lambrecht and Skiera (2004) shows their own measurements to be

consistent with a common finding that suggests consumers often exhibit a bias towards flat rate fees. Using data from a German Internet provider, they estimate that by choosing a flat fee, 48% of consumers appear to pay an average excess of 95% above the cheapest option. Conversely, in a far more detailed, natural experiment in the Kentucky local phone market, Miravete (2003) suggests consumers' choices are less biased than commonly thought, and that any measured bias is more likely to result from consumers' incorrect expectations of their own future demand. As we discuss in section 2, where we provide a detailed account of our measurement methodology, our choice of data allows us to largely abstract from the complications that can arise when firms offer a menu of tariff options as in practice, firms within the UK electricity market effectively only offer a unique tariff (per payment method). The paper then continues by presenting the descriptive results of the measurements in section 3. Section 4 offers a brief investigation into some further explanations of the findings, before section 5 finally concludes.

2. Measuring the Gains from Switching

To analyse the accuracy of consumers' switching decisions it is necessary to measure, for each consumer, both the maximum possible gains in surplus that each consumer could have achieved by switching to their best supplier and those gains that resulted from the consumer's actual choice of new supplier. Such measurements are fraught with many inherent difficulties and so this section now provides a detailed account of the paper's measurement methodology. After an introduction to the data sources in section 2.1, section 2.2 discusses the measurement difficulties and illustrates how the chosen data are particularly well suited to minimise such problems, while section 2.3 provides further details of how the data are used to make the calculations.

Section 2.1 The Data Sources

The datasets are constructed from two independent, national, cross-sectional, face-to-face surveys of consumers, that for brevity we shall refer to as the EA

and the CCP surveys. The EA survey (Cooke et al, 2001[2]) was conducted between March and August 2000 and was intentionally biased towards low-income consumers. Of the 3417 consumers surveyed, 523 had switched electricity suppliers and of these, 373 had a full set of responses which were useable for our purposes. While the presence of a low-income bias and missing information prevent us from making any major inferences about how switching behaviour may vary with consumer characteristics, an attempt to measure the accuracy of switching decisions in any sample of consumers is still informative for both theory and policymaking. In contrast, the second, (CCP) survey was designed to be representative of the general population and is more recent, having been conducted by MORI for the ESRC Centre for Competition Policy in June 2005. The survey intended to analyse search and switching behaviour across eight different product markets, although only the electricity market responses are used within this paper[3]. Of the 2027 consumers surveyed, 329 had switched suppliers, of whom 245 were useable for our purposes, leaving us with a total sample of 618 switching decisions across the two datasets.

Section 2.2 The Market and its Advantages

Considering each in turn, we now discuss the many difficulties in measuring the gains in surplus from switching suppliers and examine how our data from the UK electricity market serves to minimise these problems.

Firstly, and most fundamentally, to avoid spurious or misleading conclusions, the measurements should capture the gains that result from both the price and non-price differences between firms. Despite electricity being a near-homogenous good, it is still possible that consumers may, correctly or otherwise, perceive important non-price differences between firms. While the reliability of electricity supply does not differ between retail electricity firms

[2] The EA survey and its initial analysis were funded by the Electricity Association – an early description of consumers' choices and errors is contained in Waddams Price (2003).

[3] Chang, Waddams and Wilson (forthcoming) present a full analysis of consumer behaviour across all the markets.

in the UK (as it depends upon a vertically separated distribution function), some consumers may value the level of customer service differently across firms. To resolve this problem, we simply separate the proportion of consumers who, when asked for their reasons for switching suppliers, responded by citing sources of gains that we are unable to measure. Specifically, consumers were only kept in the sample if they cited price as a main reason for switching suppliers, without citing additional reasons that we are unable to account for, such as the quality of service, the provision of environmental tariffs or the presence of dual supply discounts (that may be offered if a consumer buys both gas and electricity from the same supplier). The remaining samples of 319 EA consumers and 156 CCP consumers now only contain switching decisions that were made with respect to measurable price differences between firms. A full summary of the consumers' (multiple) reasons for switching suppliers is presented in Tables 1a and 1b.

Tables 1a and 1b: Reasons for Switching Suppliers across the Two Datasets[4]

Reason for Switching (EA)	Mean
Cheaper	0.77
Dual Supply Discounts	0.10
Influence of Sales Agent	0.10
'Conned'/Unaware of switching	0.03
Poor Service from Old Supplier	0.03
Better Service	0.02
No Standing Charge	0.01
Other	0.05
n	373

Reason for Switching (CCP)	Mean
Better Prices/Rates	0.86
Better Service/Quality	0.19
Not Satisfied with Old Supplier	0.11
Dual Supply	0.06
Environmental Tariffs	0.03
Other	0.10
n	245

A second measurement difficulty arises from the possibility that consumers were making their decisions with reference to a consumption level that differs from their current level, as observed at the time of the survey. When assessing the likely gains from switching suppliers, a consumer should incorporate any expected effects that follow from a change in optimal consumption under the new tariff or from any foreseen demand shock that may occur after switching

[4] The CCP respondents were asked to indicate their reasons from a list of possible options, whereas the EA respondents were asked to provide an unstructured explanation for why they had switched, which was later coded into a list of reasons.

suppliers. Consequently, the inability to control for such effects within cross-sectional data such as ours, may introduce serious inaccuracies into the measurements. However, we argue that approximating the total gains by simply measuring the associated change in expenditure, while holding consumption constant, is reasonable in the electricity market as consumers' (short-run) demand is estimated to be highly price inelastic (Baker et al 1989) and is likely to be stable over time. We can test this assumption by using a feature of the EA survey. Consumers within the survey were asked a series of questions that allow the creation of a further sub sample of 151 consumers, whose responses indicate that they considered their own consumption to be highly price inelastic and stable over time[5]. As can be seen within the later results sections, the measurements from this group of consumers are not significantly different from those of the full sample, providing support for this approximation.

A further methodological difficulty arises from the possibility that consumers who switch suppliers may have a choice, not only between suppliers, but also between sets of different tariffs offered by each firm. As discussed in the introduction, such tariff choices present decision problems of their own and their existence would add to the complexity of our measurements. However, as is now explained, this problem is minimised due to the fact that firms only effectively offer a single tariff option to each consumer. Since market liberalisation in mid 1999, consumers located in each of the fourteen regional markets across the UK have been able to switch away from the original regional incumbent to one of several entrants (with twenty-eight days notice and no financial penalty). The patterns of entry resulted in most firms

[5] The subgroup of consumers indicated high price inelasticity by replying "the same" to the following questions: Q. If the cost of electricity went down would you use more electricity or use the same electricity and use the savings for something else? and Q. If the cost of electricity went up would you use less electricity or use the same electricity?, and further indicated a stable consumption pattern by replying "No" to the following questions, Q. Has there been any change in your household's circumstance in the last 2-3 years that affected your fuel consumption? and Q. Has your household's electricity ever been disconnected because of unpaid electricity bills?.

choosing to compete in most, if not all of the fourteen regions. In any one region, firms are obliged to offer tariffs across three possible consumer payment methods (standard credit, direct debit and prepayment) but only choose to offer a single choice of tariff per payment method. This is demonstrated for an example region, in Table 2 where a full set of market tariffs is presented across the three payment methods.

Consequently, for a given payment method, consumers are only offered one tariff option per firm. However, as most consumers are able to choose their payment method, a consumer may be able to choose between payment-tariff options at any single firm. To focus only on the consumers' choice of supplier, we choose to calculate all measures with respect only to each consumer's known choice of payment method(s). For example, if a consumer has always used payment method m, the gains from switching will be calculated using firms' tariffs only under payment method m and ignoring any gains that could be additionally made by changing payment method. Alternatively, if a consumer is known to have changed payment method from m to m', the gains from switching will be calculated conditional on this choice, by using the original firm's tariff under payment method m and the alternative firms' tariffs under payment method, m'.

Section 2.3 The Calculations

Using the assumptions discussed so far, we can now provide formal expressions for the maximum gains available and the actual gains made from switching suppliers for each consumer. We also discuss an additional measure for later comparison which measures the gains that would be made had each consumer switched to a randomly selected alternative supplier.

Table 2: Tariffs (in pence) for a sample region - Midlands, June 2000

	Payment Method:									
	Credit Payment			Direct Debit Payment			Prepayment			Threshold
Electricty Supplier:	Fixed	Rate1	Rate2	Fixed	Rate1	Rate2	Fixed	Rate1	Rate2	(kWh)
MEB (1) [Incumbent]	2159	6.72	-	2159	6.72	-	3734	6.72	-	-
British Gas	0	10.57	5.65	0	9.01	5.65	0	10.28	6.17	900
Eastern TXU Energi	2848	6.38	6.28	1856	6.38	6.28	3713	6.72	-	2392
East Midland	3541	5.99	-	2491	5.99	-	5116	5.99	-	-
Independent Energy	4982	5.46	-	4026	5.46	-	4497	7.77	-	-
London Electricity (2)	3048	5.86	-	3048	5.86	-	9202	7.80	-	-
Northern Electric+Gas	0	9.14	5.68	0	8.19	5.68	3990	6.52	-	1092
Norweb Energi	4922	5.30	-	4637	5.21	-	3734	6.72	-	-
Seeboard (3)	0	11.97	5.34	0	10.82	5.34	4112	6.72	-	728
Scottish Hydro	1873	6.08	-	1873	6.08	-	3990	6.52	-	-
Scottish Power	5408	5.26	-	4883	5.01	-	3734	6.72	-	-
Southern	3116	6.29	-	3053	6.16	-	3990	6.52	-	-
SWALEC	1966	5.67	-	1886	5.44	-	3734	6.71	-	-
SWEB (4)	3045	5.86	-	3045	5.86	-	4523	7.39	-	-
Utility Link (5)	3595	7.25	-	3595	7.25	-	7388	7.68	-	-
Yorkshire (6)	5561	5.76	-	5561	5.76	-	8669	5.76	-	-

Each supplier offers a tariff across three payment methods. Tariffs consist of an (possibly zero) annual standing charge, denoted as *Fixed*, with an additional marginal rate, denoted as *Rate1* in pence/kWh and in some cases, with a second marginal rate, denoted as *Rate2* for consumption over and above some annual breakpoint, denoted as *Threshold*. Some firms offer additional discounts as referred to below with reference to the numbers in brackets. (1) 3% off Direct Debit (2) 3% off Direct Debit if bill exceeds £10.50 (3) £8.40 off credit and direct debit (4) 3% off Direct Debit (5) £10.00 off direct debit if prompt payment (6) £8.40 off credit, £14.70 off direct debit.

Firstly, consider the actual gains made by consumer i by switching from his original supplier, s, to his chosen current supplier, $c \neq s$, at time t. Under the assumption that consumer i, located in region r, has a stable consumption, invariant to tariff or supplier, of C_i, the actual gains from switching will be denoted as x_i^{sw} (excluding switching costs, and suppressing the region and time subscripts). Allowing for the possibility that consumer i may have chosen a payment method under his current supplier, m', that may differ to that chosen under his original supplier, m, one can measure the gains made from switching as the difference between E_i^s - the (annual) expenditure from trading with firm s under tariff $p_s(m)$ and E_i^c - the annual expenditure resulting from trading with firm c under tariff $p_c(m')$, as seen in equation (1).

$$x_i^{sw} = E_i^s(p_s(m), C_i) - E_i^c(p_a(m'), C_i) \quad (1)$$

With a similar logic, the maximum gains available from a decision to switch away from supplier s, $x_{i,s}^{\max}$, can be expressed as the change in (annual) expenditure that would result from switching to the firm offering the lowest alternative expenditure from the set of market suppliers, S.

$$x_{i,s}^{\max} = E_i^s(p_s(m), C_i) - \min_{k \in S} E_i^k(p_k(m'), C_i) \quad (2)$$

Further, one can also express the expected gains available from switching away from supplier s, had the consumer randomly selected a firm from the consumer's set of (n-1) alternative suppliers, which shall be denoted by $x_{i,s}^{ran}$.

$$x_{i,s}^{ran} = E_i^s(p_s(m), C_i) - \left(\frac{1}{(n-1)}\right) \sum_{k \neq s} E_i^k(p_k(m'), C_i) \quad (3)$$

To calculate these measures for each of the switchers in the datasets, the programming facility in SPSS was used in combination with a set of responses

from each of the surveys and an historical dataset of tariffs[6]. As neither dataset, and in particular the EA dataset, are able to provide all the necessary information to directly construct the three measures in (1) to (3), we now discuss how the data was used in more detail for each dataset in turn.

The CCP data is very detailed. The survey asked for the date at which consumers had most recently switched suppliers. Unlike, Economides et al (2005) who were forced to assume that the consumers had switched at the date of information collection, we were able to select the set of tariffs which were relevant at the time of switching. Consumers were asked about their average (monthly) electricity expenditure, rather than their consumption directly, as consumers are more likely to accurately recall their expenditure. To make the calculations, we then used this response with the consumers' current supplier status to recover an estimate of the consumers' (annual) consumption at the time of the survey and assumed that this was the same level of consumption as was relevant for the consumers' switching decision. This method can be criticised in two respects. Firstly, the use of self-reported estimates may introduce additional noise into the calculations, as consumers' consumption estimates can often diverge from their true consumption (e.g. Mathieu and Waddams Price 2005, Miravete 2003). However this approach has the advantage that all gains are calculated in a way that is consistent with the consumers' consumption beliefs and therefore circumvents any subsequent explanations that could suggest that inefficient choices resulted from consumers' incorrect consumption estimates. Secondly, the method may be criticised due to the possibility that the level of consumption as calculated at the time of the survey may have changed since the time of switching. However, this time interval was less than two years on average, and as we know from the EA dataset, the measured gains differ very little between those

[6] The tariff dataset builds on that used by Giulietti et al (2005) and was obtained by either contacting suppliers directly or downloading bimonthly tariffs from a consumer advice website, www.which.co.uk.

consumers that indicated that their consumption had been stable for the previous two or three years and those that did not.

The EA dataset suffers from two further omissions which both raise doubts about the exact set of tariffs that were relevant for each consumer's switching decision. The first problem arises from not knowing the exact date of the switching decision. The second problem occurs due the inability of determining whether the 32% of consumers who gave details of a change in payment method, changed their method before, after, or at the same time as the switching decision. To resolve these shortcomings and to enhance the robustness of our findings we make our measurements over four different specifications.

As the EA survey was conducted between March and August 2000, only about twelve months after market liberalisation had been completed in mid 1999, the consumers could have switched using one of only four possible time-period tariff sets, namely those that commenced in June 1999, October 1999, April 2000 or June 2000. Of these, consumers would have most likely switched under either the October 1999 tariffs, as these were stable for the longest period (October 1999 to April 2000), or the June 2000 tariffs, as the national proportion of consumers switching suppliers was accelerating over the period. Using both of these time periods, we then make our calculations under two further assumptions to provide a total of four specifications. These two assumptions concern whether the 32% of consumers who had changed their payment method, changed either before they switched suppliers (the consumers traded with both their original and current supplier under their current payment method) or perhaps most realistically, at the time of switching (the consumers traded with their original supplier using their previous payment method but traded with their current supplier under their

current payment method)[7]. The four specifications shall be respectively labelled as Oct99nochange, Oct99change, Jun00nochange and Jun00change.

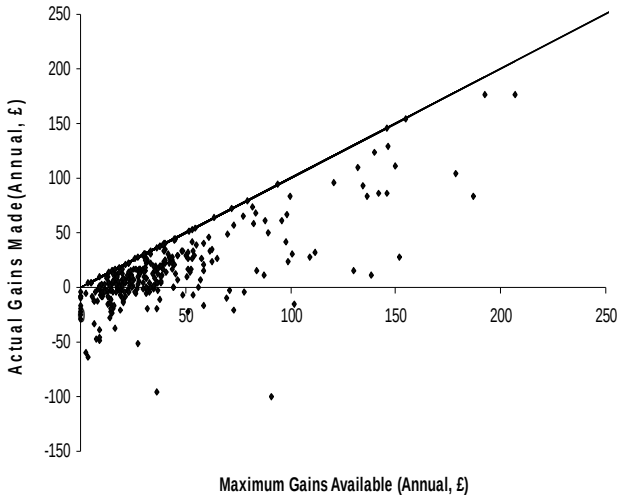
3. Descriptive Results

In this section we now present the results of the measurements. To provide a sense of the consumers' decisions, Figure 1 plots the actual gains made by switching consumers against the maximum gains available, for a representative specification from the EA dataset (Oct99change). One can immediately make two observations. Firstly, many of the consumers have not appropriated the maximum gains available as indicated by those points located off the 45° line. Such choices can be explained by the existence of search costs only if they result in consumers making positive gains in surplus and yet, we secondly observe that a significant fraction of consumers make negative gains, as indicated by those choices located below the x-axis. Many consumers have appeared to lose surplus from switching to a more expensive supplier.

A more formal set of descriptive statistics is displayed in Table 3. To consider the robustness of the results, Table 3 provides descriptive statistics over a total of six cases. The first four columns present the results from the four possible specifications within the EA dataset, while the fifth column displays the measurements from the CCP dataset. For comparison, the final column presents the results of the consumers within the CCP sample that had indicated switching suppliers for reasons other than price. The results lead us to make three observations.

[7] The most common method changes reported include moving from credit to direct debit (41%) and credit to prepayment (38%). We do not allow for the possibility that the change was made after the process of changing suppliers as this seems the most unlikely of the three possibilities.

Figure 1: The Actual Gains Made from Switching relative to the Maximum Gains Available (EA dataset, Oct99change specification)



Firstly, consumers appear to exhibit quite high levels of inaccuracy in their choice of supplier. Even amongst consumers who switched exclusively for price reasons within the two datasets, only 8-11% of consumers selected the firm offering the highest reduction in expenditure. Further, although consumers made positive average gains of between approximately twelve and seventeen pounds per year, only 26-39% of the maximum gains available were appropriated through consumers' choice of suppliers. These choices only marginally improved upon the gains that would have been made had the consumer randomly selected an alternative supplier. On average, such a selection would have given the consumer a 7-14% chance of picking the best supplier [8] and would have appropriated 18-26% of the maximum gains available.

[8] This figure was calculated by finding the reciprocal of the number of alternative suppliers, averaged across consumers, given their respective regions. The probability doubles to 0.14 for the later CCP dataset due to the heavy market consolidation in recent years.

Table 3: Descriptive Statistics of the Gain Measures Across a Range of Datasets and Specifications

	Across EA Dataset Specifications								Across CCP Dataset Specifications			
Tariff Period	June 00		June 00		Oct 99		Oct 99		Only Concerned with Price		Not Only Concerned with Price	
Adjusted for Method Change?	No		Yes		No		Yes					
	Average	(StDev)	Average	(StDev)	Average	(StDev)	Average	(StDev)	Average	(StDev)	Average	(StDev)
Number of Switchers	319		319		319		319		156		88	
Average Maximum Gains Available (annual, £)	46.19	(42.58)	44.43	(44.61)	41.49	(42.61)	39.21	(39.88)	48.13	(39.14)	49.18	(44.54)
Average Random Gains Available (annual, £)	11.17	(30.71)	9.40	(34.26)	8.71	(29.41)	7.12	(28.32)	12.36	(29.07)	9.41	(25.32)
Average Actual Gains Made (annual, £)	14.59	(33.77)	12.83	(35.85)	16.33	(39.98)	14.74	(37.02)	12.59	(42.44)	7.44	(36.20)
Average Random Gains/Average Maximum Gains	0.24		0.21		0.21		0.18		0.26		0.19	
Average Actual Gains/Average Maximum Gains	0.32		0.29		0.39		0.38		0.26		0.15	
Proportion of Switchers with Perfect Gains	0.08		0.08		0.10		0.10		0.11		0.06	
Expected Proportion if Randomly Selected	0.07		0.07		0.07		0.07		0.14		0.14	
Proportion of Switchers with Non-Negative Gain	0.73		0.67		0.70		0.67		0.62		0.55	
Average Gain given Non-Negative Gain	24.86	(32.74)	28.43	(33.81)	29.58	(39.51)	29.86	(34.30)	35.24	(31.75)	29.50	(31.89)
Proportion of Switchers with Negative Gain	0.27		0.33		0.30		0.33		0.38		0.45	
Average Gain given Negative Gain	-13.67	(15.60)	-15.22	(17.84)	-14.44	(18.27)	-16.50	(18.01)	-24.67	(29.58)	-19.58	(18.57)

Maximum Gains Available refer to the change in surplus available from trading with the cheapest alternative supplier. *Random Gains Available* refer to the expected change in surplus available from randomly selecting an alternative supplier. The *Proportion of Switchers with Perfect Gains* refers to the proportion of consumers, who appropriated all of the maximum gains available and is compared to the expected probability of doing so had the consumer randomly selected an alternative supplier

Secondly, while such behaviour could, in principle, be explained by the presence of high search costs, the selection of a more expensive supplier by a substantial proportion of consumers cannot. Through a poor choice of supplier, 27-38% of consumers appear to have lost an average amount of approximately between thirteen and twenty-four pounds per year. Even with our more robust measurements, the proportion of consumers that are observed to have made a loss from their switching decisions appears quite similar to the 42% of consumers reported by Economides et al (2005).

Finally, the results provide support for the choice of methodology in several respects. The results appear remarkably robust across the two datasets and across the EA specifications. The decision to analyse only those consumers who admitted switching for price reasons alone is supported by comparing the main results with the final column of Table 3. Including consumers who switched for reasons other than price would have led us to falsely exaggerate the inefficiency of consumers' decisions. Further, as displayed in Table A1 of the appendix, the results remain robust when compared to the measurements made when using only the sub sample of EA consumers who claimed to exhibit stable and highly price inelastic consumption.

Section 4: Explanations and Further Investigations

That so many consumers selected a more expensive supplier that resulted in them losing surplus is a puzzling finding. In this next section, we briefly investigate its possible explanations.

The robustness of the results suggests that it is unlikely that the findings are due to inaccurate survey responses or false assumptions in the methodology and so there appear to be three remaining possible explanations. Firstly, in line with the evidence reviewed by Lambrecht and Skiera (2004), consumers could be choosing more expensive firms because of some preference for certain tariff structures. Although this explanation cannot be rejected, it seems

unlikely given the fairly common two- or three-part tariff structure employed by firms and the fact that no firm offers a pure flat fee tariff. Further, as shown in Table 1a, only one percent of consumers from the EA survey suggested they switched to avoid a standing charge. Alternative explanations could suggest that the observed decisions are as a consequence of large consumer decision errors that may either occur due to the high complexity of the specific market environment, or perhaps more reasonably, due to the effects of some deliberate supplier strategy. We shall refer to such strategies, whereby firms may employ aggressive, pressurising or misleading sales tactics to influence consumers' choice of supplier, as 'mis-selling' strategies. This explanation may seem particularly plausible in the UK electricity market where the number of complaints and allegations of mis-selling tactics, such as 'cold-calling' and doorstep selling, was considered sufficient to warrant market investigations by several bodies (e.g. energywatch 2002, OFGEM, 2002 and OFT, 2004) with OFGEM subsequently fining London Electricity two million pounds in 2002[9].

Although a full examination of these explanations is beyond the scope of the current paper, we now provide a brief investigation into the possibility that the findings can be explained by mis-selling activities. We do so by estimating how the choice of suppliers is related to two sets of test variables that we will investigate in turn.

The first batch of test variables come from the survey responses which gives consumers' reasons for switching suppliers, as summarised in Tables 1a and b. In particular, the EA survey allowed for responses that firstly, cite the influence of a sales agent when making the switching decision and secondly, the possibility that the consumer was 'conned' into switching to the extent that they were not aware of giving their consent. By constructing two dummy variables for the consumers that made such responses, $agent_i$ and $conned_i$, we

[9] See http://news.bbc.co.uk/1/hi/business/2315115.stm

can test if the incidence of agent interaction or conning activity resulted in consumers appropriating significantly less of the maximum gains available.

To estimate the strength of such effects we use two estimation procedures. Firstly, following Miravete's (2003) analysis of tariff choices, we use a probit model to estimate the probability of a consumer making a positive gain in surplus from their decision, while, secondly, in order to utilise more of the available data, we model the gains made from the switching decision as a continuous variable. In contrast to both Miravete and Economides et al (2005), who modelled the probability of not selecting the supplier offering the highest surplus, both of our estimation procedures take into account the potential sample selection problem that results from only observing switching decisions for those consumers who chose to switch. Consequently, we employ a probit model with a sample selection correction and secondly, a standard Heckman correction model. Formally, both of the estimation procedures make use of two latent variables. The first latent variable describes consumer i's decision to switch suppliers, while the second describes the gains made from switching, given that consumer i has chosen to switch. As shown in equations (4) and (5), the first control stage is modelled by assuming that the switching latent variable, $y_i^{sw}*$, is a linear function of the maximum gains available, $x_i^{\max}$, a vector of demographics, D_i, which can be thought of as proxies for search and switching costs and the number of regional competitors, n_i.

$$y_i^{sw}* = x_i^{\max}\beta_1 + D_i'\beta_2 + n_i\beta_3 + \varepsilon_{i1} \quad (4)$$

$$y_i^{swg}* = x_i^{\max}\beta_4 + DD_i'\beta_5 + agent_i\beta_6 + conned_i\beta_7 + stable_i\beta_8 + \varepsilon_{i2} \quad (5)$$

In the second stage, it is then assumed that the latent variable measuring the actual gains from switching, $y_i^{swg}*$, is a similar function of the maximum gains available, and a set of consumer demographics, DD_i, but with the addition of the test dummy variables, $agent_i$ and $conned_i$. Finally, to further

test a previous measurement assumption, a dummy variable, $stable_i$, is included, which equals one only if the consumer belongs to the sub group of consumers who were thought to have highly price inelastic and stable consumption. Our assumption that all consumers had similar consumption features will be supported if this variable proves to be insignificant.

Under both estimation procedures, consumer i will be modelled to have switched suppliers (switch=1) if $y_i^{sw}* > 0$. In the first estimation procedure, the consumer will then be modelled to have made a positive gain in surplus (gain=1) only if $y_i^{swg}* > 0$ and conditional on the consumer having switched suppliers. Alternatively, in the second, continuous case, the gains from switching will modelled by setting the gains from switching equal to the second latent variable, $y_i^{swg}* = x_i^{sw}$, conditional on that consumer switching suppliers. To allow for the two stages to be correlated, both models assume that the two equations' error terms, ε_{i1} and ε_{i2} , are distributed with a bivariate normal distribution and with a correlation coefficient , ρ , to be estimated.

The demographic variables and test variables used for the estimations are summarised in Table 4 where only the price motivated switchers are included. To identify the models we assume that the possibility that a consumer has arrears with an electricity supplier and the possibility that a consumer has no gas supply both influence the decision to switch, but not the selection of supplier. The qualitative results of the estimation do not depend upon this form of identification.

Table 4: Summary Statistics of the Demographic and Test Variables

Variable Name	Variable Definition	Switchers Mean	Switchers (StDev)	Non-Switchers Mean	Non-Switchers (StDev)
highsoc	Household social grade: A, B or C1	0.28	(0.45)	0.22	(0.42)
midsoc	Household social grade: C2 or D	0.50	(0.50)	0.49	(0.50)
lowsoc	Household social grade: E	0.22	(0.42)	0.29	(0.45)
highinc	Household income: £25000 +	0.12	(0.33)	0.11	(0.31)
midinc	Household income: £12500-£25000	0.24	(0.43)	0.21	(0.41)
lowinc	Household income: Less than £12500	0.43	(0.50)	0.49	(0.50)
incref	Income status refused	0.20	(0.40)	0.20	(0.40)
age	Age of respondent	44.85	(15.95)	43.58	(16.88)
single	The household respondent is single	0.15	(0.35)	0.24	(0.43)
married	The household respondent is married	0.62	(0.49)	0.51	(0.50)
exmar	The household respondent is widowed or divorced	0.23	(0.42)	0.25	(0.43)
arrears	The household has electricty arrears	0.04	(0.21)	0.04	(0.21)
gassw	The household has previously switched gas supplier	0.51	(0.50)	0.19	(0.39)
nogas	The household has no mains gas supply	0.06	(0.23)	0.17	(0.37)
rent	The household lives in rented accommodation	0.43	(0.50)	0.57	(0.50)
disable	The household has some form of disability benefit	0.19	(0.47)	0.19	(0.46)
agent	The household cited the influence of a sales agent	0.11	(0.31)	-	-
conned	The household switched without consent	0.03	(0.18)	-	-
n	The number of regional competitors	14.75	(0.86)	14.61	(1.01)
Number of Observations		319		2611	

We continue with our previous robustness approach by comparing the estimations over the four different specifications. The estimations for the two models are reported in Tables 5 and 6. The estimated marginal effects are reported for the average consumer and refer, in Table 5 to the change in the probability of switching and to the change in the probability of switching and making a positive gain in surplus, while in Table 6, they refer to the change in the probability of switching and to the marginal change in the absolute level of appropriated gains.

Table 5: Estimations of the Probability of Making a Positive Gain (1) [10]

	June *No Method Change*		*June* *Method Change*		*October* *No Method Change*		*October* *Method Change*	
sw	M.Effect	z	M.Effect	z	M.Effect	z	M.Effect	z
n	0.01	1.05	0.01	1.07	0.01	1.05	0.01	1.07
gainmax	0.00	1.87	0.00	1.38	0.00	1.70	0.00	0.89
highsoc	0.02	0.92	0.02	0.94	0.02	0.94	0.02	0.97
midsoc	0.00	-0.05	0.00	-0.03	0.00	-0.03	0.00	0.00
highinc	-0.01	-0.55	-0.01	-0.54	-0.01	-0.51	-0.01	-0.50
lowinc	0.00	0.30	0.00	0.32	0.00	0.30	0.00	0.32
incref	-0.01	-0.89	-0.01	-0.87	-0.01	-0.87	-0.01	-0.86
age	0.00	1.01	0.00	1.02	0.00	0.97	0.00	0.97
age2	0.00	-0.92	0.00	-0.92	0.00	-0.87	0.00	-0.88
disable	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06
single	-0.03	-2.15*	-0.03	-2.18*	-0.03	-2.23*	-0.03	-2.25*
exmar	-0.01	-0.59	-0.01	-0.62	-0.01	-0.61	-0.01	-0.66
arrears	0.01	0.49	0.01	0.50	0.01	0.49	0.01	0.50
gassw	0.15	8.62**	0.15	8.63**	0.15	8.62**	0.15	8.63**
nogas	-0.04	-2.84**	-0.04	-2.80**	-0.04	-2.85**	-0.04	-2.76**
rent	-0.03	-2.54*	-0.03	-2.56**	-0.03	-2.55**	-0.03	-2.56**
Pr(sw=1, loss=1)	0.46		0.42		0.56		0.60	
pos. gain | sw								
agent	0.15	1.41	-0.07	-0.79	0.16	1.53	0.08	0.76
conned	-0.14	-0.96	-0.16	-1.13	0.20	1.21	0.00	-0.01
gainmax	0.01	4.09**	0.01	4.75**	0.01	5.89**	0.01	6.43**
stable	-0.04	-0.68	-0.04	-0.62	-0.08	-1.19	-0.08	-1.20
highsoc	-0.05	-0.50	-0.08	-0.77	-0.03	-0.26	-0.14	-1.21
midsoc	-0.09	-1.05	-0.11	-1.35	-0.18	-1.94	-0.29	-3.16**
highinc	-0.18	-1.67	-0.13	-1.26	-0.15	-1.21	-0.18	-1.39
lowinc	-0.06	-0.75	-0.03	-0.41	-0.02	-0.25	-0.07	-0.72
incref	-0.06	-0.64	-0.04	-0.44	-0.08	-0.83	-0.06	-0.54
age	0.00	0.40	-0.01	-0.85	0.01	0.71	0.01	0.74
age2	0.00	-0.62	0.00	0.63	0.00	-0.54	0.00	-0.63
disable	-0.04	-0.52	-0.06	-0.90	0.05	0.72	-0.03	-0.44
single	-0.16	-1.76	-0.14	-1.50	-0.16	-1.49	-0.30	-2.85**
exmar	0.02	0.28	0.07	0.84	-0.07	-0.84	-0.03	-0.34
rent	-0.18	-2.63**	-0.16	-2.37*	-0.12	-1.65	-0.16	-2.09*
Summary Statistics								
n	319/2930		319/2930		319/2930		319/2930	
Log-Lik	-1077		-1078		-1071		-1062.04	
LR(15)	42.7**		75.8**		73.6**		103**	
McF R2	0.02		0.03		0.03		0.05	
rho	0.38		0.41		0.22		0.17	
LR	2.45		3.06		0.68		0.36	

[10] All significant tests are indicated by * for the 5% level and by ** for the 1% level. Where applicable, coefficients are relative to the base case of a consumer who is married, of low social class and with middle income. The LR (.) statistic tests the joint significance of all the second stage coefficients. Rho refers to the estimated correlation between the two equations' error terms, which is then tested to be significantly different from zero by a LR test.

Table 6: Estimations of the Gains Made From Switching (1) [11]

	Jun-00 No Method Change		*Jun-00 Method Change*		*Oct-99 No Method Change*		*Oct-99 Method Change*	
sw	M.Effect	z	M.Effect	z	M.Effect	z	M.Effect	z
n	0.01	1.05	0.01	1.07	0.01	1.05	0.01	1.07
gainmax	0.00	1.87	0.00	1.38	0.00	1.70	0.00	0.89
highsoc	0.02	0.92	0.02	0.94	0.02	0.94	0.02	0.97
midsoc	0.00	-0.05	0.00	-0.03	0.00	-0.03	0.00	0.00
highinc	-0.01	-0.55	-0.01	-0.54	-0.01	-0.51	-0.01	-0.50
lowinc	0.00	0.30	0.00	0.32	0.00	0.30	0.00	0.32
incref	-0.01	-0.89	-0.01	-0.87	-0.01	-0.87	-0.01	-0.86
age	0.00	1.01	0.00	1.02	0.00	0.97	0.00	0.97
age2	0.00	-0.92	0.00	-0.92	0.00	-0.87	0.00	-0.88
disable	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06
single	-0.03	-2.15*	-0.03	-2.18*	-0.03	-2.23*	-0.03	-2.25*
exmar	-0.01	-0.59	-0.01	-0.62	-0.01	-0.61	-0.01	-0.66
arrears	0.01	0.49	0.01	0.50	0.01	0.49	0.01	0.50
gassw	0.15	8.62**	0.15	8.63**	0.15	8.62**	0.15	8.63**
nogas	-0.04	-2.84**	-0.04	-2.80**	-0.04	-2.85**	-0.04	-2.76**
rent	-0.03	-2.54*	-0.03	-2.56**	-0.03	-2.55**	-0.03	-2.56**
gains | sw								
agent	0.15	0.04	-1.82	-0.44	-0.88	-0.22	-1.43	-0.36
conned	2.24	0.32	1.73	0.25	-1.66	-0.24	-2.25	-0.34
gainmax	0.01	19.44**	0.01	20.79**	0.01	25.70**	0.01	23.27**
stable	0.97	0.36	0.95	0.35	-0.62	-0.24	-0.60	-0.23
highsoc	-3.12	-0.72	-1.85	-0.42	-1.79	-0.42	-0.92	-0.22
midsoc	-3.29	-0.89	-3.28	-0.87	-3.72	-1.02	-5.06	-1.42
highinc	-13.49	-2.87**	-12.76	-2.66**	-2.42	-0.52	-1.81	-0.40
lowinc	-4.18	-1.18	-4.86	-1.35	1.92	0.54	2.63	0.77
incref	-11.59	-3.03**	-11.67	-3.00**	-5.51	-1.46	-2.87	-0.77
age	-0.07	-0.16	-0.34	-0.73	0.29	0.62	0.12	0.27
age2	0.00	0.05	0.00	0.65	0.00	-0.37	0.00	-0.02
disable	-4.63	-1.65	-4.27	-1.49	-6.32	-2.27*	-6.32	-2.32*
single	-6.67	-1.54	-5.67	-1.29	-1.31	-0.31	-4.47	-1.07
exmar	-0.60	-0.18	-0.50	-0.14	0.58	0.17	-0.58	-0.18
rent	-3.69	-1.23	-2.24	-0.74	-6.19	-2.10	-5.03	-1.73
Summary Statistics								
n	319/2930		319/2930		319/2930		319/2930	
Log-Lik	-3793		-3804		-3794		-3789	
LR(15)	260**		288**		372**		332**	
McF R2	0.03		0.04		0.05		0.04	
rho	0.05		0.02		0.08		-0.02	
LR	0.07		0.01		0.19		0.01	

[11] All significant tests are indicated by * for the 5% level and by ** for the 1% level. Where applicable, coefficients are relative to the base case of a consumer who is married, of low social class and with middle income. The LR (.) statistic tests the joint significance of all the second stage coefficients. Rho refers to the estimated correlation between the two equations' error terms, which is then tested to be significantly different from zero by a LR test.

Initially consider the results of the first control stage (common to both estimation procedures) that models the decision to switch suppliers. In further support for the apparent inefficiency of consumers' choices, note that the switching decisions appear unrelated to the maximum gains available from doing so. This finding is similar to those found in previous studies of switching costs, especially when consumers believe price differences to be transitory (Giulietti et al 2005) or when consumers do not participate in active price search (Sturluson 2002). Secondly, while we can make no major inferences from the demographic variables because of the biases resulting from the construction of the sample, the estimations also suggest that switching is more likely for consumers who had previously switched gas suppliers and less likely for single consumers, consumers living in rented accommodation or consumers with no gas supply. There is no role reported for income, class, age or the number of regional competitors.

Moving on to the more interesting results of the two second-stage estimations in Tables 5 and 6, one can observe that the variable $stable_i$ is insignificant across all specifications, supporting the assumptions used in the measurement methodology. In line with both Economides et al (2005) and Miravete (2003), we find that few demographic variables robustly predict the ability of consumers to make accurate decisions. Living in a rented property is reported to be associated with a large reduction in the probability of switching to make a positive gain in surplus, while there is some evidence that consumers with a disability or a higher income appropriate significantly less of the maximum gains available. Table 5 also predicts that a consumer is less likely to make a loss from switching suppliers if the maximum gains available are higher, as could be consistent with consumers having a higher incentive to make an accurate decision when the returns from doing so are larger. (One cannot draw such an inference from Table 6 as the gainmax variable is acting as a control variable for the actual gains made.)

The estimation results report no evidence to suggest that consumers' decisions are influenced by the self-reported measures of sales or conning activity. Across all specifications, the two test variables are insignificant, and so we must initially conclude that mis-selling may fail to be an adequate explanation for the inefficiency of consumers' decisions. However, to provide a final, less direct test of the effects of mis-selling, the estimations are now repeated with the inclusion of another test variable - the number of competitors in each consumer's regional market. While conventional theories of consumer search do not predict any negative relationship between the consumers' ability to appropriate the gains available and the number of competitors[12], it is reasonable to conjecture that as the number of competitors increase, firms may increasingly rely on mis-selling strategies to profit from reducing the accuracy of consumers' decisions. In a different, but related sense, recent work by Spiegler (2006) shows a similar intuition by illustrating how firms face an increased incentive to obfuscate when faced with harsher competition, by increasing the variance of their utility offers.

To provide a test of such an effect, we can once again exploit a feature of the UK electricity market. Due to variations in the patterns of entry at the time of market liberalisation, the number of suppliers varied between twelve and sixteen at the time of the EA survey[13]. Consequently, if mis-selling were an explanation, we might expect regional markets with a higher number of competing suppliers to exhibit consumers making less efficient decisions[14]. Such an effect may seem initially plausible given the small, but significant

[12] Indeed, for any given price distribution and cost of search, a consumer should accept any discovered price below the optimal reservation price, which is defined to be independent of the number of firms (Kohn and Shavell 1974).

[13] These numbers refer to the number of large firms that were patronised by consumers in our sample and does not include some smaller firms that also operated across all regions. Including such firms only increases the number by a constant across regions and does not affect our qualitative results. No such variation exists at the time of the CCP survey due to later market consolidation.

[14] It is feasible, but unlikely given the limited variation and the small number of firms in our data, that such a relationship could also result from an effect supported in the psychology literature that suggests that consumers' decisions become less efficient when the number of

correlation coefficient of 0.04 between the number of regional competitors and the self reported influence of a sales agent.

Formally, the two estimation procedures are repeated with the replacement of the previous test variables, $agent_i$ and $conned_i$, with the new test variable, n_i, measuring each consumer's number of regional competitors[15]. As the estimated effects of the remaining variables differ very little from those reported previously in Tables 5 and 6, only the estimated effects of the test variable are displayed in Tables 7 and 8. The full estimation results for the two procedures can be viewed in Tables A2 and A3 within the appendix.

Table 7: Estimated Marginal Effects of the Number of Regional Competitors on the Probability of Switching to Make a Positive Gain[16]

	Jun-00 No Method Change		*Jun-00 Method Change*		*Oct-99 No Method Change*		*Oct-99 Method Change*	
pos. gain | sw	M.Effect	z	M.Effect	z	M.Effect	z	M.Effect	z
n	-0.04	-0.90	-0.05	-1.27	-0.06	-1.47	-0.06	-1.66

Table 8: *Estimated Marginal Effects of the Number of Regional Competitors on the Actual Gains Made from Switching*

	Jun-00 No Method Change		*Jun-00 Method Change*		*Oct-99 No Method Change*		*Oct-99 Method Change*	
gains | sw	M.Effect	z	M.Effect	z	M.Effect	z	M.Effect	z
n	-4.04	-2.65**	-4.23	-2.73**	-2.61	-1.74	-3.34	-2.27*

While there is no reported relationship between the number of regional competitors and the probability of switching to make a positive gain, Table 8

options increases, due to the increased decision complexity (Iyengar and Lepper 2000, Swait and Adamowicz 2001a, b).

[15] Both the number of competitors and the maximum gains can be included as explanatory variables, since they have a negligible correlation of between 0.02 and 0.03 across specifications.

[16] Significance denoted at 5% by * and at 1% by **.

indicates that in three of the four specifications, consumers appear to appropriate relatively less of the maximum gains available to them in regions with a higher number of suppliers. The increased number of suppliers may force firms to expand their mis-selling activity in order to profit from increasing the inaccuracy of consumers' switching decisions. However, this effect is also consistent with several other explanations. Much of the variation in the number of regional competitors arises from the relative lack of market entry into the two Scottish electricity regions. Consequently, the result may also be consistent with the effects of some unobserved characteristic of the firms or consumers within the Scottish markets. Indeed, as Table A4 in the appendix shows, adding a dummy variable to represent switching decisions made within the Scottish markets removes the formerly reported relationship with the number of competitors. With this limitation in mind, and given the insignificance of the previous self-reported test variables, we can only conclude that mis-selling activities do not appear to be a satisfactory explanation of the inefficiency of consumers' choices within this dataset. Consequently, the only remaining explanation of consumers' poor choices appears to involve the existence of pure decision errors, which could result from the inherent complexities of the market in question.

5. Conclusion

By using two independent datasets from the UK electricity market this paper has suggested that the capacity of consumers to efficiently choose between suppliers may be substantially limited. While stressing that the results are not representative of the general population, we find that, by switching suppliers, consumers only appropriated between 26-39% of the maximum gains available to them. Such behaviour is wholly consistent with the presence of high search costs, yet, in contrast to this explanation we also find that 27-38% of consumers actually lost surplus as a result of switching. Such a failure of consumers to accurately compare between alternative suppliers can damage their welfare, both directly through sacrificed gains, and indirectly, by

delivering an increased source of market power to firms. Indeed, together with the better known effects of switching costs, such consumer behaviour may seriously impede the competitive process, even after a market has been liberalised or has been made subject to standard competition policy, echoing recent arguments by Waterson (2003) and others.

After a brief analysis, this paper has rejected an explanation suggesting that firms' misleading sales activities may have been responsible for the inaccuracy of consumers' choices. The gains made by consumers are reported to be insignificantly related to the self-reported influence of a sales agent, or to the increased sales activity that may result from an increased number of regional competitors. Instead, consumers' poor choices seem more consistent with an explanation of pure decision error, perhaps as a consequence of the particularly complex market environment involving the use of complicated non-linear tariffs. Following the recent advances made by Gabaix and Laibson (forthcoming) and Spiegler (forthcoming), future research would be useful in further understanding the possibly anti-competitive effects of confusing tariff and price structures and whether policy, if at all, should regulate their use.

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Appendix:

Table A1: *Descriptive Statistics of the Gain Measures across the Four EA Dataset Specifications using only those Consumers with Stable, Perfectly Price Inelastic Consumption*

Tariff Period	June 00		June 00	
Adjusted for Method Change?	No		Yes	
	Average	(StDev)	Average	(StDev)
Number of Switchers	319		319	
Average Maximum Gains Available (annual, £)	46.19	(42.58)	44.43	(44.61)
Average Random Gains Available (annual, £)	11.17	(30.71)	9.40	(34.26)
Average Actual Gains Made (annual, £)	14.59	(33.77)	12.83	(35.85)
Average Random Gains/Average Maximum Gains	0.24		0.21	
Average Actual Gains/Average Maximum Gains	0.32		0.29	
Proportion of Switchers with Perfect Gain	0.08		0.08	
Expected Proportion if Random Alternative Selected	0.07		0.07	
Proportion of Switchers with Non-Negative Gain	0.73		0.67	
Average Gain given Non-Negative Gain	24.86	(32.74)	28.43	(33.81)
Proportion of Switchers with Negative Gain	0.27		0.33	
Average Gain given Negative Gain	-13.67	(15.60)	-15.22	(17.84)

Tariff Period	Oct 99		Oct 99	
Adjusted for Method Change?	No		Yes	
	Average	(StDev)	Average	(StDev)
Number of Switchers	319		319	
Average Maximum Gains Available (annual, £)	41.49	(42.61)	39.21	(39.88)
Average Random Gains Available (annual, £)	8.71	(29.41)	7.12	(28.32)
Average Actual Gains Made (annual, £)	16.33	(39.98)	14.74	(37.02)
Average Random Gains/Average Maximum Gains	0.21		0.18	
Average Actual Gains/Average Maximum Gains	0.39		0.38	
Proportion of Switchers with Perfect Gain	0.10		0.10	
Expected Proportion if Random Alternative Selected	0.07		0.07	
Proportion of Switchers with Non-Negative Gain	0.70		0.67	
Average Gain given Non-Negative Gain	29.58	(39.51)	29.86	(34.30)
Proportion of Switchers with Negative Gain	0.30		0.33	
Average Gain given Negative Gain	-14.44	(18.27)	-16.50	(18.01)

Table A2: Estimation of the Probability of Making a Positive Gain (2) [17]

	June *No Method Change*		*June* *Method Change*		*October* *No Method Change*		*October* *Method Change*	
sw	M.Effect	z	M.Effect	z	M.Effect	z	M.Effect	z
n	0.01	1.05	0.01	1.07	0.01	1.05	0.01	1.07
gainmax	0.00	1.87	0.00	1.38	0.00	1.70	0.00	0.89
highsoc	0.02	0.92	0.02	0.94	0.02	0.94	0.02	0.97
midsoc	0.00	-0.05	0.00	-0.03	0.00	-0.03	0.00	0.00
highinc	-0.01	-0.55	-0.01	-0.54	-0.01	-0.51	-0.01	-0.50
lowinc	0.00	0.30	0.00	0.32	0.00	0.30	0.00	0.32
incref	-0.01	-0.89	-0.01	-0.87	-0.01	-0.87	-0.01	-0.86
age	0.00	1.01	0.00	1.02	0.00	0.97	0.00	0.97
age2	0.00	-0.92	0.00	-0.92	0.00	-0.87	0.00	-0.88
disable	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06
single	-0.03	-2.15*	-0.03	-2.18*	-0.03	-2.23*	-0.03	-2.25*
exmar	-0.01	-0.59	-0.01	-0.62	-0.01	-0.61	-0.01	-0.66
arrears	0.01	0.49	0.01	0.50	0.01	0.49	0.01	0.50
gassw	0.15	8.62**	0.15	8.63**	0.15	8.62**	0.15	8.63**
nogas	-0.04	-2.84**	-0.04	-2.80**	-0.04	-2.85**	-0.04	-2.76**
rent	-0.03	-2.54*	-0.03	-2.56**	-0.03	-2.55**	-0.03	-2.56**
Pr(sw=1, loss=1)	0.50		0.44		0.62		0.65	
pos gain | sw								
n	-0.04	-0.90	-0.05	-1.27	-0.06	-1.47	-0.06	-1.66
gainmax	0.01	4.42**	0.01	5.17**	0.01	5.09**	0.01	4.76**
stable	-0.04	-0.63	-0.04	-0.65	-0.07	-1.11	-0.08	-1.13
highsoc	-0.08	-0.75	-0.09	-0.86	-0.05	-0.51	-0.16	-1.44
midsoc	-0.11	-1.25	-0.12	-1.39	-0.18	-2.04*	-0.29	-3.01**
highinc	-0.18	-1.61	-0.16	-1.50	-0.10	-0.86	-0.16	-1.29
lowinc	-0.07	-0.81	-0.03	-0.39	-0.02	-0.17	-0.05	-0.61
incref	-0.05	-0.51	-0.03	-0.29	-0.05	-0.54	-0.03	-0.31
age	0.00	0.21	-0.01	-0.89	0.01	0.63	0.01	0.69
age2	0.00	-0.41	0.00	0.66	0.00	-0.44	0.00	-0.57
disable	-0.04	-0.53	-0.06	-0.90	0.05	0.65	-0.04	-0.50
single	-0.16	-1.69	-0.16	-1.76	-0.13	-1.20	-0.30	-2.55**
exmar	0.03	0.37	0.07	0.82	-0.08	-0.89	-0.03	-0.39
rent	-0.17	-2.52*	-0.18	-2.53*	-0.12	-1.63	-0.17	-2.06*
Summary Statistics								
n	319/2930		319/2930		319/2930		319/2930	
Log-Lik	-1078		-1078		-1072		-1060.9	
LR(14)	40.7**		75.9**		72.2**		105**	
McF R2	0.02		0.03		0.03		0.05	
rho	0.33		0.37		0.17		0.10	
LR	1.84		2.35		0.39		0.13	

[17] All significant tests are indicated by * for the 5% level and by ** for the 1% level. Where applicable, coefficients are relative to the base case of a consumer who is married, of low social class and with middle income. The LR (.) statistic tests the joint significance of all the second stage coefficients. Rho refers to the estimated correlation between the two equations' error terms, which is then tested to be significantly different from zero by a LR test.

Table A3: Estimation of the Gains Made From Switching (2) [18]

	Jun-00 No Method Change		*Jun-00 Method Change*		*Oct-99 No Method Change*		*Oct-99 Method Change*	
sw	M.Effect	z	M.Effect	z	M.Effect	z	M.Effect	z
n	0.01	1.05	0.01	1.07	0.01	1.05	0.01	1.07
gainmax	0.00	1.87	0.00	1.38	0.00	1.70	0.00	0.89
highsoc	0.02	0.92	0.02	0.94	0.02	0.94	0.02	0.97
midsoc	0.00	-0.05	0.00	-0.03	0.00	-0.03	0.00	0.00
highinc	-0.01	-0.55	-0.01	-0.54	-0.01	-0.51	-0.01	-0.50
lowinc	0.00	0.30	0.00	0.32	0.00	0.30	0.00	0.32
incref	-0.01	-0.89	-0.01	-0.87	-0.01	-0.87	-0.01	-0.86
age	0.00	1.01	0.00	1.02	0.00	0.97	0.00	0.97
age2	0.00	-0.92	0.00	-0.92	0.00	-0.87	0.00	-0.88
disable	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06
single	-0.03	-2.15*	-0.03	-2.18*	-0.03	-2.23*	-0.03	-2.25*
exmar	-0.01	-0.59	-0.01	-0.62	-0.01	-0.61	-0.01	-0.66
arrears	0.01	0.49	0.01	0.50	0.01	0.49	0.01	0.50
gassw	0.15	8.62**	0.15	8.63**	0.15	8.62**	0.15	8.63**
nogas	-0.04	-2.84**	-0.04	-2.80**	-0.04	-2.85**	-0.04	-2.76**
rent	-0.03	-2.54*	-0.03	-2.56**	-0.03	-2.55**	-0.03	-2.56**
gains | sw								
n	-4.04	-2.65**	-4.23	-2.73**	-2.61	-1.74	-3.34	-2.27*
gainmax	0.01	19.74**	0.01	21.15**	0.01	25.84**	0.01	23.32**
stable	0.80	0.30	0.76	0.28	-0.78	-0.30	-0.80	-0.31
highsoc	-4.56	-1.06	-3.19	-0.73	-2.67	-0.63	-1.99	-0.48
midsoc	-3.70	-1.01	-3.62	-0.98	-3.97	-1.10	-5.34	-1.51
highinc	-12.79	-2.79**	-12.29	-2.63**	-2.52	-0.55	-1.87	-0.42
lowinc	-3.60	-1.02	-4.25	-1.19	2.41	0.69	3.27	0.95
incref	-9.98	-2.61**	-9.99	-2.57**	-4.64	-1.22	-1.72	-0.46
age	-0.08	-0.17	-0.33	-0.71	0.32	0.70	0.17	0.37
age2	0.00	0.02	0.00	0.58	0.00	-0.47	0.00	-0.14
disable	-4.54	-1.63	-4.18	-1.48	-6.39	-2.31*	-6.41	-2.37*
single	-7.31	-1.71	-6.52	-1.49	-1.50	-0.36	-4.64	-1.12
exmar	-1.13	-0.34	-1.08	-0.32	0.16	0.05	-1.16	-0.35
rent	-4.22	-1.42	-2.91	-0.97	-6.78	-2.30*	-5.76	-1.99*
Summary Statistics								
n	319/2930		319/2930		319/2930		319/2930	
Log-Lik	-3794		-3799		-3793		-3786	
LR(14)	267**		295**		375**		337**	
McF R2	0.03		0.04		0.05		0.04	
rho	-0.02		-0.06		0.04		-0.07	
LR	0.02		0.07		0.05		0.15	

[18] All significant tests are indicated by * for the 5% level and by ** for the 1% level. Where applicable, coefficients are relative to the base case of a consumer who is married, of low social class and with middle income. The LR (.) statistic tests the joint significance of all the second stage coefficients. Rho refers to the estimated correlation between the two equations' error terms, which is then tested to be significantly different from zero by a LR test.

Table A4: Estimating the Gains Made From Switching with a Scottish Dummy[19]

	Jun-00 *No Method Change*		*Jun-00* *Method Change*		*Oct-99* *No Method Change*		*Oct-99* *Method Change*	
sw	M.Effect	z	M.Effect	z	M.Effect	z	M.Effect	z
n	0.01	1.05	0.01	1.07	0.01	1.05	0.01	1.07
gainmax	0.00	1.87	0.00	1.38	0.00	1.70	0.00	0.89
highsoc	0.02	0.92	0.02	0.94	0.02	0.94	0.02	0.97
midsoc	0.00	-0.05	0.00	-0.03	0.00	-0.03	0.00	0.00
highinc	-0.01	-0.55	-0.01	-0.54	-0.01	-0.51	-0.01	-0.50
lowinc	0.00	0.30	0.00	0.32	0.00	0.30	0.00	0.32
incref	-0.01	-0.89	-0.01	-0.87	-0.01	-0.87	-0.01	-0.86
age	0.00	1.01	0.00	1.02	0.00	0.97	0.00	0.97
age2	0.00	-0.92	0.00	-0.92	0.00	-0.87	0.00	-0.88
disable	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06
single	-0.03	-2.15*	-0.03	-2.18*	-0.03	-2.23*	-0.03	-2.25*
exmar	-0.01	-0.59	-0.01	-0.62	-0.01	-0.61	-0.01	-0.66
arrears	0.01	0.49	0.01	0.50	0.01	0.49	0.01	0.50
gassw	0.15	8.62**	0.15	8.63**	0.15	8.62**	0.15	8.63**
nogas	-0.04	-2.84**	-0.04	-2.80**	-0.04	-2.85**	-0.04	-2.76**
rent	-0.03	-2.54*	-0.03	-2.56**	-0.03	-2.55**	-0.03	-2.56**
gains | sw								
n	3.90	1.22	3.12	0.96	-3.84	-1.26	-4.38	-1.48
scotland	26.89	2.81**	24.90	2.56**	-4.23	-0.46	-3.61	-0.40
gainmax	0.01	19.92**	0.01	21.36**	0.01	25.80**	0.01	23.31**
stable	0.63	0.24	0.59	0.22	-0.78	-0.30	-0.80	-0.31
highsoc	-5.38	-1.27	-3.95	-0.91	-2.55	-0.60	-1.89	-0.45
midsoc	-4.19	-1.16	-4.09	-1.11	-3.91	-1.08	-5.28	-1.49
highinc	-12.93	-2.85**	-12.45	-2.69**	-2.59	-0.57	-1.93	-0.43
lowinc	-2.94	-0.84	-3.65	-1.03	2.39	0.68	3.25	0.95
incref	-9.95	-2.63**	-9.97	-2.59**	-4.71	-1.24	-1.78	-0.48
age	-0.06	-0.14	-0.32	-0.69	0.33	0.72	0.17	0.39
age2	0.00	-0.03	0.00	0.54	0.00	-0.49	0.00	-0.16
disable	-4.78	-1.74	-4.41	-1.58	-6.40	-2.31*	-6.43	-2.38*
single	-5.96	-1.40	-5.28	-1.22	-1.50	-0.36	-4.63	-1.12
exmar	-1.62	-0.48	-1.52	-0.45	0.18	0.05	-1.14	-0.35
rent	-4.79	-1.63	-3.44	-1.15	-6.77	-2.30*	-5.75	-1.99*
Summary Statistics								
n	319/2930		319/2930		319/2930		319/2930	
Log-Lik	-3790		-3797		-3793		-3786	
LR(15)	2745**		301**		375**		336.99	
McF R2	0.04		0.04		0.05		0.04	
rho	-0.15		-0.04		0.04		-0.08	
LR	0.01		0.05		0.05		0.15	

[19] All significant tests are indicated by * for the 5% level and by ** for the 1% level. Where applicable, coefficients are relative to the base case of a consumer who is married, of low social class and with middle income. The LR (.) statistic tests the joint significance of all the second stage coefficients. Rho refers to the estimated correlation between the two equations' error terms, which is then tested to be significantly different from zero by a LR test.