



Consumer behaviour in the British retail electricity market

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Abstract

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JEL Classification: D12, L13, L44.

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1 Introduction

Consumer activity plays a crucial role in securing effective markets. Understanding what determines consumer behaviour, and how this varies between customers, is essential to maximise the effectiveness of policies targeting consumer searching and switching. We identify the relationship between searching and switching behaviour in the electricity market, which factors determine whether people search and switch, and the variation in the effects of these factors amongst consumers who hold different attitudes. We also explore the nature of impediments to searching and switching, how these vary across consumers and the implications for regulatory policy.

When markets supplied by an incumbent monopolist are opened to retail competition and ex ante price controls are removed, the benefits of market liberalisation depend on consumers actively searching out and switching to better deals.⁴ Consequently many policy makers have active strategies to improve the levels of consumer searching and switching as an instrument to discipline the markets and deliver efficient outcomes.

Despite government efforts to promote consumer activity, the European Commission finds that consumers often fail to take advantage of potential gains available from switching supplier in liberalised energy markets (European Commission, 2010). The UK government and the energy regulator have promoted consumer empowerment and activity, constraining the tariffs which companies may offer to simplify consumer choice and stimulate activity. In the UK levels of switching have continued to fall to their lowest level since records began a decade ago (12% in the year up to the first quarter of 2013, compared with 20% four years earlier⁵), suggesting growing obstacles to consumer activity in the market.

We base our analysis on the concept of a consumer choosing rationally between inaction and action, and introduce the potential for heterogeneity in consumer type, exploring novel aspects of the consumer decision to exercise choice. Firstly, we distinguish between searching and switching as two different, but potentially related, consumer decisions, and identify the strength of this relationship within different consumer groups. Secondly, by using survey data we are able to incorporate consumers' own beliefs about their potential gains and costs of interacting with the market, and we separate the direct effects of demographic characteristics from their indirect influence on consumer expectations. Thirdly, we explore

⁴Consumer behaviour plays a vital role in competition policy (e.g. Prendergast, 2002; Waterson, 2003; Wilson and Waddams Price, 2010) because the way in which consumers search and eventually switch provider can have a substantial impact on market power and competition.

⁵Source Department of Energy and Climate Change Quarterly domestic energy switching statistics (QEP 2.7.1)

whether consumers behave differently in searching and switching electricity supplier according to their more general attitudes to purchasing, and whether these in turn influence how strongly different factors affect behaviour. Finally, we discuss the implications of our findings for the design and implementation of policies to encourage consumer activity.

Our unique data set, from a specially designed survey conducted in January 2011, includes information about search and switching behaviour in the electricity market, general attitudes to markets and consumption and specific views on the electricity market, socio-economic characteristics, and consumers' own beliefs about potential gains and the time and effort required to search and switch supplier. We analyse the data in two stages, first using cluster analysis to identify three different groups of consumers according to their general consumption attitudes. We then investigate the determinants of consumer activity in the electricity market within each group, how closely searching and switching activity are related and the patterns of causality within each group.

The first main result of the paper is the heterogeneity in consumers' choices. We find that consumers do indeed behave differently according to their attitudes. Our analysis at group level reveals different determinants of consumer activity, compared with examining the pooled data (which is equivalent to considering an average representative consumer in the market), which has been the main focus of the literature on consumers' switching decisions in energy markets. Across the group as a whole, the main determinants of searching and switching together are similar to those found in other studies, with expected gain, confidence, experience of switching in other markets and internet use all affecting activity. But only expected gain is significant for all of the three groups (though with different strengths), demonstrating both the importance of this factor and the variability in the effect of other determinants.

Within groups, we focus on the role of consumer expectations and confidence in the electricity market and experience in other markets, demographic characteristics and contact with marketing and information sources. The second key result of the paper is that we find differences not only in the propensity of the different groups to search and switch, but also in the strength of the relationship between the activities, and in whether and how strongly individual factors influence each of them.

Our findings inform the debate on developing appropriate policies to encourage consumer activity, and indicate that a variety of policies are required to stimulate market activity effectively across all groups. The results suggest that relying on consumers' activity to promote competition in the retail electricity market has limitations, and that a more nuanced understanding of how different types of people behave will provide policy makers with better

instruments to increase activity and improve market outcomes.

1.1 Relevant Literature

There are behavioural explanations for low consumer activity in energy markets, such as a status quo bias toward the incumbent firm (Samuelson and Zeckhauser, 1988). Some consumers lack experience in searching and switching to better deals, others may lack interest or capacity, and some may expect prices to be similar regardless of the supplier they choose, either because they believe that the market is competitive or because they suspect explicit or tacit collusion between suppliers.

Much of the recent empirical literature on search and switching costs focuses on whether consumers behave as if they face such barriers, and findings indicate significant costs in markets as diverse as credit cards (Stango, 2002), phone services (Shi et al., 2006; Park, 2011), and automobile insurance (Israel, 2005). Regarding confidence, Pirinsky (2013) shows that confidence is positively related to willingness to take risk and participate in competitive interactions. Many studies do not distinguish between search and switching costs, but we follow Wilson (2012) and Honka (2013) in analysing the two actions separately but simultaneously. We also explore the roles of confidence, though (unlike Pirinsky) at the individual level.

Several papers study consumers' switching decisions in energy. In the Swedish electricity market Garling et al. (2005) demonstrated experimentally the existence of switching inertia, and Ek and Söderholm (2008) showed that potential gains from more active behaviour are positively related to the probability of changing supplier and/or renegotiating contracts with existing suppliers. We focus on different groups of consumers rather than, as they did, on the average consumer, and we consider separately the roles of searching and switching.

Wilson and Waddams Price (2010) present evidence that consumers' capacity to choose efficiently between electricity suppliers is limited,⁶ and suggest that observed consumer behaviour may be driven by pure decision error or inattention. Sitzia et al. (2012) present experimental evidence of the importance of both complexity and inattention in an energy market context, and conclude that while easier comparisons may remove some barriers to activity, other important factors, in particular consumer inattention, are key to increasing switching performance.

⁶They use two surveys, one (Cooke et al. (2001)) conducted in 2000, and the second in 2005 (Waddams Price et al., 2013).

Waddams Price et al (2013) show persistent variations in responses both across markets and between consumers,⁷ suggesting that policies which identify potential gains and give consumers confidence in their estimates are likely to improve consumer activity. Giuliatti et al. (2005), henceforth GWW, examine switching behaviour in the deregulated UK residential natural gas market and find that longer-term savings are the main drivers of switching behaviour. We build on the framework of GWW, but focus on search and switching decisions separately rather than both decisions together.

In the next section we present our economic framework and econometric methodology, and section 3 describes the data set, variables and cluster analysis. Section 4 reports and discusses the results and section 5 concludes the paper with a discussion of policy implications.

2 Economic Framework and Econometric Methodology

Our framework builds on GWW but with two innovations. First, our unique data set allows us to identify searching and switching as separate activities by consumers rather than treating both decisions together as in the GWW model, where they are not separately identified.⁸ Second, in contrast to GWW, who focus on consumers' awareness when the British gas market first opened up to competition, we analyse a more mature market; therefore, we do not explore consumers' awareness of choice, but instead restrict our analysis to those consumers who are aware of the possibility of switching electricity provider.⁹

We model searching and switching in electricity as two different, but potentially related, consumer electricity decisions. We follow GWW in treating the individual's decision to search and switch as a comparison between the levels of utility which the consumer expects as a result of undertaking the activity compared with her present situation, but we use the consumer's own valuation of benefits rather than estimating gains 'objectively' from those available in the market. The lowest price is likely to be available to all consumers with particular demand characteristics (consumption levels, payment methods), but the *expected* value of the new situation may vary because consumers have different prior views both about the initial level of savings and their persistence relative to other possibilities in the market¹⁰. We allow for such

⁷They use the 2005 CCP consumer survey and distinguish between eight different markets.

⁸This distinction is important because the mechanisms of searching and switching frictions (e.g. search and switching costs) can provide differences in their effects upon consumer behaviour, competition and welfare (e.g. Wilson, 2012) in a mature market.

⁹In Giuliatti et al. (2005) 86% of the consumers were aware of alternative gas suppliers, while in our data set almost 93% of the consumers are aware of alternative electricity suppliers.

¹⁰Waddams Price and Zhu (2013) show that the superiority of a tariff from any one supplier is generally eroded over a period of around two years.

variations, anticipating that higher expected gains will stimulate more activity.

A consumer who is confident about her level of gain is more likely to search and switch than another with the same central expectation but greater uncertainty around that expectation. Search itself may increase confidence, so we distinguish between confidence in gains before and after searching. More general confidence may be acquired from experience, and we would expect those who have switched supplier in other similar markets, where consumers have a similar 'default' relationship with the seller to be more active in the electricity market.

The costs of searching and switching will also vary both in reality and, more importantly for our analysis, in consumers' expectations. We imagine that lower estimates of the time and difficulty involved would stimulate activity; consumers with access to online price comparison sites can scan the market much more quickly and thoroughly than those without. The *value* of time required to search and switch also varies between consumers, depending on income and employment, and on whether the process is intrinsically enjoyable or burdensome. We anticipate that variation in all these expectations of gain, confidence, time and difficulty, and the trade-off between them, affects whether consumers engage on searching for better deals and switching supplier.

While search often precedes switching, switching may occur without search, usually as a result of information about a new deal from friends/relatives or direct marketing (e.g. by telephone or doorstep selling); in this case information about the potential gain from switching is received, and may be acted on, without confirmatory search. Among consumers who do search, some may refine their estimate of potential savings after their search of the market. When consumers are deciding whether to search, they would consider the expected costs not only of the search process itself, but also the probability of eventually switching and the potential gains from switching (net of the effort and any costs of switching), if they *do* find a better deal (Wilson, 2012). However the switching process alone does not incur search costs (since search has either already occurred or is omitted), and so only anticipated switching costs are relevant in deciding whether to change supplier. We model search and switching as separate but potentially related decisions, and explore the relationship between the decisions, as well as the determinants of each.

In summary, given some stimulus, a consumer searches to find a better deal and, if she finds a better offer, she switches. Formally, consumers' decisions can be expressed as follows.

Consumer i searches if:

$$\int_0^\tau [V_i(p_n^b, \mathbf{P}, \mathbf{A}, \mathbf{X}, \mathbf{L}, \mathbf{E}) - V_i(p_c, \mathbf{P}, \mathbf{A}, \mathbf{X}, \mathbf{L}, \mathbf{E})] dt - se_i - sw_i^b > 0. \quad (1)$$

Consumer i switches if:

$$\int_0^\tau [W_i(p_n, \mathbf{P}, \mathbf{A}, \mathbf{X}, \mathbf{L}, \mathbf{Z}) - W_i(p_c, \mathbf{P}, \mathbf{A}, \mathbf{X}, \mathbf{L}, \mathbf{Z})] dt - sw_i > 0. \quad (2)$$

V_i and W_i are the expected indirect utility which consumer i receives from searching and switching, respectively. p_n is the anticipated price of the new supplier after search and superscript b denotes the equivalent before searching; thus p_n^b is the expected price before searching, p_c is the price of the current supplier, \mathbf{P} is the vector of other prices, \mathbf{A} is the vector of the consumer's attitudes, \mathbf{X} is the vector of socio-economic characteristics (including income), \mathbf{L} is the vector of information variables¹¹ and experience in other markets, \mathbf{E} is the vector of confidence variables before searching, and \mathbf{Z} is the vector of confidence variables before switching, se_i and sw_i represent the expected search and switching costs.

Equation (1) represents consumer i 's expected surplus from searching alternative suppliers in the market (including the potential gains from, probability of and cost of switching), and equation (2) represents consumer i 's expected surplus from switching itself. The expected monetary benefit from search and switching continues from the current period, $t = 0$, until time $t = \tau$ when consumer i expects the price of the new electricity provider to converge with that of alternative suppliers, or until she expects to switch again.¹² Finally, we assume that the functions V_i and W_i are separable in their arguments.

We expect the trade-offs to depend on several factors. Previous literature suggests that younger and older people are more likely to be active than the middle aged; that gender may play a role; that those who live in single adult households are generally less active in these markets; that more education increases the chance of activity, while higher income decreases it; and that those who are not in employment may be more active. People living in rented accommodation generally have less incentive to switch supplier because they expect to enjoy

¹¹Positive characteristics of an alternative supplier may induce consumers to review their current situation.

¹²Since the expected benefit from search and switching both start at 0, we allow for the possibility of switching without necessarily searching.

the benefits for a shorter time. We expect those with greater internet use to find it easier to search and switch and so be more likely to do so (though some of this effect will be captured directly in measuring the anticipated ease of search and switch).

Whether or not the respondent reports receiving information/marketing from various sources would also affect activity. Each source of information may portray positive attributes of an alternative supplier which might stimulate the individual to reconsider her current situation. Each source of information recalled is therefore likely to increase switching, and search is likely to be stimulated by all such evidence except direct marketing: telephone or doorstep approaches might deter searching if they convinced the householder that a uniquely better deal was available.

Moreover consumer attitudes to markets are likely to change the nature of the relationships between variables, rather than merely shift the probability of activity. They may also be correlated with the other variables in the equation. We therefore divide our sample into three groups, using responses to five questions which invite (dis)agreement with statements which are likely to affect activity in markets, and particularly the trade-off between potential monetary gain and effort involved in realising such gain. One question asks about general attitudes to markets: we would expect those who look around for bargains to be more likely to search and switch in electricity. Two questions ask about time constraints, which we would expect to deter activity in the market. Activity would also be deterred by loyalty, which is the subject of the final two questions. Rather than explore the individual effect of each of these variables we use them to classify respondents into groups, and we then identify the underlying relationships between the other variables within each group.

Our estimation strategy therefore consists of two steps. First, we perform cluster analysis to identify three groups of consumers according to their attitudes. The second step is to model, separately for each group, consumers' self reported activity in searching and switching electricity supplier as a potential two-stage decision process, using a latent variable model.

Since both search and switching decisions may be related for some consumers, we apply the bivariate probit model with partial observability (Meng and Schmidt, 1985) within each group of consumers, so that whether the consumer searches ($y_1 = 1$) and switches ($y_2 = 1$) electricity supplier takes the following form:

$$Pr(y_1 = 1, y_2 = 1) = \Phi(M\beta_1, N\beta_2, \rho) \quad (3)$$

The vector M includes socio-economic characteristics, information variables, experience in switching in other markets, the expected time for searching and switching, the expected ease of searching and switching, expected gains and confidence in those gains, all estimated before search is undertaken. N includes the same variables, evaluated after search and before switching, with the omission of expected time and ease of search. (Where no search is undertaken, relevant expectations are the same in M and N). Finally, ρ is the correlation coefficient between the residuals of each of the two probits (one for search activity and the other for switch).

3 Data Set and Cluster Analysis

Our household survey was administered through face-to-face interviews with a representative sample of 2537 adults aged 16 and over in Great Britain in January 2011. From this group we analyse 1992 responses from those who are aware that they can choose their electricity supplier and who are (solely or jointly) responsible for making that choice.

Dependent variables. A binary dependent variable, *search*, takes the value of 1 if the respondent reports that during the last three years she explored the possibility that another electricity supplier could offer a better deal, and takes the value 0 otherwise. A second binary dependent variable, *switch*, takes the value of 1 if the respondent reports changing electricity supplier during the same period, and takes the value 0 otherwise.¹³

Socio-economic variables. We use socio-economic variables to control for observable differences between respondents, including *age*, *gender*, *partner status* and *number of adults*. Information about whether the house is in a *rural area*, *internet use* and *tenure status* for each respondent are also included. To avoid anticipated reluctance to provide income information and consequent missing observations, we construct a variable, *proxy income*, to capture the respondent's perception of the tightness of her budget. *Educational* and *employed status* were each included as binary variables.

Attitude variables. Respondents were asked how far they agreed with five statements on general attitudes to markets. Each statement had six options, and was coded -1 if the respondent disagreed (strongly or unspecified), 1 if she agreed (strongly or unspecified) and 0 if she neither agreed nor disagreed or did not know. General market attitude was measured by agreement with the statement "When making bigger purchases (e.g. holidays or furniture) I

¹³We exclude the possibility of changing supplier as a result of moving house since such a choice represents a different decision process.

usually spend quite a lot of time looking around for deals that might save a few pounds" (*big bargain hunter*). To assess time constraints, respondents were asked to rate: "I don't really have the time to spend looking around for deals that might save a few pounds" (*gain/time*) and "Life is too short to keep worrying about whether you are getting the best deal around" (*life too short*). Two statements measured 'loyalty', namely "Once I find a product or service that I think is OK, I tend to stick with it" (*status quo*) and "I would be upset if I purchased a product or service and later found out that I could have got a better deal" (*feel regret*).

Information/marketing variables. Respondents were asked whether they recalled receiving information or marketing from a range of potential sources, including: advertising by other electricity suppliers (such as on the internet, billboards, newspapers, magazines etc.); direct marketing by telephone and by home visits; approaches in public places; direct mailing (post or email); or information from friends or family about a better deal from another electricity supplier. Each of these was represented by a binary variable where 1 indicates such communication was received, and 0 that the respondent does not recall any message in this category.

Expectations. Respondents were asked how much money they had expected to save per year by changing supplier, distinguishing between their expectations before and after they had looked around for better deals, and generating variables *presearchexgain* and *preswitchexgain* respectively. We also asked how confident the respondents were of those expected gains. We create binary variables for confidence about each of these alternatives: *confidpresearch* and *confidpreswitch*.

Participants were asked how long they expected to have to look around to identify a better deal and the time they expected it would take to change electricity supplier once they had found one. We identify the amount of time anticipated before each activity took place as *presearchextime* and *preswitchextime*, respectively¹⁴. Expectations about ease or difficulty of the searching/switching process are captured by the binary variables *presearchexeasy* and *presearchexeasyswitch*.

Only forty per cent of respondents could provide estimates of these key variables of expected gains, time, ease and confidence, so the numbers of complete observations dropped to 812. Unsurprisingly the different groups experienced different rates of attrition, and we discuss below the implications for assessing the results.

¹⁴We were unsuccessful in our attempts to distinguish between expectations of switch time before and after searching.

Switching experience. Respondents were asked whether, during the previous twelve years, they had changed the supplier of various other services, namely mobile telephone, broadband or dial-up internet, fixed-phone line rental, fixed phone calls package, car or home contents insurance, bank account or mortgage. The variable 'switch other' took the value 1 if such a change had been made in any of these markets, and 0 otherwise.

3.1 Clustering

We used Ward's method¹⁵ to identify three groups of consumers, which we denote G1, G2 and G3, according to their general consumption attitudes, as shown in table 1 below.

Table 1: Clusters in groups G1, G2 and G3

	G1	G2	G3	Whole Sample
<i>Attitudes used for grouping</i>				
Big bargain hunter	0.97	0.99	0.06	0.63
Gain/time	-0.80	0.99	0.31	0.09
Life too short	0.01	0.44	0.77	0.41
Status quo	0.68	0.86	0.94	0.83
Feel regret	0.93	0.89	-0.11	0.52
<i>Attitudes to electricity market</i>				
Same price	0.21	0.56	0.62	0.46
Regular search	-0.35	-0.54	-0.77	-0.56
<i>Activity in the electricity market: proportion which</i>				
Searched	0.41	0.29	0.19	0.290
Switched	0.37	0.26	0.23	0.286
<i>Number of observations</i>	708	522	762	1992

Such a grouping process which clusters similar responses together results in some extreme values for the variables within each group. Members of G1 are less likely¹⁶ to stick with a product/service and more likely to have time to look around for better deals. Those in G2 are likely to stick with a product/service and have little time to look around for better deals. Members of G3 are most likely to stick with a product/service and least likely to spend time looking around when making big purchases.

¹⁵This is a standard hierarchical agglomerative linkage method, in which the fusion of two clusters is based on the size of an error sum-of-squares criterion. For details see Everitt et al. (2011).

¹⁶Our comparison of the groups is restricted to variables which are significantly different at 1%.

The groups' views of the electricity market mirrored their more general attitudes (though only the latter were used to assign respondents to groups): the first group expects to find price differences between suppliers, while the second and third groups expect prices to be similar. Probably as a consequence of these expectations, the first group is more likely to check the electricity deals available regularly, and is more likely to have searched and switched. Switching is least prevalent in group 3, but members of group 3 are not significantly less likely to search for better deals than group 2. While higher proportions of groups 1 and 2 have searched than have switched, more in group 3 have switched than searched, perhaps indicating greater responsiveness to direct marketing approaches (though they do not recall more such approaches than other respondents). These observations demonstrate the considerable heterogeneity between groups in these respects, reported in Table 4 in the Appendix.

The expectations of potential gain and the time required and ease of search and switching show little significant variation between groups, but G1 showed more confidence in their estimations of gains. More importantly, the groups differ in their ability to provide estimates of the time anticipated for searching and switching, the ease of these activities, the potential gains available and their confidence in the estimates of the gains. Just over half of G1 provided all the necessary estimates, while only 42% of G2 and 31% of G3 did so. Consequently the subgroups for which we are able to perform the full analysis are an unrepresentative subset of each of their respective groups. The characteristics of the subgroups are shown in table 5 in the Appendix, and the tests of significant differences relative to their corresponding parent group are reported in table 1 of the Supplemental Material. The subset which provided these estimates, who we refer to as G1a, G2a and G3a respectively, were, not surprisingly, each more active than their respective 'parent' groups: fewer expected the same price and more undertook regular search. Such selectivity affects how we should interpret the results.

Those who could provide responses for all questions reported that they had expected significantly higher gains before they started searching, but in most other respects the subgroups expressed similar expectations to those in their respective full group¹⁷. In terms of demographics, the included subgroup G1a contained a higher proportion of men and is younger on average than its rather female dominated parent group; subgroups 2a and 3a have had more years of formal education than their respective full groups. Across the groups, a larger proportion of the included subgroup is in employment, and members use the internet more frequently than in the respective parent group. In group 3, a larger proportion of those included own their own house.

¹⁷Of course this assessment is complicated by missing values; however many respondents could answer some but not all the questions, enabling some comparison.

Some attitudes also vary between the full and included subgroups. Fewer in subgroup 1a stick to products they like and think that life is too short to worry about getting the best deal than in group 1 as a whole. Across the whole sample fewer in the included subgroups than in their full groups believe electricity prices are similar, and more report that they are regular searchers: subgroups are more active, both in the electricity and in other markets, than their respective parent groups. Many of these selection biases are unsurprising, and we consider the implications of these differences in reporting and discussing the results in the next section.

4 Results

The *heterogeneity* between the groups described above is reflected in differences in the members' search and switching behaviour, as shown in the results displayed in table 4. First we note that the estimated correlation coefficients of the residuals ($\hat{\rho}$) are positive and statistically significant for all groups, demonstrating that consumers are more likely to switch once they have searched for alternative deals. However the estimated correlations are low, indicating a *weak* correlation between searching and switching decisions. The strength of the relationship between search and switching for G1a is the lowest among groups; this group searches regularly and will switch only when they find a good deal; they are less likely to do so since they are probably already on relatively favourable contracts. G3a exhibits low search, consistent with their expectation that prices from different suppliers in the electricity market are similar. Moreover G3a consumers feel least regret at 'bad' decisions, so members of this group may switch provider without confirmation that they are getting the best deal available. Consequently, once they have searched. consumers in both G2a and G3a are more likely to switch than those in G1a.

The only consistently significant explanatory variable for activity across all three groups is the positive effect of anticipated gains on switching. But the marginal effect varies between groups and is twice as high in G1a as G2a, which, in turn, is more than twice as high as for G3a. The relationship is quadratic in all groups, so that the marginal effect of gains declines with the size of the gains. Confidence in the gain has a significant effect (at 1%) on search and switch only for G2a; it seems that G1a are active searchers and G3a tend to be inactive, regardless of confidence in potential gains. Experience of switching in other markets is also likely to boost confidence, and this effect is clear within G1a (which has higher levels of both experience and confidence) but not within the other groups.

Expected search and switching time does not influence the relevant activity, and anticipated ease of search and switch has little effect within any of the sub-groups. Very few

socio-economic characteristics are significant in influencing searching and switching behaviour; men are more likely to switch in group 1a (which has a smaller proportion of men than the other groups); the familiar U-shaped age curve, with the middle aged least active, appears only weakly in group 3a and education has little significant marginal effect. Only in sub-group 1a are respondents living with a partner more likely to be active in the market; and only in group 3a are those not working more likely to search. More frequent internet use increases activity among group 1a and, to a lesser extent, group 3a, but has no effect within group 2a; although this group expect some price differences among electricity suppliers, using internet more often does not increase the probability of searching and switching, presumably because they do not have time to look around.

Few marketing strategies affect market behaviour, and the effect sometimes seems to be perverse. Direct marketing by telephone seems to slightly deter activity in G3a, and doorstep selling has a similar effect on search in G1a and switching in G2a. Consumers in G1a are more likely to search when they receive information about potential better deals from friends and family.

We performed the same analysis with the pooled sub-groups, both with and without dummies to represent the different groups, to check the effect of grouping our observations: results are reported in tables 4 and 5 in the appendix. The correlations between the residuals showed a significant but weak relationship between the decisions; expected gain had a significant positive marginal effect both on search and switching activity, as did confidence in the level of potential gain. The only other significant variable for the pooled sample was internet use. The significance of some of these variables declined slightly with the inclusion of group dummies (G3a as a baseline): the dummy associated with group 1a was positive and significant at 1%, but the dummy associated with group 2a did not have a significant 'marginal effect'. Our analysis of groups has clearly revealed some important differences between the groups which are obscured by use of pooled data, even when using dummies to distinguish between groups.

Results for the Bivariate Probit Model

Variable	G1a			G2a			G3a		
	Search	Switch	dy/dx	Search	Switch	dy/dx	Search	Switch	dy/dx
gender	0.311**	-0.173	0.017	0.167	-0.337	-0.035	0.229	0.002	0.034
age	0.019	0.032	0.011	0.004	-0.019	-0.003	-0.026	-0.084**	-0.013*
age ²	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001**	0.000
educ	0.668***	-0.178	0.067	0.156	0.129	0.046	-0.112	-0.316	-0.049
house area	0.101	-0.035	0.011	0.382	-0.080	0.045	-0.206	0.233	-0.002
marital status	0.313	0.188	0.096*	-0.156	0.242	0.023	-0.299	-0.146	-0.064
employed status	0.229	0.069	0.057	-0.186	-0.112	-0.048	-0.510**	-0.182	-0.097*
internet use	0.410*	0.257	0.123**	-0.148	0.441	0.062	0.545*	0.229	0.094***
adults	-0.056	-0.028	-0.017	0.053	0.143	0.033	0.032	-0.093	-0.005
tenure	-0.129	-0.264	-0.084	0.121	-0.456	-0.059	0.239	0.151	0.049
proxy income	-0.016	-0.007	-0.005	0.122	0.129	0.041	-0.068	-0.127	-0.024
advertising	0.034	-0.252	-0.049	-0.197	-0.257	-0.077	0.257	-0.255	0.013
telephone	0.090	-0.056	0.004	0.016	0.162	0.031	-0.315	-0.266	-0.072*
doorstep	-0.308*	0.021	-0.051	0.135	-0.515**	-0.069	-0.175	-0.054	-0.032
public place	-0.159	-0.048	-0.004	0.081	0.310	0.068	-0.106	0.059	-0.010
mail/email	0.206	-0.125	0.009	-0.295	-0.079	-0.056	0.215	0.136	0.047
friend	0.316*	-0.266	-0.010	0.374	-0.181	0.014	0.263	-0.412	-0.012
switch other	0.871***	0.683**	0.241***	0.455	0.321	0.106*	-0.059	-0.459	-0.058
presearchexgain	0.002		0.0003	0.006***		0.0009**	0.008***		0.001***
presearchexgain ²	-0.000001		0.0000002	-0.00001**		-0.000002**	-0.00002**		-0.000002***
preswitchexgain		0.0073***	0.002***		0.006***	0.001***		0.004***	0.0004***
preswitchexgain ²		-0.00001***	-0.000002**		-0.000006**	-0.000001**		-0.000002	-0.0000002
presearchextime	0.001**		0.0003**	0.000		0.000	0.000		0.000
preswitchextime	0.001	0.000	0.000	-0.002	-0.001	0.000	0.000	0.000	0.000
presearchexeasy	0.240		0.045	0.196		0.028	0.135		0.020
presearchexeaswitch	0.290	0.226	0.000	-0.200	0.268	0.024	0.182	0.114	0.037
confidpresearch	0.020		-0.010	0.615***		0.088***	0.155		0.023
confidpreswitch	-0.056	0.367*	0.082**		0.536**	0.094***		0.210	0.022
constant	-2.887***	-2.141***		-1.482	-1.641		-0.329	1.969*	
N		360			217			235	
Prob > chi2		0.000			0.020			0.012	
Log-likelihood		-420.34			-243.75			-256.69	
$\hat{\rho}$		0.221**			0.363***			0.279**	

[] *, **, *** indicate statistical significance at the, 10%, 5% and 1% levels, respectively. dy/dx is the marginal effect on switching and searching.

Finally we address the issue of the non representative nature of the subgroups, because of the missing values in consumer estimates of the independent variables. One concern is of reverse causality: does being active in the market generate estimates of potential gains and costs, rather than the latter driving the former, despite our efforts to recover pre search estimates of anticipated gains? It is clear that each sub-group able to provide these estimates is, indeed, more active than its counterpart which cannot do so, but we still find that within each group the main driver of activity is expectations of greater gains. The only exception is within the sub-group that regularly searches (G1a), where, unsurprisingly, the size of expected gain does not affect reported searching (but does affect switching). To check the effect of the 'lost' observations, we estimated the bivariate probit model for the omitted respondents with the information available (socio-economic characteristics, information and switching experience variables), which we report in the Supplementary Material. We find much higher correlation between the residuals of the search and switch equations, confirming that the analysis omits variables which influence both activities (presumably the variables which these consumers cannot estimate). This confirms that where we can control for the expected gain and pain, we are able to identify better the individual determinants of searching and switching. However the different nature of the selected subgroups suggests that our findings apply only to the most active group, who are already well informed about the market. The omitted households are more passive, and so our conclusions represent the most 'optimistic' view of consumer activity in the market.

Our results support findings elsewhere in the literature that the strongest and most consistent driver of activity in the market is anticipated gain, and we confirm that not only objective possibilities but subjective consumer expectations drive this relationship. Our separation of search and switching shows that while this is so for switching across the groups, the strength of the relationship varies between groups, and higher expected gains do not stimulate further search among a group that is already active. Our results support the findings of heterogeneity in consumer decisions identified in Waddams Price et al 2013, and Pirinsky's conclusions¹⁸ that those consumers who are more confident in the expected savings from switching electricity supplier are more likely to search and switch provider. The lack of influence of anticipated search time and difficulty confirm Sitzia et al.'s (2012) findings that reducing complexity may have a limited effect on stimulating activity in the market.

Our survey data confirm that the main driver of consumer action is a belief that savings are available, and, for some consumers with an 'intermediate' level of activity, the importance

¹⁸Pirinsky studies how confidence influence individuals' behaviour and finds that confidence is positively related to individual willingness to take risk and participate in competitive interactions.

of confidence in their estimates of these gains. While we observe that each of these sub-groups behaves in a way that might be described as 'collectively rational', our aggregate data are unable to test the rationality of any individual respondent.

5 Policy Implications

Our main finding - heterogeneity in consumer choice - suggests the need for careful analysis and targeting of policy designed to increase consumer activity. The difference in the effect of the drivers of consumer activities in the three sub-groups demonstrates the importance of designing consumer policy so that appropriate and effective stimuli are available to each group. For example, increasing potential gains will not increase searching amongst the group which regularly searches the market, and encouraging more frequent use of the internet is unlikely to stimulate activity amongst group 2, who expect price differences but have little time to search. However this group *will* be stimulated by increasing their confidence in estimates of potential gains, a factor which has no significant effect on the other two (more and less active, respectively) groups.

Perhaps most relevant for policy are the factors which do *not* significantly affect switching, in particular estimates of the time and ease of search and switching. We find that respondents are no more likely to have searched or switched if they expected the process to take longer, holding other factors constant. If these do not deter searching and switching, then policies by both the EU and the British energy regulator to ease the process of searching and switching may have disappointing effects, at least among those who are sufficiently aware of the market to have some idea of the potential gains available and time commitment required. However, if this group's confidence improves, some may increase their activity. The zero or apparently negative effect of direct marketing suggests there should be little concern about any adverse effect from the withdrawal of such approaches by the largest British energy retailers, around the time of our survey¹⁹.

Our finding that potential gains is a consistent driver in consumer activity across groups supports the idea that price differentials in the market can incentivise consumers to look for better deals (unless they are already actively doing so on a regular basis) and to switch providers when they find one.²⁰ The more consumers believe they can gain by switching, the more active they will be and, conversely, policies which reduce the price differentials will deter switching. The significant fall in switching following the introduction of the non discrimination

¹⁹See for example "Perth-based energy supplier SSE ends cold calls", <http://www.bbc.co.uk/news/uk-scotland-scotland-business-23731428>.

²⁰Hviid and Waddams Price, 2012; Waddams Price and Zhu, 2013.

clauses by Ofgem shows this effect operating in practice (Waddams Price and Zhu, 2013).

Such interventions are often predicated on grounds of fairness, as were the non-discrimination clauses. Regulators and politicians are concerned that those who are inactive in the market receive less good deals and may include a disproportionate share of more vulnerable households. Within our sample we find that the more inactive group (G3) feels less income constrained than the other two groups, though they are a little older and are less likely to be employed. They do not obviously constitute a vulnerable group, and there is little evidence on distributional grounds to support interventions which are likely to reduce switching and jeopardise competitive benefits across the market.

Our results apply to an unrepresentative sub-group of consumers who are more active than the overall group. Three fifths of the sample could not provide estimates of their own expectations of potential gains, confidence, time for and ease of switching. The less active groups who are excluded are likely to require different interventions to reach them, engage their attention and stimulate activity. By identifying different types of consumer, our analysis provides the basis for more targeted strategies to stimulate consumer activity for different types of consumers, so stimulating suppliers to offer good deals across the market.

While consumer activity is a crucial part of healthy markets, our data set and findings suggest that relying on consumer activity alone to promote competition in the retail electricity market has limitations. Most of the consumers rarely check the deals available and many consumers do not proceed to switch even if they expect that they could save money by changing supplier. Among the more alert and informed we find that searching and switching are weakly related decisions, and that using the internet more often increases the probability of switching only for some consumers. Thus, even if the government focuses on promoting the use of internet, for example through price comparison web pages, such a policy would probably have only a small effect on switching electricity provider. Policy makers need to develop a more sophisticated understanding of what motivates consumers if they are to stimulate activity effectively in competitive markets. Rather than blanket policies, which may be better for headlines, agencies should instead ensure that they understand differences and target a variety of interventions carefully at particular groups.

References

Ek, K., and P. Söderholm, 2008. "Households' switching behavior between electricity suppliers in Sweden", *Utilities Policy*, 16, pp. 254-261.

European Commission, 2010. The functioning of the retail electricity markets for consumers in the European Union, Commission Staff Working Paper.

Everitt, B., S. Landau, M. Leese, and D. Sthal, 2011. "Cluster Analysis 5th Edition", Wiley Series in Probability and Statistics.

Gärling, T., A. Gamble, and E. Asgeir Juliusson, 2008. "Consumers' switching inertia in a fictitious electricity market", *International Journal of Consumer Studies*, 32, pp. 613-618.

Giulietti, M., C. Waddams Price, and M. Waterson, 2005. "Consumer Choice and Competition Policy: A Study of UK Energy Markets", *The Economic Journal*, 115, pp. 949-968.

Giulietti, M., M. Waterson, and M. Wildenbeest, 2013. "Estimations of search frictions in the British electricity market", forthcoming in *Journal of Industrial Economics*.

Hedeström, T., H., Svedsäter, and T. Gärling, 2004. "Identifying heuristic choice rules in the Swedish Premium Pension Scheme", *Journal of Behavioral Finance*, 5, pp. 32-42.

Honka, Elisabeth, 2013. "Quantifying Search and Switching Costs in the U.S. Auto Insurance Industry", available at SSRN: <http://ssrn.com/abstract=2023446> or <http://dx.doi.org/10.2139/ssrn.2023446>

Hortacsu, A., S. H. Madanizadeh, and S. L. Puller, 2011. "Power to Choose: An Analysis of Consumer Behaviour in the Texas Retail Electricity Market", Mimeo.

Hviid, M., and C. Waddams Price, 2012. "Non-discrimination clauses in the retail energy sector", *Economic Journal*, 122, 236-252.

Israel, M. A., 2005. "Tenure dependence in consumer-firm relationships: An empirical analysis of consumer departures from automobile insurance firms", *RAND Journal of Economics*, 36, 165-192.

Park, M., 2011. "The Economic Impact of Wireless Number Portability", *Journal of Industrial Economics*, 59, 714-745.

Pirinsky, C., 2013. "Confidence and economic attitudes", *Journal of Economic Behavior & Organization*, 91, 139-158.

Prendergast, C., 2002. "Consumers and agency problems", *The Economic Journal*, 112, pp. C34-51.

Samuelson, W., and R. Zeckhauser, 1988. "Status quo bias in decision-making", *Journal of Risk and Uncertainty*, 1, pp. 7-59.

Sitzia, S., J. Zheng, and D. Zizzo, 2012. "Complexity and Smart Nudges with Inattentive Consumers", *CCP Working Papers* 12-13.

Shi, M., Chiang, J., and B. Rhee, 2006. "Price competition with reduced consumer switching costs: The case of "wireless number portability" in the cellular phone industry", *Management Science*, 52, 27-38.

Stango, V., 2002. "Pricing with consumer switching costs: Evidence from the credit card market", *Journal of Industrial Economics*, 50, 475-492.

Waddams Price, C., C. Webster, and M. Zhu, 2013. "Effective empowerment: Empirical estimates of consumer switching behaviour", *CCP Working Paper* no 13-11.

Waddams Price, C., and M. Zhu, 2013. "Prices and Switching in the British Electricity Market", *CCP Working Paper* no 13-12.

Waterson, M., 2003. "The role of consumers in competition and competition policy", *International Journal of Industrial Organization*, 21, pp. 129-150.

Wilson, C., and C. Waddams Price, 2010. "Do consumers switch to the best supplier", *Oxford Economic Papers*, 62, pp. 647-668.

Wilson, C., 2012. "Market frictions: A unified model of search costs and switching costs", *European Economic Review*, 56, pp. 1070-1086.

Appendix: Table 3 Variable definitions

Variable	Definition
switch	=1 if the respondent changed electricity supplier in the last three years, 0 otherwise.
search	=1 if the respondent explored deals available at other electricity suppliers in the last three years, 0 otherwise.
same price	There isn't much point in changing electricity supplier because you end up paying pretty much the same whoever you are with. =1 if agree, =0 neither agree nor disagree, =-1 if disagree.
regular search	I regularly check the deals available at other electricity suppliers to be sure that I am not paying more than I need to. =1 if agree, =0 neither agree nor disagree, =-1 if disagree.
enjoy search	I enjoy looking around for good deals. =1 if agree, =0 neither agree nor disagree, =-1 if disagree.
status quo	Once I find a product or service that I think is OK, I tend to stick with it. =1 if agree, =0 neither agree nor disagree, =-1 if disagree.
life too short	Life is too short to keep worrying about whether you are getting the best deal around. =1 if agree, =0 neither agree nor disagree, =-1 if disagree.
gain/time	I don't really have the time to spend looking around for deals that might save a few pounds. =1 if agree, =0 neither agree nor disagree, =-1 if disagree.
feel regret	I would be upset if I purchased a product or service and later found out that I could have got a better deal. =1 if agree, =0 neither agree nor disagree, =-1 if disagree.
big bargain hunter	When making bigger purchases (e.g. furniture or holiday) I usually spend quite a bit of time looking around for deals that might save a few pounds. =1 if agree, =0 neither agree nor disagree, =-1 if disagree.
gender	=1 if male, 0 otherwise.
age	in years.
education	=1 if degree, postgraduate, etc., =0 if less than degree level.
house area	=1 if non-rural, =0 if rural.
marital status	=1 if married or living with partner, =0 if single or widowed or separated or divorced.
employed status	=1 if working (part-time or full-time), =0 if not working.
adults	Number of adults in the household.
internet use	Whether internet has been used in the last week: =1 if yes, =0 if no.
tenure	=1 own home with or without mortgage, =0 if not.
proxy income	Household budget availability. =1 if very tight, =2 if tight, =3 if comfortable, =4 if very comfortable.
advertising	=1 if respondent reports seeing advertising from other suppliers, 0 otherwise.
telephone	=1 if respondent reports contact by telephone from other suppliers, 0 otherwise.
doorstep	=1 if respondent reports visit at home from other suppliers, 0 otherwise.
public place	=1 if respondent reports contact in a public place by other suppliers, 0 otherwise.
mail/email	=1 if respondent reports receiving postal mail or email from other suppliers, 0 otherwise.
friend/family	=1 if respondent reports being told about possible better deals by friends or family, 0 otherwise.
switchgainpresearch	Amount of money (£) respondent believed could be saved per year by changing supplier before looked around for better deal.
switchgainpreswitch	Amount of money (£) respondent believed could be saved per year by changing supplier.
presearchetime	Amount of time (in minutes) consumer believed it would take to find out about the deals available at other suppliers.
preswitchetime	Amount of time (in minutes) consumer believed it would take to change supplier.
confidpresearch	=1 if before search the respondent is confident about amount she expected to save per year to the nearest £5 by changing supplier, 0 otherwise.
confidpreswitch	=1 if before switch the respondent is confident about amount expected to save per year to the nearest £5 by changing supplier, 0 otherwise.
presearcheasiness	How easy/difficult search is expected to be before search. =1 if very easy and fairly easy, or =0 if fairly difficult and very difficult.
presearcheasinessswitch	How easy/difficult switch is expected to be before switch. =1 if very easy and fairly easy, or =0 if fairly difficult and very difficult.
switch other	=1 if respondent has changed provider in another market (e.g. mobile, broadband internet, car insurance, bank account, etc.) in the last twelve years, 0 otherwise.

Table 4: Descriptive Statistics of Main Groups

Variable	Obs.				Mean				Std. Dev.			
	G1	G2	G3	All	G1	G2	G3	All	G1	G2	G3	All
switch	708	522	762	1992	0.37	0.26	0.23	0.287	0.48	0.44	0.42	0.452
search	708	522	762	1992	0.41	0.29	0.19	0.291	0.49	0.45	0.39	0.454
same price	708	522	762	1992	0.21	0.56	0.62	0.46	0.90	0.76	0.71	0.81
regular search	708	522	762	1992	-0.35	-0.54	-0.77	-0.56	0.87	0.77	0.56	0.76
status quo	708	522	762	1992	0.68	0.86	0.94	0.83	0.68	0.48	0.27	0.51
life too short	708	522	762	1992	0.01	0.44	0.77	0.41	0.91	0.82	0.56	0.84
gain/time	708	522	762	1992	-0.80	0.99	0.31	0.09	0.40	0.08	0.85	0.92
feel regret	708	522	762	1992	0.93	0.89	-0.11	0.52	0.31	0.39	0.80	0.75
big bargain hunter	708	522	762	1992	0.97	0.99	0.06	0.63	0.20	0.08	0.87	0.71
gender	708	522	762	1992	0.43	0.52	0.51	0.48	0.49	0.50	0.50	0.50
age	708	522	762	1992	48.40	48.81	55.24	51.12	16.27	16.22	18.35	17.38
educ	708	522	762	1989	0.28	0.31	0.26	0.28	0.45	0.46	0.44	0.45
house area	708	522	762	1992	0.87	0.86	0.86	0.86	0.33	0.35	0.35	0.34
marital status	708	522	762	1992	0.69	0.65	0.60	0.65	0.46	0.48	0.49	0.48
employed status	708	522	762	1992	0.54	0.61	0.46	0.53	0.50	0.49	0.50	0.50
adults	708	522	762	1992	2.08	2.02	1.90	2.00	0.88	0.87	0.81	0.85
internet use	708	522	762	1992	0.80	0.78	0.62	0.73	0.40	0.41	0.48	0.45
tenure	708	522	762	1992	0.67	0.67	0.68	0.67	0.47	0.47	0.47	0.47
proxy income	699	518	751	1968	2.45	2.52	2.65	2.55	0.90	0.93	0.96	0.93
advertising	708	522	762	1992	0.70	0.68	0.61	0.66	0.46	0.47	0.49	0.47
telephone	708	522	762	1992	0.39	0.39	0.37	0.38	0.49	0.49	0.48	0.49
doorstep	708	522	762	1992	0.55	0.54	0.56	0.55	0.50	0.50	0.50	0.50
public place	708	522	762	1992	0.36	0.29	0.25	0.30	0.48	0.46	0.43	0.46
mail/email	708	522	762	1992	0.43	0.44	0.41	0.43	0.50	0.50	0.49	0.49
friend/family	708	522	762	1992	0.23	0.18	0.16	0.19	0.42	0.39	0.37	0.39
switchgainpresearch	450	278	367	1095	89.26	88.15	77.68	85.09	109.94	118.18	143.60	124.19
switchgainpreswitch	466	289	371	1126	95.64	94.44	77.04	89.20	109.82	133.68	147.23	129.47
presearchexetime	602	423	558	1583	78.22	77.27	65.88	73.61	114.36	100.05	97.57	104.99
preswitchexetime	601	418	559	1578	66.28	64.78	62.02	64.37	115.51	91.34	103.96	105.40
confidpresearch	415	253	318	986	0.74	0.64	0.64	0.68	0.44	0.48	0.48	0.47
confidpreswitch	440	267	331	1038	0.77	0.67	0.65	0.70	0.42	0.47	0.48	0.46
presearchexeasy	665	488	675	1828	0.81	0.79	0.79	0.80	0.39	0.41	0.41	0.40
Presearchexeasyswitch	666	490	685	1841	0.79	0.78	0.76	0.78	0.41	0.41	0.43	0.42
switch other	708	522	762	1992	0.89	0.83	0.75	0.82	0.32	0.37	0.43	0.38

Table 5: Descriptive Statistics of Subgroups

Variable	Mean			Std. Dev.		
	G1a	G2a	G3a	G1a	G2a	G3a
switch	0.24	0.17	0.16	0.43	0.38	0.37
search	0.26	0.17	0.13	0.44	0.38	0.33
same price	0.39	0.63	0.67	0.84	0.69	0.65
regular searcher	-0.49	-0.63	-0.80	0.80	0.71	0.52
status quo	0.77	0.87	0.94	0.58	0.47	0.26
life too short	0.18	0.43	0.77	0.89	0.82	0.55
gain/time	-0.78	0.99	0.30	0.42	0.08	0.84
feel regret	0.94	0.88	-0.10	0.29	0.43	0.80
big bargain hunter	0.98	0.99	0.01	0.15	0.08	0.86
gender	0.38	0.49	0.50	0.49	0.50	0.50
age	50.32	49.79	56.07	17.56	17.11	19.16
educ	0.27	0.25	0.23	0.44	0.43	0.42
house area	0.89	0.86	0.86	0.32	0.35	0.35
marital status	0.63	0.64	0.55	0.48	0.48	0.50
employed status	0.49	0.56	0.43	0.50	0.50	0.49
adults	2.03	2.02	1.87	0.94	0.89	0.82
internet use	0.72	0.73	0.57	0.45	0.45	0.50
tenure	0.64	0.64	0.65	0.48	0.48	0.48
proxy income	2.38	2.44	2.61	0.86	0.93	0.98
advertising	0.67	0.67	0.61	0.47	0.47	0.49
telephone	0.39	0.41	0.35	0.49	0.49	0.48
doorstep	0.51	0.50	0.54	0.50	0.50	0.50
public place	0.34	0.29	0.22	0.48	0.46	0.41
mail/email	0.38	0.44	0.40	0.49	0.50	0.49
friend/family	0.20	0.17	0.15	0.40	0.38	0.36
switchgainpresearch	54.56	53.61	49.59	86.37	89.88	147.29
switchgainpreswitch	71.99	73.19	51.95	95.64	118.92	150.46
searchtime	66.41	73.17	66.24	72.98	86.51	105.86
switchtime	62.74	60.44	60.23	102.27	72.43	114.72
confidpresearch	0.80	0.78	0.63	0.40	0.42	0.49
confidpreswitch	0.84	0.76	0.61	0.37	0.43	0.49
presearchexeasy	0.79	0.79	0.78	0.41	0.41	0.41
presearchexeasyswitch	0.76	0.75	0.74	0.42	0.44	0.44
switch other	0.85	0.79	0.70	0.35	0.41	0.46

Table 6: Bivariate Probit - Pooled Groups

Variable	Search	Switch	dy/dx
gender	0.200**	-0.149	0.007
age	0.003	-0.026	-0.004
age ²	0.000	0.0003*	0.000
educ	0.250**	-0.142	0.015
housearea	0.095	0.085	0.031
maritalstatus	0.045	0.091	0.024
employedstatus	-0.117	-0.048	-0.029
internetuse	0.324**	0.229	0.091***
adults	0.020	0.008	0.005
tenure	0.044	-0.091	-0.009
proxyinc	-0.020	-0.034	-0.010
seenadvert	0.107	-0.202*	-0.017
telephone	-0.030	-0.098	-0.023
doorstep	-0.117	-0.075	-0.034
publicplace	-0.098	0.060	-0.006
mail	0.077	0.025	0.018
friend	0.288**	-0.256**	-0.005
switchother	0.349**	0.113	0.077**
presearchexgain	0.003***		0.0005***
presearchexgain ²	-0.000003***		-0.0000005***
preswitchexgain		0.005***	0.001***
preswitchexgain ²		-0.000003***	-0.0000006***
presearchexetime	0.001**		0.0002**
preswitchexetime	0.000	0.000	0.000
presearchexeasy	0.170		0.063**
presearchexeasyswitch	0.164	0.205	0.030
confidpresearch	0.174*		0.030*
confidpreswitch		0.368***	0.068***
constant	-1.684***	-0.451	
Log-likelihood	-493.98	-512.57	
Full Model			
N	812		
Prob > chi2	0.000		
Log-likelihood	-994.73		
$\hat{\rho}$	0.289***		

Table 7: Bivariate Probit with Dummy for each Group

Variable	Search	Switch	dy/dx
dummy G1	0.506***	0.178	0.121***
dummy G2	0.261**	-0.052	0.034
gender	0.224**	-0.135	0.014
age	0.002	-0.026	-0.005
age ²	0.000	0.0003*	0.000
educ	0.289***	-0.124	0.025
housearea	0.105	0.085	0.033
maritalstatus	0.041	0.076	0.021
employedstatus	-0.083	-0.022	-0.018
internetuse	0.289**	0.213	0.083**
adults	0.006	0.001	0.001
tenure	0.042	-0.092	-0.009
proxync	-0.006	-0.029	-0.006
seenadvert	0.068	-0.214*	-0.027
telephone	-0.034	-0.097	-0.024
doorstep	-0.091	-0.064	-0.028
publicplace	-0.105	0.052	-0.009
mail	0.082	0.025	0.019
friend	0.261**	-0.272*	-0.012
switchother	0.279*	0.092	0.062
presearchexgain	0.0031***		0.0005***
presearchexgain ²	-0.000003***		-0.0000005***
preswitchexgain		0.005***	0.001***
preswitchexgain ²		-0.000003***	-0.0000005***
presearchextime	0.001*		0.0001*
preswitchextime	0.000	0.204	0.000
presearchexeasy	0.173		0.030
presearchexeasyswitch	0.154	0.000	0.061**
confidpresearch	0.145		0.025
confidpreswitch		0.350***	0.064***
constant	-1.924***	-0.494	
Log-likelihood	-491.91	-502.82	
Full Model			
N	812		
Prob > chi2	0.000		
Log-likelihood	-983.76		
$\hat{\rho}$	0.280***		