Submission by

Alternative Technology Association

on the

Review of Effectiveness of Competition in the Electricity and Gas Retail Markets in South Australia – First Draft Report

13th August 2008

By Email to: submissions@aemc.gov.au

Introduction

The Alternative Technology Association (ATA) welcomes the opportunity to provide comment on the First Draft Report as part of the Review of Effectiveness of Competition in the Electricity and Gas Retail Markets in South Australia, as released by the Australian Energy Market Commission (AEMC) on the 4th July 2008.

ATA is a not-for-profit organisation established in 1980 to empower our community to develop and share sustainable solutions for the way we live and to promote the uptake of sustainable technologies in order to protect our environment. The organisation provides service to over 4500 members who are actively promoting sustainability in their own homes by using good building design and implementing water conservation and renewable energy technologies.

ATA advocates in both the government and industry arena for ease of access and continual improvement of these technologies, as well as the production and promotion of information and products needed to change the way we live. As Australia's peak member-based organisation representing early-adopters of renewable energy systems, ATA is in a unique position to highlight the needs and concerns of small-scale renewable energy system owners and their interaction with the retail energy market.

Customer Awareness and 'Churn'

Similar to its Victorian Review, the AEMC has again used customer awareness and 'churn' (the level of customer switching) as two of the key determinants of effective competition in the South Australian market. ATA remains sceptical of customer awareness and churn as strong indicators of market effectiveness, particularly as the Commission itself has indicated that customer churn has largely been in response to direct marketing by retailers as consumers believe energy to be a *"low involvement commodity"*[1] – and are *"unlikely to actively seek out a market offer"*[2].

[1] AEMC 2008, *Review of the Effectiveness of Competition in Electricity and Gas Retail Markets in South Australia*, First Draft Report, 4 July 2008, Sydney – Page 15.

[2] AEMC 2008, *Review of the Effectiveness of Competition in Electricity and Gas Retail Markets in South Australia*, First Draft Report, 4 July 2008, Sydney – Page 22.

Simply because a customer may be aware that they can change electricity retailers bears little relationship as to whether they may be able to source an improved market offer. This requires a significant investment of consumer time and energy into researching the best available options to suit their needs. Direct marketing by an electricity retailer will always be biased in favour of that retailer's product and as such, information gained via direct marketing cannot be taken by the astute consumer as a balanced appraisal of the best market opportunities.

Benefits of Effective Competition

The AEMC suggest that while *"customers may not investigate every potential energy offer that is available to them, a customer that is largely satisfied with the outcome of their decision to switch has experienced the benefits of effective competition."*[3] ATA challenges this assertion and believes that a customer who has not fully investigated potential energy offers would not be in a position to know whether they have experienced the full benefit from a switching decision.

In line with this, the AEMC customer survey inadequately addresses issues pertaining to information asymmetries between retailers and consumers and the inherent transaction costs. ATA believe that an investigation by the AEMC into the actual consumer benefit (measured in dollar value) of switching decisions may highlight irregularities in the competitive process.

Supporting this view is a study[4] by the *Centre for Competition Policy*, the *Economic and Social Research Council* and the *University of Oxford* in the United Kingdom. Titled *"Do Consumers Switch to the Best Supplier"*, this study sought to assess the ability of consumers to choose improved market arrangements between alternate electricity suppliers.

Across two independent datasets from the UK electricity market, the research found that consumers switching exclusively for price reasons appropriated only a quarter to a half of the maximum gains available. While such behaviour could be explained by high search costs, the research also observed that 20 – 32% of consumers actually *reduced* their surplus as a result of switching. The study rejected an explanation that this was primarily caused by suppliers' inappropriate selling tactics.

[3] AEMC 2008, *Review of the Effectiveness of Competition in Electricity and Gas Retail Markets in South Australia*, First Draft Report, 4 July 2008, Sydney – Page 126.

[4] Centre for Competition Policy et al, 2007. *"Do Consumers Switch to the Best Supplier"*, Department of Economics, University of Oxford, UK.

Indeed the research suggested that the capacity of consumers to choose efficiently between suppliers was limited, with any gains or losses reported to be insignificantly related to the self-reported influence of a sales agent. Instead, consumers' poor choices seemed more consistent with an explanation of pure decision errors, potentially due to a lack of research time or understanding by the consumer. A copy of this study is attached to this submission.

Together with the effects of switching costs that reduce the willingness of consumers to switch suppliers (as also acknowledged by the Commission), such behaviour may seriously impede the competitive process.

Future of Price Regulation

The ability of consumers to effectively choose improved market arrangements may have serious ramifications in the context of any move towards complete price deregulation – as was proposed under the Victorian Review.

ATA would again have serious concerns with any recommendation that saw retailers being obliged to set their own standing offer prices. As argued in our Victorian submission, this would likely give rise to a situation whereby retailers are able to heavily load their standing offers at the expense of market contracts, in order to have the most competitive contracts upon which to lure consumers.

Again this could quite easily lead to a situation whereby low-income, low-consumption, rural and disadvantaged consumers find themselves subsidising wealthy, educated and internet-savvy customers (this issue is of specific concern in South Australia given the high proportion of people on fixed incomes and in poorly serviced remote rural areas).

Consumers who choose not to exercise their right to switch as well as customers who appear undesirable to service on behalf of the retailer (low-consumption customers, phone-based sign-ups rather than internet, rural consumers not able to be door-knocked) may find themselves on either an undesirable standing offer or an expensive market contract at the expensive of desirable customers, who receive the benefits of lower priced offers.

Arrangements for Grid-Connected Systems – ATA members

ATA believe that the process of obtaining a retail contract for the grid-connection of small renewable energy systems in South Australia needs greater certainty. A number of our members have experienced significant difficulties with respect to tariff and metering arrangements.

Whilst South Australia has recently implemented a feed-in tariff for small scale grid connected photovoltaic systems, ATA understands that there is no requirement for retailers to publish specific contract terms and conditions governing the relationship with these customers. (A search on the AGL and Origin websites and subsequent discussion with their customer consultants confirmed this to be the case, at least for these two retailers.)

In Victoria, the recent introduction of the *Energy Legislation Amendment 2008* regulates the offers made by electricity retailers for the buy-back of electricity from small-scale renewable electricity generators. The legislation requires all electricity retailers to offer and publish fair and reasonable price, terms and conditions for the feed-in of electricity, with the fair and reasonable criteria determined by the Department of Primary Industry and assessed by the Essential Services Commission. A copy of the Victorian *Fair and Reasonable Criteria* is attached to this submission for reference.

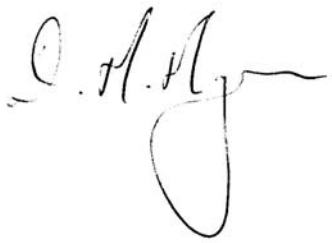
The introduction of this legislation is a clear recognition of the failure of deregulation in that state to provide adequate terms and conditions for small scale renewable energy proponents. This issue was previously highlighted by national research published by ATA in 2005, which found the lack of clear information for consumers and information asymmetries in favour of electricity retailers to be major barriers to the uptake of small scale renewable energy systems.

The establishment of similar regulation in South Australia would provide welcome access to information and greater certainty for small scale renewable energy proponents.

Further Contact

ATA again welcomes the opportunity to respond to the First Draft Report as part of the *Review of Effectiveness of Competition in the Electricity and Gas Retail Markets in South Australia*.

Yours sincerely,



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Do Consumers Switch to the Best Supplier?

by

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CCP Working Paper 07-06

Abstract: This paper assesses the ability of consumers to choose between alternative suppliers. Across two independent datasets from the UK electricity market we find that consumers switching exclusively for price reasons appropriated only a quarter to a half of the maximum gains available. While such behaviour can be explained by high search costs, the observation that 20-32% of the consumers actually *reduced* their surplus as a result of switching cannot. A brief analysis rejects an explanation involving suppliers' mis-selling tactics. Consumers may need direct protection, as well as good information, if their decisions are insufficiently accurate to engender competitive markets.
April 2007 (Original Version: May 2006)

JEL Classification Codes*: *L00, D83
Keywords*: *Search Costs, Switching Costs, Decision Errors, Mis-selling.

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1. Introduction

Competition policy and other policy initiatives are increasingly based on the assumption that consumers can play a positive role in generating market competition by choosing to trade with the supplier that best suits their needs. However there are several reasons why consumers might not do so. They may be unwilling to change suppliers due to the existence of switching costs (see Farrell and Klemperer 2006 for a review), consumers may be unaware of alternative suppliers due to the existence of search costs (see Baye et al forthcoming for a review); or consumers may be unable to evaluate and compare between different supplier's offers correctly due to the existence of cognitive decision-making costs (Perloff and Salop 1985, Gabaix et al 2005). While previous empirical research has largely focussed on identifying the effects of switching costs, this paper investigates the importance of the last two possibilities by empirically analysing the accuracy with which switching consumers choose their 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 independent datasets from the UK electricity market. Across two (non-representative) subsets of this data and under a range of differing assumptions, only 8-19% of consumers switched to the firm offering the highest surplus and, in aggregate, switching consumers appropriated only between 28% and 51% 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 experimental evidence that proposes consumers often search too little (Sonnemans 1998 and Tenorio and Cason 2002). However one finding is inconsistent with such explanations, namely that 20-32% of switching consumers appear to have *lost* surplus through their choice of supplier. These consumers lost an average £14-35 pounds per year, even when any additional switching costs (monetary or other) are excluded.

This latter finding is particularly interesting given the choice of controls employed within the measurement methodology. The results cannot be explained by consumers' unmeasured heterogeneous preferences between firms since the analysis is restricted to consumers who, when asked, indicated that they had switched suppliers only to gain a lower price. Neither can the findings be consistent with consumers making their decisions with respect to an incorrect estimate of their own consumption as all results are derived from consumers' own (expenditure) beliefs and remain robust across consumption perturbations of plus and minus ten percent. The paper also rejects an explanation that suggests that consumers' inaccurate choices may have resulted from the pressurising or misleading influence of suppliers' mis-selling activities. Consumers' choices are insignificantly related to the self-reported influence of a sales agent or to any increased sales activity that may result from an increased number of regional competitors. Instead, the findings appear most consistent with pure consumer decision error which could, in part, result from the high levels of complexity within the market environment. This conclusion underlines the importance of further research into the possible incentives firms may face in anti-competitively exploiting or inducing consumer confusion[1].

Very little previous research has empirically examined the switching accuracy of consumers. 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, Economides et al (2005) suggest that 42% of consumers appear to have switched to a more expensive supplier, resulting in an average loss of $4.32 per month. In determining the market power effects resulting from consumers failing to switch suppliers in the UK

[1] Recent research in this area has been growing. Ellison and Ellison (2004) discuss the use of 'obfuscation' strategies, whereby firms may offer add-on prices or multiple product dimensions in order to gain market power by deliberately increasing the difficulty of comparison making; after empirically analysing the US cellular telephone industry, Miravete (2007) suggests that firms may exploit consumer confusion with the use of "dominated" tariffs, but only when the profits from more standard price discrimination strategies are relatively low.

gas market, Giulietti et al (2005) suggest a form of consumer inaccuracy by showing that consumers' (binary) switching decisions appear unrelated to the monetary gains available from doing so, especially for consumers who expect price differences to be transitory. A larger related literature, however, measures the ability with which consumers can pick the cost-minimising tariff from a menu of tariffs offered by the *same* firm. Although not directly relevant for our analysis due to the prevalence of a single tariff option (per payment method) offered by each UK electricity supplier, these studies suggest that some consumers may exhibit a bias towards flat rate fees, and to a lesser extent, a bias towards pay-per-use tariffs. Using data from a German Internet provider, Lambrecht and Skiera (2006) estimate that around a third of consumers have a persistent 'flat-rate bias', with over half of these paying an excess of 100% above the cheapest alternative tariff. Della Vigna and Malmendier (2004, 2006) find a related bias in consumers' choice of health club tariffs and derive its implications for firms' pricing decisions. Conversely, in a detailed natural experiment Miravete (2003) suggests consumers' phone tariff 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 – an explanation that cannot be applied to our results.

Section 2 offers a detailed account of the measurement methodology and section 3 presents the descriptive results; section 4 discusses some possible sources of measurement bias and further analysis. Section 5 investigates the possibility that mis-selling may explain the results. Section 6 concludes.

2. Measuring the Gains from Switching

To analyse the accuracy of consumers' switching decisions it is necessary to measure both the maximum possible gains in surplus that each consumer could have achieved by switching to their best supplier and the gains which each consumer made through their actual choice of new supplier. This section

provides a detailed account of our measurement methodology. After an introduction to the market and the data in section 2.1, section 2.2 discusses the measurement approach and illustrates how the UK electricity market is particularly well suited for such an analysis. Section 2.3 provides further details of how the data are used to make the calculations.

Section 2.1 The Market and the Data

Since liberalisation of the residential electricity markets was completed in mid 1999, electricity suppliers have been permitted to enter any of the fourteen regional UK markets to compete with the original regional incumbent. While few new suppliers chose to enter the industry, many regional incumbents took the opportunity to enter most, if not all, of the regions in which they had not previously been incumbent, as did the national gas supplier, British Gas. By law, each active supplier is obliged to offer tariffs for three possible consumer payment methods - standard credit, direct debit and prepayment. Suppliers' tariffs vary be region, partly reflecting cost differences and in practice, as shown in Table 1 for an example region, Midlands, suppliers only choose to offer a single two- or three-part tariff per payment method[2]. In addition, for those suppliers that may also be active in the gas market, it has become increasingly common to participate in mixed bundling by offering a dual-supply discount to those consumers who choose to be supplied both forms of energy.

Despite being presented with the opportunity to switch to a potentially cheaper supplier (with twenty-eight days notice and no financial penalty), about half of energy consumers have remained reluctant to move away from their regional incumbent. To analyse the accuracy of those consumers that did choose to switch, we construct two datasets from two independent, cross-

[2] Subsequent to the paper, suppliers offered wider choices of tariffs, including 'capped' tariffs.

Table 1: Example Set of Tariffs (Midlands Region, June 2000, in pence)

	Payment Method: Credit			Direct Debit			Prepayment				
Electricity Supplier:	Fixed	Rate1	Rate2	Fixed	Rate1	Rate2	Fixed	Rate1	Rate2	Threshold	Dual-Supply Discount
MEB (Regional Incumbent)	2159	6.72	-	2094	6.52	-	3734	6.72	-	-	-
British Gas	0	10.57	5.65	0	9.01	5.65	0	10.28	6.17	900	1460
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	-	-	250
Independent	4982	5.46	-	4026	5.46	-	4497	7.77	-	-	-
London Electricity (1)	3048	5.86	-	3048	5.86	-	9202	7.80	-	-	-
Northern Electric and 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 (2)	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	-	-	1050
Southern	3116	6.29	-	3053	6.16	-	3990	6.52	-	-	-
SWALEC	1966	5.67	-	1886	5.44	-	3734	6.71	-	-	-
SWEB	3045	5.86	-	2954	5.68	-	4523	7.39	-	-	-
Utility Link	3595	7.25	-	2595	7.25	-	7388	7.68	-	-	-
Yorkshire	4721	5.76	-	4091	5.76	-	8669	5.76	-	-	-

Each supplier offers a tariff across three payment methods. Each tariff consists of an (possibly zero) annual fixed fee, *Fixed*, with an additional marginal rate, *Rate1* in pence/kWh, with in some cases, a second marginal rate, *Rate2,* for consumption over and above some annual breakpoint, *Threshold* in kWh. Dual supply discounts are offered only to credit or direct debit consumers (except by East Midland/Powergen who offer them to all consumers). Additional discounts are labelled with numbers in brackets - (1) 3% off Direct Debit if bill exceeds £10.50 (2) £8.40 off credit and direct debit.

sectional, face-to-face surveys of consumers in England, Scotland and Wales. The EA survey (Cooke et al, 2001[3]) 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 that were useable for our purposes.

While the presence of a low-income bias and missing information limit our ability to draw general inferences about how switching behaviour varies with consumer characteristics, a measurement of 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[4]. Of the 2027 consumers surveyed, 370 had switched suppliers in the previous three years, of whom 245 were useable for our purposes.

Section 2.2 Measurement Methodology

Price is only one dimension of consumer choice, and in calculating the gains made from choosing to switch suppliers, it is important to estimate not only the effects of differences in price, but also the possible gains that arise from non-price differences. Whilst such gains are likely to be small in a near-homogeneous market like electricity, they may exist for two main reasons. First, although the reliability of supply is independent across suppliers (since it depends upon the distribution function which is vertically separated), consumers may perceive that firms vary in attributes such as customer service or environmental awareness. Second, in addition to the possible monetary benefits of being supplied electricity and gas by the same supplier, for which we account for, consumers may perceive some non-price, practical benefits

[3] 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).

[4] The CCP survey was designed to analyse search and switching behaviour across eight different product markets as analysed by Chang and Waddams Price (forthcoming). Here, only the data from the electricity market is used.

from only having to deal with one supplier. To avoid the difficulties of measuring such non-price benefits we restrict our analysis to of the gains from switching made by the subset of consumers whose decisions were purely motivated by price. Specifically, we focus on two sub samples of 318 and 154 consumers respectively who, when asked, cited only differences in price as a reason for switching. We can then be confident that there are no unobserved consumer benefits arising from factors such as the quality of service, the provision of 'environmental' tariffs or the practical benefits of being dual-supplied. A full summary of the consumers' (multiple) reasons for switching suppliers is presented in Tables 2a and 2b[5].

Tables 2a and 2b: Reasons for Switching Suppliers across the Two Datasets

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

Since all the selected consumers have stated that they are motivated only by differences in firms' tariffs, one would ideally measure the (annual) gains made by consumer i from switching from an old supplier, o, to a new supplier, n, (excluding switching costs) by estimating the associated change in (approximate) consumer surplus, as in (1)

$$\Delta CS_i = CS_i^n - CS_i^o \approx [u_i(C_i^n) - E(C_i^n; T^n)] - [u_i(C_i^o) - E(C_i^o; T^o)] \quad (1)$$

[5] The EA respondents were asked to provide an unstructured explanation for why they had switched, which was later coded into an exclusive list of reasons, whereas the CCP respondents were asked to indicate their reasons from a list of (non exclusive) possible options. No distinction is made between price and non-price benefits of dual-supply and so all consumers who cited dual-supply as a reason for changing suppliers are eliminated from the sample.

where the consumer surplus received at any firm j is composed of the utility that consumer *i* receives from choosing to annually consume C_i^j units of electricity, $u_i(C_i^j)$, minus the associated bill expenditure, $E(C_i^j;T^j)$, dependent upon firm j's tariff, T^j. The cross-sectional nature of the data prevents the direct calculation of (1) as the level of pre-switching consumption, C_i^o, cannot be identified. Instead, we construct an upper bound for the gains made from switching which relies on comparing the expenditures that would result from consuming the level of post-switching consumption, C_i^n, at each supplier, as shown in (2)[6]. The difference between the upper bound and the approximate change in consumer surplus described by (1) is likely to be minimal in markets for goods such as electricity where demand has been estimated to be highly price inelastic (Baker et al 1989). Indeed, this claim is later supported by results that indicate that the calculated upper bounds of the switching gains made for a sub sample of 146 EA consumers whose survey responses indicated that they considered their own consumption to be highly price inelastic and stable over time, differ insignificantly to those calculated for the remaining EA consumers[7].

$$\Delta CS_i \leq E(C_i^n;T^o) - E(C_i^n;T^n) \qquad (2)$$

[6] The upper bound can be derived with a revealed preference argument to ensure $u_i(C_i^o) - E(C_i^o;T^o) \geq u_i(C_i^n) - E(C_i^n;T^o)$.

[7] 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?.

We recover an estimate of post-switching consumption, $\hat{C}_i^n$, by using details of each consumer's individual estimate of their own electricity expenditure[8] and their supplier status. The use of such an approximation offers two advantages. First, consumers are more likely to recall their expenditure rather than their consumption. Second, and more importantly, all gains will be calculated in a way that is consistent with consumers' consumption beliefs, circumventing any subsequent explanation of inaccurate choices resulting from consumers' incorrect consumption estimates. A potential drawback however comes from the possibility that each consumer's expenditure beliefs as used in their switching decision may have differed from those reported at the time of the survey because of some change in consumption in the intervening period. Though we know that the measured gains differ insignificantly between those EA consumers who indicated that their consumption had been stable for the previous two or three years and those that did not, we further investigate this possibility by repeating all of the measurements whilst perturbing the recovered estimate of consumption by plus and minus ten percent.

Having decided to switch to a certain supplier, consumers may face an additional decision between the new suppliers' menu of tariff options. Whilst such menus are limited due to the fact that firms elected to offer only a single tariff per payment method, a supplier's tariffs may still vary by the consumer's choice of payment method and gas supplier. To focus only on the accuracy of consumers' choice of supplier and not their choice of payment method or gas supplier, all switching gains will be made by comparing suppliers' relevant tariffs, whilst treating each consumer's known choice of payment method(s) and gas supplier as given. To explain this further, the next section provides formal expressions for each of the measures which are calculated for each consumer.

[8] Where possible, consumers were asked to find a recent bill and provide an estimate of their expenditure on a weekly, fortnightly, monthly or quarterly basis as they preferred.

Section 2.3 The Calculations

Consider first, the actual gains made by consumer i, having decided to switch from his original supplier, o, to his current supplier, n. Allowing each supplier's tariff to vary by the date of switching, t, electricity supply region, r, choice of gas supplier, g, and choice of payment method, m, (which we allow to change at the time of switching), the (upper bound of the) actual gains made, x_i^{sw}, is calculated using expression (3).

$$x_i^{sw} = E[\hat{C}_i^n; T_{tr}^o(m^o, g)] - E[\hat{C}_i^n; T_{tr}^n(m^n, g)] \qquad (3)$$

Using a similar logic, an upper bound for the maximum gains available from consumer i's decision to switch away from supplier s, $x_{i,s}^{\max}$, will be calculated by comparing i's expenditure at their current supplier, n, with the minimum from the equivalent expenditures offered by i's set of regional suppliers, S_r, as in (4).

$$x_{i,s}^{\max} = E[\hat{C}_i^n; T_{tr}^o(m, g)] - \min_{k \in S_r} E[\hat{C}_i^n; T_{tr}^k(m', g)] \qquad \geq 0 \qquad (4)$$

By use of (5), we further calculate the (upper bound of the) gains available from switching away from supplier, s, to the supplier offering the median equivalent expenditure, $x_{i,s}^{med}$.

$$x_{i,s}^{med} = E[\hat{C}_i^n; T_{tr}^o(m, g)] - \underset{k \in S_r}{median}\, E[\hat{C}_i^n; T_{tr}^k(m', g)] \qquad (5)$$

All three measurements, (3)-(5), are estimated at three consumption levels for each consumer (the originally estimated level and the two perturbed levels) using data from the surveys and an historical dataset of tariffs[9]. As neither dataset, and in particular the EA dataset, provides all the necessary

[9] 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.

information directly, we now discuss how each survey was used to make the calculations.

The EA dataset suffers from two omissions which both raise doubts about the exact set of tariffs relevant for each consumer's switching decision. The first omission involves the exact date of the switching decision. Economides et al (2005) faced the same problem and were forced to assume that consumers had switched at the date of information collection. The second problem arises from the inability to determine 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 the measurements are reported 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 rising over the period. Using both of these time periods, the calculations are then made 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 more 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)[10]. The four specifications shall be respectively labelled as Oct99nochange, Oct99change, Jun00nochange and Jun00change.

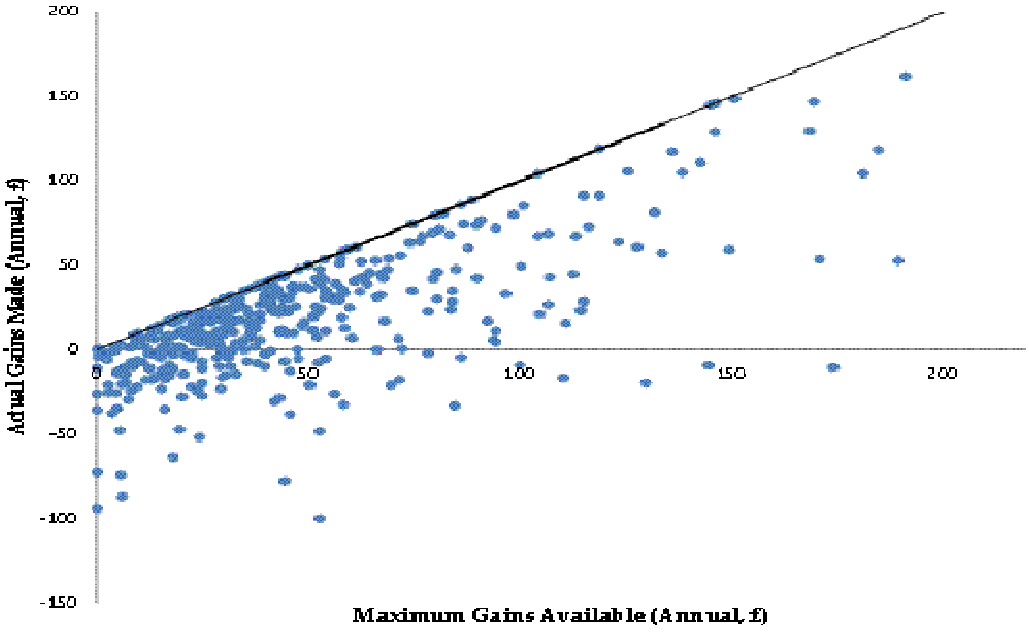
In contrast, the CCP data is very detailed and avoids these problems. It allows us to select the exact set of tariffs that were relevant for each consumer's decision.

3. Descriptive Results

To provide an initial description of the data, Figure 1 plots the actual gains made by switching against the maximum gains available, for all consumers (averaging across specifications for the EA sample). Two immediate observations can be made. First, many of the consumers have not appropriated the maximum gains available as indicated by the points located off the 45° line. This is wholly consistent with an explanation of search costs. The second observation, however, is not, namely the significant fraction of consumers appear to have actually lost surplus by switching to a more expensive supplier, as indicated by the points below the x-axis. To explore the findings in more detail, Table 3 displays the main results derived from the originally estimated levels of consumption, while Table 4 compares these with the results using the perturbed consumption levels.

Figure 1: The Actual Gains Made from Switching relative to the Maximum Gains Available, CCP and EA (pooled specification) Datasets

[10] The most commonly reported method changes include moving from credit to direct debit (41%) and credit to prepayment (38%). We do not allow for the unlikely possibility that the change was made after the process of changing suppliers.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0
-50
-100
-150
0
50
100
150
200
Actual Gains Made (Annual, £)
Maximum Gains Available (Annual, £)

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

Data	CCP		EA		EA		EA		EA		EA	
Specification			Pooled		Oct 99 no change		Oct 99 change		Jun 00 no change		Jun 00 change	
	Average	(StDev)	Average	(StDev)	Average	(StDev)	Average	(StDev)	Average	(StDev)	Average	(StDev)
Number of Switchers	154		318		318		318		318		318	
Average Maximum Gains Available (annual, £)	49.04	(39.20)	44.22	(42.65)	43.02	(42.84)	41.42	(39.91)	47.08	(42.85)	45.35	(45.00)
Average Median Gains Available (annual, £)	12.37	(33.96)	12.30	(27.14)	12.02	(26.19)	10.42	(25.82)	14.25	(26.51)	12.52	(30.04)
Average Actual Gains Made (annual, £)	17.92	(43.18)	19.41	(38.56)	21.36	(41.57)	19.75	(38.99)	19.13	(35.61)	17.40	(38.09)
Average Median Gains/Average Maximum Gains	0.25		0.28		0.28		0.25		0.30		0.28	
Average Actual Gains/Average Maximum Gains	0.37		0.44		0.50		0.48		0.41		0.38	
Proportion of Switchers with Perfect Gains	0.18		0.14		0.18		0.18		0.10		0.10	
Expected Proportion if Random Alternative Selected	0.14		0.07		0.07		0.07		0.07		0.07	
Proportion of Switchers with Negative Gain	0.31	(0.46)	0.25	(0.43)	0.24	(0.43)	0.26	(0.44)	0.22	(0.41)	0.29	(0.45)
Average Gain given Negative Gain	-26.96	(32.99)	-17.56	(19.16)	-16.78	(20.77)	-19.23	(19.80)	-15.76	(16.93)	-18.47	(19.14)
Proportion of Switchers with Non-Negative Gain	0.69	(0.46)	0.75	(0.43)	0.76	(0.43)	0.74	(0.44)	0.78	(0.41)	0.71	(0.45)
Average Gain given Non-Negative Gain	37.64	(30.55)	31.85	(35.29)	33.13	(39.27)	33.52	(34.53)	28.98	(33.24)	31.78	(34.10)

Maximum Gains Available refers to the change in surplus that would have been realised by a switcher had they switched to their cheapest alternative supplier. *Median Gains Available* refers to the change in surplus realised by a switcher had they switched to the supplier offering the median of alternative offers. The *Proportion of Switchers with Perfect Gains* refers to the proportion of consumers who appropriated all of the maximum gains available. This is compared to the expected probability of doing so had the consumer randomly selected an alternative supplier.

Table 4: Comparing the Calculated Gain Measures with the Perturbed Consumption Levels

Data	CCP		EA		EA		EA		EA		EA	
Specification			Pooled		Oct 99 no change		Oct 99 change		Jun 00 no change		Jun 00 change	
Using Estimated Consumption	Average	(StDev)	Average	(StDev)	Average	(StDev)	Average	(StDev)	Average	(StDev)	Average	(StDev)
Average Maximum Gains Available (annual, £)	49.04	(39.20)	44.22	(42.65)	43.02	(42.84)	41.42	(39.91)	47.08	(42.85)	45.35	(45.00)
Average Actual Gains Made (annual, £)	17.92	(43.18)	19.41	(38.56)	21.36	(41.57)	19.75	(38.99)	19.13	(35.61)	17.40	(38.09)
Average Actual Gains/Average Maximum Gains	0.37		0.44		0.50		0.48		0.41		0.38	
Proportion of Switchers with Perfect Gains	0.18		0.14		0.18		0.18		0.10		0.10	
Proportion of Switchers with Negative Gain	0.31	(0.46)	0.25	(0.43)	0.24	(0.43)	0.26	(0.44)	0.22	(0.41)	0.29	(0.45)
Using Estimated Consumption -10%												
Average Maximum Gains Available (annual, £)	47.47	(37.56)	42.04	(38.00)	41.17	(41.66)	40.97	(36.27)	42.44	(38.21)	43.57	(35.85)
Average Actual Gains Made (annual, £)	20.76	(41.19)	18.51	(34.89)	20.72	(40.53)	19.27	(37.05)	17.42	(31.99)	16.64	(29.99)
Average Actual Gains/Average Maximum Gains	0.44		0.44		0.50		0.47		0.41		0.38	
Proportion of Switchers with Perfect Gains	0.16		0.13		0.19		0.14		0.10		0.08	
Proportion of Switchers with Negative Gain	0.25	(0.43)	0.23	(0.42)	0.24	(0.43)	0.24	(0.43)	0.22	(0.41)	0.23	(0.42)
Using Estimated Consumption +10%												
Average Maximum Gains Available (annual, £)	53.30	(49.22)	53.23	(59.92)	44.12	(44.46)	43.88	(38.75)	51.81	(47.86)	73.09	(108.62)
Average Actual Gains Made (annual, £)	17.98	(52.50)	21.36	(39.39)	22.42	(42.48)	20.82	(39.27)	21.64	(39.19)	20.56	(36.63)
Average Actual Gains/Average Maximum Gains	0.34		0.42		0.51		0.47		0.42		0.28	
Proportion of Switchers with Perfect Gains	0.14		0.13		0.19		0.15		0.10		0.08	
Proportion of Switchers with Negative Gain	0.32	(0.47)	0.22	(0.42)	0.24	(0.43)	0.24	(0.43)	0.20	(0.40)	0.21	(0.41)

Maximum Gains Available refers to the change in surplus that would have been realised by a switcher had they switched to their cheapest alternative supplier. *Median Gains Available* refers to the change in surplus realised by a switcher had they switched to the supplier offering the median of alternative offers. The *Proportion of Switchers with Perfect Gains* refers to the proportion of consumers who appropriated all of the maximum gains available. This is compared to the expected probability of doing so had the consumer randomly selected an alternative supplier.

In support of the chosen measurement methodology, the results are remarkably robust across datasets, across specifications and across consumption levels. Despite restricting the analysis to consumers who switched exclusively for price reasons, many of the consumers failed to switch to the cheapest supplier. Across datasets, specifications and consumption levels, the reported percentage of consumers selecting their cheapest supplier ranges from only 8-19%. Although consumers as a whole made positive average gains of between £16 and £22 per annum, these consumers only appropriated between 28-51% of the maximum gains available to them. Such choices compare only slightly favourably to the gains that consumers would have received from switching to a randomly selected supplier, which, on average, would have offered consumers a 7-14% chance of picking the cheapest supplier[11] and appropriated 25-30% of the maximum gains available. More startlingly, 20-32% of consumers switched to a more expensive supplier. These consumers appear to have lost, on average, approximately £14-35 per year, even without taking into account any costs of switching. The proportion of loss-making consumers appears lower, but similar to the 42% of consumers reported less robustly by Economides et al (2005) in the New York telephone market. Finally, although it is difficult to make robust comparisons given the biases within each of the samples, switching accuracy does not appear to have improved over the five years between the two surveys.

Section 4: Potential measurement bias

The extent to which consumers' choices appear inaccurate is puzzling. Either a significant proportion of consumers have made very poor decisions or the measurement methodology has overstated consumers' inaccuracy across both datasets. This section discusses the possibility of two sources of measurement error and concludes that their effect upon the results should be limited.

[11] 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.

While we have taken account of the monetary benefits from dual-supply, one source of mis-measurement comes from the possibility that the calculations are paying insufficient attention to the non-price benefits of dual supply, as indicated by the 74% of consumers who chose to switch to their gas supplier. This explanation can be rejected for two reasons. First, to be included in our sample these consumers must have systematically failed to cite dual-supply as a reason for switching. Second, the dual-supplied switchers were not significantly less accurate in their decisions than other consumers. If anything, consumers who have the same supplier for both fuels made more accurate decisions than those who were jointly supplied (see Table A1 in the Appendix).

A second potential source of measurement error derives from the variability in tariff structures between suppliers. Consumers' decisions may be determined by some unobserved preference for a flat-rate or pay-per-use tariff. While the variability in tariff structures in the UK electricity market is limited - there are no purely flat fee tariffs - tariffs do vary in the inclusion of a zero or positive fixed fee (standing charge). In Table 2a, however, only 1% of consumers cited the existence of no standing charge as a reason for switching and Table A2 in the Appendix suggests that the only evidence of a bias occurs within the EA dataset where consumers switching to tariffs with positive fixed fees gain significantly less than consumers who made no change in their chosen tariff structure. The possible effect of this, however, seems minimal as only between 6 and 16% of consumers chose to make such a change in tariff structure.

If one discounts the previous two possibilities, then there remain only two possible explanations for the results. Either the consumers have made genuine decision errors, possibly as a result of the complexity of the market environment, or perhaps more credibly, consumers have been prompted into making inaccurate switching decisions as a direct result of some deliberate supplier sales strategy. This latter explanation may seem particularly

plausible in the UK electricity market. While some complaints have been targeted at internet price comparison sites for misleading consumers by favouring certain suppliers[12], many allegations have been aimed at the use of mis-selling tactics by suppliers themselves. The problem of aggressive or misleading 'cold-calling' or doorstep selling was considered so serious that several bodies conducted market investigations (energywatch 2002, OFGEM 2002 and OFT 2004) and OFGEM subsequently fined London Electricity two million pounds[13].

5. Further Analysis

To consider whether there is any evidence consistent with this hypothesis, this section offers a brief investigation into the possibility of mis-selling. It proceeds by estimating how switching decisions are related to two sets of test variables, each analysed in turn.

First, we analyse whether the accuracy of consumers' switching decisions is adversely affected by the self-reported influence of suppliers' sales activity, as captured by two dummy variables from the EA survey. These correspond to consumers reporting that they had been 'conned' into switching without consent, $conned_i$, or that a sales agent had been active in their switching decision, $agent_i$. To do so, we use two procedures to estimate equation (6), where the (latent) gains from switching, $y_i^{swg}*$, will be modelled as a function of the two test variables $agent_i$ and $conned_i$ while controlling for a vector of consumer demographics, D_i, and each consumer's maximum available gains, $x_i^{\max}$. A further variable, $stable_i$, is included to investigate whether the measured switching accuracy of the sub group of consumers who reported highly price inelastic and stable consumption differed from the rest of the sample. As later reported, the effect of this variable is insignificantly different from zero suggesting that the constructed upper bound for the gains made

[12] See http://business.guardian.co.uk/story/0,,1975484,00.html. December 19th 2006.
[13] See http://news.bbc.co.uk/1/hi/business/2315115.stm. October 10th 2002.

from switching forms a close approximation to the true gains from switching. Equation (6) will be used first, as a basis for estimating a probit model to investigate the probability of a consumer making a positive gain from switching and second, as a basis to estimate the gains made from switching as a continuous variable using OLS with heteroscedasticity-consistent standard errors. All relevant variables are described and summarised in Table 5.

$$y_i^{swg} * = \beta_1 + agent_i \beta_2 + conned_i \beta_2 + D_i ' \beta_3 + x_i^{\max} \beta_4 + stable_i \beta_5 + \varepsilon_i \qquad (6)$$

For robustness, the two estimations are conducted across each of the four EA data specifications and are reported in Tables 6 and 7. The results suggest that the self-reported incidence of sales and conning activity have an insignificant effect on switching accuracy across all specifications. The estimations also indicate, in line with the findings of Economides et al (2005) and Miravete (2003), that very few demographic variables are useful predictors of the ability of consumers to make accurate decisions. Consumers living in rented property appear to make less accurate decisions, while some of the specifications suggest that consumers with higher incomes appropriate less of the available gains. Consumers are less likely to make a loss from switching suppliers if the maximum gains available are higher, a finding consistent with consumers having a higher incentive to make an accurate decision when the rewards from doing so are larger. The estimations also show no evidence that previous experience may help improve decision accuracy. While Giulietti et al (2005) suggest that consumers are more likely to switch if they have previously switched in other markets, we find that a past experience of switching gas suppliers does nothing to improve (and sometimes reduces) the accuracy of electricity switching decisions.

Table 5: Summary Statistics of the Demographic and Test Variables

Variable Name	Variable Definition	Mean	(StDev)
highsoc	Household social grade: A, B or C1	0.28	(0.45)
midsoc	Household social grade: C2 or D	0.49	(0.50)
lowsoc	Household social grade: E	0.22	(0.42)
highinc	Household income: £25000 +	0.13	(0.33)
midinc	Household income: £12500-£25000	0.25	(0.43)
lowinc	Household income: Less than £12500	0.43	(0.50)
incref	Income status refused	0.20	(0.40)
age	Age of respondent	44.86	(15.96)
single	The household respondent is single	0.15	(0.36)
married	The household respondent is married	0.62	(0.49)
exmar	The household respondent is widowed or divorced	0.23	(0.42)
arrears	The household has electricty arrears	0.04	(0.21)
gassw	The household has previously switched gas supplier	0.51	(0.50)
rent	The household lives in rented accommodation	0.43	(0.50)
disable	The household has some form of disability benefit	0.19	(0.47)
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	(0.85)
	Number of Observations	318	

Table 6: Estimations of the Probability of Making a Positive Gain[14]

[14] All significant tests are indicated by * for the 5% level and by ** for the 1% level. Where applicable, all marginal effects are calculated for the average switcher relative to the base case of a consumer who is married, of low social class and with middle income.

	June *No Method Change*		*June* *Method Change*		*October* *No Method Change*		*October* *Method Change*	
	M.Effect	z	M.Effect	z	M.Effect	z	M.Effect	z
agent	0.03	0.53	-0.16	-1.62	0.08	1.39	0.04	0.61
conned	-0.18	-1.16	-0.23	-1.24	0.07	0.79	-0.07	-0.45
gainmax	0.00	4.23**	0.01	7.16**	0.01	5.52**	0.01	7.18**
stable	-0.03	-0.55	-0.02	-0.46	-0.05	-1.04	-0.06	-1.31
highsoc	-0.01	-0.11	-0.07	-0.74	0.02	0.21	-0.08	-0.89
midsoc	-0.02	-0.39	-0.07	-1.00	-0.05	-0.79	-0.14	-2.12*
highinc	-0.24	-2.03*	-0.22	-1.78	-0.13	-1.21	-0.16	-1.37
lowinc	-0.05	-0.69	-0.04	-0.55	-0.03	-0.43	-0.09	-1.40
incref	-0.09	-1.13	-0.11	-1.21	-0.08	-1.05	-0.10	-1.17
age	0.00	0.63	-0.01	-0.83	0.00	0.30	0.00	0.21
age2	0.00	-0.71	0.00	0.78	0.00	-0.01	0.00	0.12
disable	-0.05	-0.96	-0.07	-1.25	0.00	-0.01	-0.04	-0.70
single	-0.10	-1.17	-0.08	-0.86	-0.12	-1.33	-0.21	-2.07
exmar	0.01	0.09	0.03	0.50	0.02	0.29	0.02	0.29
rent	-0.15	-2.87**	-0.16	-2.58**	-0.10	-1.93	-0.14	-2.55**
arrears	0.03	0.27	-0.01	-0.05	0.09	1.29	0.08	1.02
gassw	-0.12	-2.77**	-0.12	-2.44*	-0.05	-1.20	-0.04	-0.84
n	318		318		318		318	
Log-Lik	-141.7		-145.6		-144.3		-137.0	
LR(17)	51.90**		89.65**		58.78**		91.07**	
McF R2	0.15		0.24		0.17		0.25	

Table 7: Estimations of the Gains Made From Switching [15]

[15] All significant tests are indicated by * for the 5% level and by ** for the 1% level. Where applicable, all coefficients are estimated relative to the base case of a consumer who is married, of low social class and with middle income.

	June *No Method Change*		*June* *Method Change*		*October* *No Method Change*		*October* *Method Change*	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t
agent	-0.70	-0.14	-2.57	-0.49	-2.10	-0.41	-3.34	-0.58
conned	0.22	0.05	-0.03	-0.01	-3.64	-0.45	-3.75	-0.49
gainmax	0.01	9.43**	0.01	11.05**	0.01	14.24**	0.01	10.55**
stable	0.93	0.31	0.79	0.27	-1.22	-0.42	-1.54	-0.54
highsoc	-4.21	-0.90	-2.98	-0.61	-2.26	-0.56	-2.28	-0.54
midsoc	-3.88	-1.00	-3.91	-0.95	-3.08	-0.85	-4.45	-1.16
highinc	-13.90	-2.21*	-13.23	-2.08*	-1.08	-0.19	-0.36	-0.06
lowinc	-5.12	-1.39	-5.80	-1.50	1.89	0.52	1.55	0.41
incref	-13.57	-3.22**	-13.73	-3.22**	-6.87	-1.57	-5.63	-1.41
age	-0.02	-0.04	-0.27	-0.51	0.39	0.81	0.27	0.55
age2	0.00	0.18	0.00	0.66	0.00	-0.25	0.00	0.04
disable	-4.87	-1.30	-4.52	-1.16	-6.53	-1.77	-6.30	-1.71
single	-5.66	-1.25	-4.94	-1.06	-0.33	-0.08	-3.25	-0.75
exmar	-0.49	-0.16	-0.33	-0.10	0.16	0.05	-0.44	-0.13
rent	-6.08	-2.17*	-4.54	-1.58	-8.40	-2.77**	-7.71	-2.46*
arrears	-8.98	-1.21	-8.22	-1.08	-4.17	-0.66	-4.48	-0.72
gassw	-3.92	-1.33	-3.44	-1.15	-4.27	-1.53	-3.32	-1.20
constant	5.28	0.38	7.29	0.52	-15.52	-1.23	-12.03	-0.92
n	318		318		318		318	
F(17,300)	10.34**		14.06**		18.37**		14.06**	
R2	0.58		0.61		0.68		0.64	

To provide a further and less direct test of the effects of mis-selling, the estimations are now repeated with the inclusion of a different 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[16], it is reasonable to conjecture that mis-selling strategies may be more attractive to firms as the profits from more standard forms of competition are reduced from increases in the number of suppliers. In a related sense, recent work by Spiegler (2005) illustrates how firms face an increased incentive to obfuscate by increasing the variance of their utility offers when faced with more competitors, while Miravete (2007) offers evidence to suggest that firms are more likely to employ dominated tariff options when competition increases. To provide a test of such an effect, we

[16] 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 independently from the number of firms (Kohn and Shavell 1974).

exploit the fact that the number of regional competitors varied between twelve and sixteen at the time of the EA survey[17]. If mis-selling were an explanation, one might expect regional markets with a higher number of competing suppliers to exhibit consumers making less accurate decisions[18]. 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 the number of regional suppliers available to each consumer[19]. As the estimated effects of the remaining variables differ very little from those reported previously in Tables 6 and 7, only the estimated effects of the test variable are displayed in Tables 8 and 9.

Table 8: Estimated Marginal Effects of the Number of Regional Competitors on the Probability of Switching to Make a Positive Gain[20]

	June *No Method Change*		*June* *Method Change*		*October* *No Method Change*		*October* *Method Change*	
	M.Effect	z	M.Effect	z	M.Effect	z	M.Effect	z
n	-0.01	-0.54	0.03	-0.96	-0.04	-1.43	-0.05	-1.77

Table 9: Estimated Marginal Effects of the Number of Regional Competitors on the Actual Gains Made from Switching

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

[18] It is feasible, but unlikely given the limited variation in the number of firms, that consumer inaccuracy may also be prompted by a 'choice overload' effect from the increased complexity of the decision (e.g. Iyengar and Lepper 2000 and Iyengar and Kamenica 2006).

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

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

	June *No Method Change*		*June* *Method Change*		*October* *No Method Change*		*October* *Method Change*	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t
n	-3.76	-2.47*	-3.84	-2.47*	-1.87	-0.99	-2.66	-1.36

While there is no reported relationship between the number of regional competitors and the probability of switching to make a positive gain, Table 9 offers some weak evidence that could be consistent with a hypothesis of mis-selling, by showing that in two out of four specifications, consumers appear to appropriate relatively less of the maximum available gains in regions with a higher number of suppliers. As much of the variation in the number of regional competitors arises, however, from the relative lack of market entry in the two Scottish electricity regions, such a finding could also be consistent with the existence of some unobserved characteristic of firms or consumers within the Scottish markets, although there is no parallel evidence of this in the later CCP data which has much less variation in the number of suppliers (see Table A3 in the Appendix). The results are therefore unclear and given the insignificance of the previous self-reported test variables, we conclude that the data offers no obvious evidence that mis-selling explains the inaccuracy of consumers' switching decisions. Instead, consumers' choices appear to be more consistent with the existence of pure decision errors, perhaps resulting from the inherent difficulty in interpreting tariff offerings.

5. Conclusion

By using two independent datasets from the UK electricity market this paper has suggested that the capacity of consumers to choose efficiently between suppliers may be limited. While the results are not necessarily representative of the general population, they suggest that between a fifth and a third of consumers actually lost surplus as a result of switching, and in aggregate, switching consumers only appropriated between a quarter and a half of the

maximum gains available to them. Such a failure of consumers to compare accurately between alternative suppliers can damage their welfare, both directly and indirectly, by reducing their immediate gains, and by delivering an increased source of market power to firms. Indeed, together with the better known effects of switching costs that reduce the willingness of consumers to switch suppliers, such behaviour may seriously impede the competitive process, even after a market has been liberalised or has been made subject to standard competition policy (as recently argued by Waterson 2003).

After a brief analysis, we reject 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 errors. While this may not be surprising given the suppliers' use of non-linear tariffs, it casts serious doubts over consumers' decision making ability in more complex markets where, unlike electricity, the optimal choice of supplier may also depend upon multiple dimensions of product quality. Further research would be valuable in exploring the existence and nature of mistakes in other markets, and in understanding how authorities should, if at all, intervene with the use of informational remedies and consumer protection policy.

References:

Baye M.R., Morgan J. and Scholten P. (forthcoming) *"Information, Search and Price Dispersion"* in Handbook on Economics and Information Systems, Elsevier

Baker P., Blundell R. and Micklewright J. (1989) *"Modelling Household Energy Expenditure Using Micro-Data"* Economic Journal vol.99 p.720-738

Chang Y. and Waddams Price C. (forthcoming) *"Search and Switching Across Relationship Markets"* ESRC Centre for Competition Policy Working Paper

Cooke D., Ferrari A., Giuletti M., Sharratt D. and Waddams Price C. (2001) *"Affording Gas and Electricity: Self Disconnection and Rationing by Prepayment and Low Income Credit Consumers and Company Attitudes to Social Action"* www.ccp.uea.ac.uk/publications.asp#2001

Della Vigna S. and Malmendier U. (2004) *"Contract Design and Self-Control: Theory and Evidence"* Quarterly Journal of Economics vol. 119(2) p.353-402

Della Vigna S. and Malmendier U. (2006) *"Paying Not to Go to the Gym"* American Economic Review vol. 96 (3) p. 694-719

Economides N., Seim K. and V.B. Viard (2005) *"Quantifying the Benefits of Entry into Local Phone Service"* NET Institute Working Paper, October 2005

Ellison G. and Ellison S.F. (2004) *"Search, Obfuscation and Price Elasticities on the Internet"* NBER Working Paper 10570

energywatch (2002) *"Doorstep and Telephone Selling: A Guide for Gas and Electricity Consumers"* Information Sheet

Farrell J. and Klemperer P. (2006) *"Coordination and Lock-In: Competition with Switching Costs and Network Effects"* Forthcoming in Handbook of Industrial Organization Vol 3, M. Armstrong and R. Porter (eds), North-Holland

Gabaix X., Laibson D. and Li H. (2005) *"Extreme Value Theory and the Effects of Competition on Profits"* Working Paper March 2005

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

Iyengar S.S. and Lepper M. (2000) *"When Choice is Demotivating: Can One Desire Too Much of a Good Thing?"* Journal of Personality and Social Psychology vol.79 p.995-1006

Iyengar S.S. and Kamenica E. (2006) *"Choice Overload and Simplicity Seeking"* Working paper, October 2006

Kohn M.G. and Shavell S. (1974) *"Optimal Adaptive Search"* Journal of Economic Theory vol. 9 p.93-123

Lambrecht A. and Skiera B. (2006) *"Paying Too Much and Being Happy About It: Existence, Causes and Consequences of Tariff Choice Biases"* Journal of Marketing Research, forthcoming, May 2006

Miravete E.J. (2003) *"Choosing the Wrong Calling Plan? Ignorance and Learning"* American Economic Review vol. 93(1) p.297-310

Miravete E.J. (2007) *"The Doubtful Profitability of Foggy Pricing"* Working Paper October 2004

OFGEM (2002) *"OFGEM Keeps up Pressure on Suppliers to Reduce Misselling"* The Office of Gas and Electricity News, Press Release 30 January 2002

OFT (2004) *"Doorstep Selling: A Report on the Market Study"* Office of Fair Trading, May 2004

Perloff J.M. and Salop S.C. (1985) *"Equilibrium with Product Differentiation"* Review of Economic Studies vol. 52 p. 107-120

Sonnemans J. (1998) *"Strategies of Search"* Journal of Economic Behavior and Organization vol.35, p.309-332

Spiegler R. (2005) *"Competition Over Agents with Boundedly Rational Expectations"* Theoretical Economics vol. 1(2) p.207-231

Tenerio R. and Cason T.N. (2002) *"To Spin or Not to Spin? Natural and Laboratory Experiments from The Price is Right"* Economic Journal vol.112 p.170-195

Waddams-Price C. (2003) *"Spoilt for Choice? The Costs and Benefits of Opening UK Residential Energy Markets"* Working Paper December 2003

Waterson M. (2003) *"The Role of Consumers in Competition and Competition Policy"* International Journal of Industrial Organization vol.21 p. 129-150

Appendix[21]:

Table A1: Switching Accuracy of Dual and Non-Dual Supplied Consumers

	Not Dual Supplied		Dual Supplied	
CCP Data	Average	(StDev)	Average	(StDev)
Number of Switchers	29		125	
Proportion of switchers	0.19		0.81	
Average Actual Gains Made (annual, £)	15.36	(62.37)	18.52	(37.68)
Average Maximum Gains Available (annual, £)	48.07	(49.43)	49.27	(36.66)
Average Actual Gains/Average Maximum Gains	0.32		0.38	
Proportion of Switchers with Negative Gain	0.45	(0.51)	0.27	(0.45)
EA Data (Pooled Specifications)	Average	(StDev)	Average	(StDev)
Number of Switchers	96		222	
Proportion of switchers	0.30		0.70	
Average Actual Gains Made (annual, £)	10.45**	(43.17)	23.29	(30.95)
Average Maximum Gains Available (annual, £)	46.87	(50.42)	43.07	(34.82)
Average Actual Gains/Average Maximum Gains	0.22		0.54	
Proportion of Switchers with Negative Gain	0.39**	(0.40)	0.19	(0.34)

Table A2: Switching Accuracy by Changes in Chosen Tariff Structure

[21] Notes for Tables A1-A3. ** and * are used to indicate a significant difference in means under both a standard t-test and a non-parametric Mann-Whitney U test at the 5% and 1% respectively.

	No Change in Tariff Structure		Fixed Fee to No Fixed Fee		No Fixed Fee to Fixed Fee	
CCP Data	Average	(StDev)	Average	(StDev)	Average	(StDev)
Number of Switchers	69		29		56	
Proportion of Switchers	0.45		0.19		0.36	
Average Actual Gains Made (annual, £)	19.46	(43.29)	19.43	(32.43)	15.25	(48.19)
Average Maximum Gains Available (annual, £)	46.97	(33.38)	55.08	(45.67)	48.46	(42.55)
Average Actual Gains/Average Maximum Gains	0.41		0.35		0.31	
Proportion of Switchers with Negative Gain	0.28	(0.45)	0.28	(0.45)	0.36	(0.48)
EA Data (Pooled Specifications)	Average	(StDev)	Average	(StDev)	Average	(StDev)
Number of Switchers	155		145		18	
Proportion of Switchers	0.49		0.46		0.06	
Average Actual Gains Made (annual, £)	9.53	(26.66)	34.12**	(38.44)	-14.04**	(25.32)
Average Maximum Gains Available (annual, £)	40.72	(32.17)	49.38	(47.38)	32.81	(33.93)
Average Actual Gains/Average Maximum Gains	0.23		0.69		-0.43	
Proportion of Switchers with Negative Gain	0.35	(0.39)	0.07**	(0.20)	0.81**	(0.36)

Table A3: Switching Accuracy between Scottish and Non-Scottish Regions

	Scot		Non-Scot	
CCP Data	Average	(StDev)	Average	(StDev)
Number of Switchers	18		136	
Proportion of Switchers (%)	0.12		0.88	
Average Actual Gains Made (annual, £)	4.23	(60.73)	19.73	(40.25)
Average Maximum Gains Available (annual, £)	44.28	(32.61)	49.67	(40.05)
Average Actual Gains/Average Maximum Gains	0.10		0.40	
Proportion of Switchers with Negative Gain	0.33	(0.49)	0.30	(0.46)

DPI CRITERIA
for the assessment of
"FAIR AND REASONABLE"
FEED-IN TARIFF OFFERS

CRITERION
NUMBER

1. An offer must not require that a customer buy gas from the retailer, in order for that customer to enter an electricity feed-in contract with that retailer.

   (For the avoidance of doubt, the Department of Primary Industries would not recommend to the Minister for Energy and Resources that an offer be referred to the Essential Service Commission under section 40I of the **Electricity Industry Act 2000** by reason only that the offer required a person be an electricity customer of the retailer in order to enter an electricity feed-in contract with that retailer).

2. An offer must state that the retailer will pay or credit the customer for electricity supplied under the feed-in contract with the same frequency as the customer is billed for electricity supplied to the customer by that retailer.

3. An offer must:
   (a) identify all additional costs related to the feed-in contract which the customer will pay and, for each cost, must either state the amount or specify that the retailer will inform the customer of the amount on request prior to entering the contract; and
   (b) state whether any Renewable Energy Certificates relevant to the feed-in contract are part of the feed-in contract offer.

4. An offer must:
   (a) specify that the retailer will pay or credit the customer, for electricity supplied by the customer under a feed-in contract, at a rate not less than the rate the customer pays to buy electricity from the retailer; and
   (b) use as the basis for this calculation the cost of the bill received by the customer, excluding the service to property charge and government charges.

5. An offer must include terms and conditions which incorporate into the feed-in contract clauses to the effect of each of the following:

   (a) if requested by the customer, the retailer will make a request to the relevant distributor to connect the customer's small renewable energy generation facility to the distributor's distribution system as soon as practicable after the customer satisfies clause 1 of the Energy Retail Code with respect to the feed-in contract. The retailer will

make the request by no later than the next business day after receiving from the customer all documentation required under the **Electricity Safety Act 1998** and all documentation reasonably required by the retailer or the relevant distributor;

(b) unless the customer gives explicit informed consent, the retailer will base a feed-in tariff payment or credit on a reading of the customer's NEM-compliant meter that records the supply of electricity from the customer to the distribution system, and in any event, the retailer will use its best endeavours to ensure that the meter is read at least once in any 12 month period. For the avoidance of doubt, a retailer does not breach this criterion if the retailer is unable to read a meter in any relevant period as a result of the customer breaching criterion 5(j) or some other event outside the retailer's control;

(c) if the retailer is not able to reasonably or reliably base a feed-in tariff payment or credit on a reading of the meter, the retailer will not make a payment or credit unless the relevant distributor estimates the generation in accordance with applicable regulatory instruments;

(d) the retailer will review a feed-in payment or credit to a customer at the customer's request, to be conducted on the basis specified in clause 6.1 of the Energy Retail Code;

(e) if the retailer seeks to bill a customer to make up overpaying or over-crediting the customer for electricity supplied by the customer, the retailer is to proceed on the basis specified in clause 6.2 of the Energy Retail Code;

(f) if the retailer has underpaid or under-credited a customer for electricity supplied by the customer, the retailer will credit the amount on the customer's next bill;

(g) if an event occurs which is outside the reasonable control of the retailer or a customer (i.e. force majeure event) and the retailer or the customer breaches their feed-in contract due to this event only, the breach is to be dealt with on the basis specified in clause 18 of the Energy Retail Code;

(h) the tariff and terms and conditions of the feed-in contract between the customer and the retailer may only be varied by agreement in writing between the customer and the retailer. For the avoidance of doubt, if the amount of the tariff changes in accordance with a term or condition of a feed-in contract previously agreed between the customer and the retailer, no further agreement is required;

(i) the customer's explicit informed consent is required to vary from the provisions listed in this Criterion number 5;

(j) the customer will allow the retailer, the responsible person or the retailer's or the responsible person's representative safe, convenient and unhindered access to the relevant address and to the meter that records the supply of electricity from the customer to the distribution system, for the purpose of reading the meter and for connection, disconnection, reconnection, maintenance and repair. The retailer, the responsible person, or the retailer's or responsible person's representative will carry or wear official identification and, on request, will show that identification to the customer;

(k) the customer will inform the retailer as soon as possible of any relevant change to contact details;

(l) the retailer will give the customer notice of any variation to the retailer's tariffs that affects the feed-in contract with the customer. The notice will be given as soon as practicable and in any event no later than the next billing and payment cycle;

(m) on request, the retailer will provide the customer with reasonable information on any feed-in tariffs the retailer may offer to the customer. The information must be given within 10 business days of the customer's request, and if the customer requests it, in writing;

(n) the retailer will retain a customer's historical feed-in payment or crediting data for at least two years, even though in the meantime the customer's contract with the retailer to supply electricity to the distribution system and the customer's contract to buy electricity from the retailer may have terminated;

(o) the retailer will process a customer's request for historical data relating to a feed-in contract in the same manner as a request for historical data relating to a supply of electricity to the customer under clause 27.2 of the Energy Retail Code;

(p) a complaint by a customer in relation to a feed-in contract will be handled by the retailer in accordance with the relevant Australian Standard on Complaints Handling or the "Benchmark for Industry Based Customer Dispute Resolution Schemes" published by the Department of Industry, Tourism and Resources (Cth). The retailer will proceed in the manner specified in clause 28.2 of the Energy Retail Code;

(q) the customer and retailer may agree a commencement date for the feed-in contract, but the contract does not commence until the customer has given explicit informed consent;

(r) a customer may terminate a feed-in contract with the retailer without notice and if the feed-in contract is a fixed term contract or an evergreen contract, the retailer may impose an early termination fee in the manner specified in clause 24.1(d) of the Energy Retail Code.

Despite the notice period, the termination does not become effective until:

(i) if the customer and the retailer enter a new feed-in contract, the expiry of any cooling-off period in respect of the new feed-in contract;

(ii) if the feed-in contract is terminated because the customer wants to enter a feed-in contract with another retailer, the date when the other retailer becomes responsible for the feed-in contract; or

(iii) if a contract for the supply of electricity to the customer is terminated with regard to a relevant supply address having been disconnected, the date when the customer no longer has a right under the Energy Retail Code to be reconnected:

(whichever occurs last);

(s) the retailer may not terminate a feed-in contract with a customer unless the retailer and the customer enter into a new feed-in contract, or the customer has transferred to another retailer in respect of the address relevant to the feed-in contract;

(t) if the feed-in contract between the retailer and a customer is a fixed term contract:

(i) the retailer will notify the customer of the following information between one and two months before the expiry date:

- the date that the feed-in contract is due to expire;
- the options available to the customer; and
- the tariff and terms and conditions that will apply after that date if the customer does not exercise any other option; and

(ii) the feed-in contract between the retailer and the customer will continue after the expiry date on the tariff and terms and conditions notified, without further need for written agreement, provided the tariff and terms and conditions have taken effect in accordance with section 40H of the **Electricity Industry Act 2000**;

(u) where the feed-in contract provides for an amount payable by a customer for the customer's breach of the feed-in contract, it will either state the amount or include a simple basis for determining that amount. The contract will include provisions consistent with clause 32(b) and (c) of the Energy Retail Code;

(v) a notice, consent, document or other communication given by a retailer under a feed-in contract will be given in a manner specified in clause 33 of the Energy Retail Code; and

(w) a retailer may only assign the retailer's feed-in contract with a customer with the customer's consent, unless the assignment forms part of the transfer to the same third party of all or substantially all of the retailer's retail business.

Note:
Clauses 35 (“Definitions”) and 36.2 (“Interpretation”) of the Energy Retail Code apply to this Criterion number 5 unless the context requires otherwise; and

“responsible person” means the person who has responsibility for meter reading for a particular connection point, being either the retailer or the relevant distributor.