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Residential Energy Markets**

by

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Redundant Regulation? Competition and Consumer Choice in Residential Energy Markets

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Management Briefing

In April 2000 the energy regulator removed the price constraints imposed at privatisation from nearly half the households in the UK, those who paid for their gas or electricity by monthly direct debit, with the remaining domestic gas prices to be deregulated in 2001 and electricity in 2002. UK energy markets had been opened completely to new entrants between 1996 and 1998 for gas, and between 1998 and 1999 for electricity, a world first. The UK energy regulator has reaffirmed his predecessors' beliefs in the efficacy of competition, and has made significant moves to transform his role in the retail market to one more like that of a competition authority than a regulator. The principal objective of the Gas and Electricity Markets Authority, is "to protect the interests of consumers...wherever appropriate by promoting effective competition..." (Utilities Act, 2000. pp 6 and 9); in doing so it should have regard to the interests of individuals who are disabled or chronically sick, of pensionable age, with low incomes, and residing in rural areas. We offer direct empirical evidence on the way in which consumers exercise choice in energy markets. We then use it to question whether the regulator is justified in considering that traditional ex ante regulation is indeed redundant in these markets and that it can realistically be replaced by competition.

When the UK government opened up the gas market to competition, new suppliers responded enthusiastically, offering consumers a choice amongst several competing firms and savings of up to 20%. But, as in telecoms, a market where choice has been available for much longer, only a minority of consumers have switched gas supplier so far. Given the continued dominance of the incumbent firm (supplying about 70% of the market), we examine whether the market can be regarded as competitive in a real sense. In particular, we show why some people switch while others do not. We also examine whether some groups, particularly those listed above, for which the regulator has statutory responsibility, are less likely to switch and

are thus vulnerable to exploitation by the incumbent. Finally we consider the implications for regulatory policy and the continued removal of price caps.

In determining whether the market will become competitive, there are two issues we consider. First, is a minority - perhaps one third - of consumers actively in the market for a new supplier sufficient to render the market competitive? Secondly, the consumers who are not switching suppliers are tolerating a considerable gap between the price they pay and the lowest price available in the market. Is it likely that consumers will become more willing to switch supplier over time, so reducing this spread and hence the need for regulatory intervention?

Based on our analysis we draw the following conclusions. Most people, it seems, are unlikely on present trends to change their gas supplier. In the main, this is because although they know they have the opportunity, they find the *search* costs too high relative to the benefits to tempt them to make the move. A subset of people are temperamentally predisposed to making a change, but this group is not large enough to make a big impact on the incumbent's entrenched position. A significant group of customers is willing to tolerate the incumbent's prices being substantially above entrants' prices. As a result, the market is unlikely to become very competitive because the incumbent left to itself will have an incentive to keep prices high.

This is a rather pessimistic scenario, since it implies a somewhat friction-ridden operation of the market mechanism in an important area of consumption for most people. On our results, a major part of the problem for smooth running relates more directly to search costs than switching costs. Moreover, some of the more vulnerable not only have the least to gain from shopping around (because of the payment methods available to them) but may also have a lower propensity to make a switch, even if equal gains were available to them. If the market is to work better, the process of finding a new more competitive supplier needs to become more streamlined, in particular search costs need to be reduced, and consumers made aware that the process is not, generally, beset with difficulty. Both Oftel and Ofgem publicise comparisons both of price and quality provided by different suppliers. Our analysis suggests that this is a valuable service, but additional effort to reduce search costs is necessary, along with continued regulatory surveillance of the incumbent's considerable market power.

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Abstract

The UK energy regulator has recently removed price controls from about 40% of residential energy users, and plans total deregulation of the gas and electricity markets by 2002, relying instead on general competition policy to protect consumers. We examine responses to a specially commissioned survey of over one thousand consumers, to identify determinants of consumer choice between suppliers. We conclude that there are substantial switching costs which seem higher for more vulnerable groups. By assessing the savings which consumers require to switch supplier, we deduce that the incumbent retains considerable market power, suggesting that some continued regulation may be necessary.

JEL: L500, L950, D120, L120

Keywords: regulation, competition, domestic energy market, search costs, switching costs

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1. Introduction

In April 2000 the energy regulator removed the price constraints imposed at privatisation from nearly half the households in the UK, those who paid for their gas or electricity by monthly direct debit, with the remaining domestic gas prices to be deregulated in 2001 and electricity in 2002. UK energy markets had been opened completely to new entrants between 1996 and 1998 for gas, and between 1998 and 1999 for electricity, a world first¹. The UK energy regulator has reaffirmed his predecessors' beliefs in the efficacy of competition, and has made significant moves to transform his role in the retail market to one more like that of a competition authority than a regulator.² In July 2000 he stated: "Ofgem's view [is] that as competition develops, regulation should move from ex-ante requirements to ex-post regulation, where action is only taken against the behaviour of market participants that has harmful effects on customers and/or competition Ofgem believes that the Competition Act 1998 can address anti-competitive behaviour that will cause appreciable harm to customers or competitors in the gas and electricity supply markets." (Ofgem, 2000a, executive summary pp 2-3).

The principal objective of the Gas and Electricity Markets Authority, to which the regulator's duties are transferred under the Utilities Act, is "to protect the interests of consumers...wherever appropriate by promoting effective competition..." (Utilities Act, 2000. pp 6 and 9); in doing so it should have regard to the interests of individuals who are disabled or chronically sick, of pensionable age, with low incomes, and residing in rural areas. We offer direct empirical evidence on the way in which consumers exercise choice in energy markets. We then use it to question whether the regulator is justified in considering that traditional ex ante regulation is indeed redundant in these markets and that it can realistically be replaced by competition.

¹ In the US competition is being widely introduced for residential users, with similar ambitious plans to deregulate the market.

² This is clearly more difficult in the regulation of Transco, the National Grid company and the regional distribution systems which are responsible for the pipes and wires.

When the UK government opened up the gas market to competition, new suppliers responded enthusiastically, offering consumers a choice amongst several competing firms and savings of up to 20%. But, as in telecoms, a market where choice has been available for much longer, only a minority of consumers have switched gas supplier so far. Given the continued dominance of the incumbent firm, still supplying 72% of the market in September 2000 (Centrica, 2000), we examine whether the market can be regarded as competitive in a real sense. In particular, we show why some people switch while others do not. We also examine whether some groups, particularly those listed above, for which the regulator has statutory responsibility, are less likely to switch and are thus vulnerable to exploitation by the incumbent. Finally we consider the implications for regulatory policy and the continued removal of price caps.

In determining whether the market will become competitive, there are two issues we consider. First, is a minority - perhaps one third - of consumers actively in the market for a new supplier sufficient to render the market competitive? Secondly, the consumers who are not switching suppliers are tolerating a considerable gap between the price they pay and the lowest price available in the market. Is it likely that consumers will become more willing to switch supplier over time, so reducing this spread and hence the need for regulatory intervention?

Switching between products is not confined to utility services, and there is a significant literature which studies such behaviour. Rothschild (1974) has modelled the consumer's decision of how long to continue searching. Klemperer (e.g. 1989,1995) has developed a considerable amount of theoretical work in the area. He considers three types of switching costs, of which transactions costs are the main category relevant to our decision. Such costs naturally make the individual firm's demand more inelastic and so reduce rivalry. Some customers, with a high reservation price, may effectively be monopolised by the incumbent, allowing the incumbent to sustain a higher price than entrants in the longer run³. Knittel (1997) examines telecoms switching behaviour in the US long distance market. He seeks to explain market power (the price-cost margin), in terms of search costs (a function of the

³ We do not here consider models dealing with several established suppliers over more than one time period.

availability of market information for example on prices, advertising, etc. and the opportunity cost of time) and switching costs, which in his market largely take the form of a fee for switching. Significantly, he attempts to distinguish between search and switching costs on the basis that the fee is the direct measure of switching cost. Calem and Mester (1995) have analysed consumer behaviour in the US credit card market and the consequences for interest rates. Green (2000) presents a theoretical model of how switching costs may hinder competition in a residential energy market. There are few financial penalties for switching suppliers, largely because the regulators have discouraged such penalties, but it is known anecdotally that some consumers do explore the potential savings from switching and decide it is not worth their while, suggesting some distinction between the perception of the two costs.

There is also a literature in marketing which studies these issues, (see e.g. Bawa, 1990; Purushottam and Krishnamurthi, 1992; Gilboa and Pazgal, 1995). Purushottam and Krishnamurthi (1992) is probably the most relevant of these. The basic premise of their model is that choice history, that is the sequence of choices made in the past, affects every choice decision. There are two components: S for stay, describes the evolution in utility of brand i , currently being consumed, whilst M for move, describes the evolution in utilities of other brands j . From this, we take the notion that consumer perceptions about brands (particularly, in our case, perceptions about the incumbent and about the evolution of the new entrants) matter, in addition to the more direct influence of prices.

Switching between gas suppliers is of a rather different nature from, say, choosing grocery brands. The decision takes on something of the character of investment decision. In this way it resembles both the telecoms and the credit card market. In section 2 we outline our economic modelling framework, then in section 3 we describe the data and discuss our estimates using a double hurdle model which distinguishes awareness of opportunities to change supplier from the contingent decision to take advantage of such an opportunity. Section 4 presents the savings that people say they require before changing supplier, and examines the implications for switching behaviour and the incumbent's market power. Section 5 concludes that the incumbent retains significant market power and suggests some policy implications.

The raw material for our paper comes from a specially commissioned questionnaire study carried out for the authors. This was a follow-up study which took place around 12 months later than our original survey, reported in Parmar, Waddams Price and Waterson (2000). At the time of the first survey, only a minority of consumers had had the opportunity to switch gas suppliers, whereas by the time of the follow-up, all consumers were able to change. We obtained over 1100 useable responses to the survey.

2. The Modelling Framework

Consider the choice of a brand of yoghurt. Usually, all brands are arrayed in a common section of the supermarket cool cabinet. The consumer brings a purchasing history to the decision, in terms of tastes and desires. Experimenting is cheap; a mistake can be corrected next week. There are even easier choices to make, for example between bags of granulated white sugar.

By comparison, choice between gas suppliers might be thought of as relatively complex. The good, like sugar, is essentially homogeneous. However, the consumer is unused to making a choice, given a purchasing history (of gas) which encompassed only one supplier, coupled with an unfamiliar procedure (indeed, for some consumers, the conceptual leap involved in the idea of a supplier using existing transportation equipment is considerable). Consumers may not even be aware of a choice, while this is obvious when products are displayed on the supermarket shelves. The incumbent supplier has no incentive to make switching easy⁴. All suppliers have an incentive to give biased advice, both in terms of comparisons with other suppliers and in terms of the customers to whom they seek to give advice, though they do have incentives to streamline the process of switching to them once a decision has been reached. In the current state of technology, it is not sensible for consumers to change suppliers with great frequency since procedures must be undergone each time a new choice is made, and suppliers may impose minimum supply periods, despite the regulator's discouragement. Tariffs are complex and not easy to compare.

⁴ For historical reasons, the incumbent gas supplier faces a cost disadvantage on input prices. The entrants incur significant up-front costs which become sunk, so they have an incentive to avoid direct price competition. Consumers do know several of these as suppliers of electricity.

We therefore argue that the decision to change supplier has more in common with an investment. Time and effort are involved in making the decision and subsequently implementing it, so that logically a change of supplier should only be made if the expected benefits outweigh the costs. We outlined our basic investment model in Parmar, Waddams Price and Waterson (2000), and are able to develop this further in the current paper, based on data when the gas market was fully open, and all the consumers interviewed had a choice of suppliers. One innovation is the attempt to draw a distinction between search and switching costs. The second sample round has the additional advantage that since all markets are open, but some markets had been open for much longer than others, we can observe the effect of this elapsed time on consumers' awareness of competition. This 'awareness' variable is a significant innovation, and helps to explain some of the apparent contradictions in earlier work. In the early days of competition the regulatory office (now Ofgem) delivered a leaflet to every household as gas competition was 'rolled out', but there is no requirement on the incumbent supplier to send out with consumer bills a notice that they now have a choice. Hence it is quite possible that some consumers remain unaware of their ability to choose.

Our underlying approach is that there are two stages in a consumer's decision to switch away from an incumbent energy supplier. Accordingly, we analyse the decision as a double-hurdle model. First, the consumer must be aware they have the opportunity to switch. Second, once aware, the benefits of switching must exceed the costs in order for them to decide to move. Of course, once the decision in principle to change supplier has been made, a particular supplier must be chosen. However, given the large number of suppliers available compared with the size of our set of switchers, we do not model the choice of one alternative supplier rather than another. In the paragraphs below, we discuss the modelling of awareness and of the decision to change supplier.

Awareness is likely to be influenced by factors relating to the importance of gas to the consumer, by the general awareness of the consumer to changes in their environment, and by the time which has elapsed since a choice has been available. The importance of the product, in turn, relates to the extent of consumption, the nature of the housing tenure, and possibly income. General awareness will potentially be influenced by education level, awareness (as signalled by previous decisions) of similar changes in related services such as telephone suppliers and car insurance, and perhaps demographics such as age. In sum:

$A = a(\text{Consumption, Tenure, Income, Education, Age, Telephone switching, Elapsed time})(1)$
where A is a zero/ one variable.

Once aware of the possibility, consumers take a decision on whether to exercise their choice. Here we draw both on our earlier model of costs and benefits and Green's (2000) framework. Generalising slightly from Green's model, consumer j will move to the entrant e for which the expression

$$B = v_{ej} - s_j + f(p_i, p_e) \quad (2)$$

is maximised, subject to net benefits, $B > 0$, where v is the added value (if any) from the entrant over the incumbent, s is the search plus switching cost, and $f_1 > 0$, $f_2 < 0$. From our standpoint, we may treat this as a useful reference to guide our empirical work. The larger is B, the more likely it is that the consumer will change. Clearly, the search and switching costs will be dependent upon characteristics and perceptions of the individual or household concerned and the nature of the market.

The gross benefits arising through price differences will depend upon consumption level and expectations regarding future prices. Since we do not aim to model the choice of a specific alternative to British Gas, we average benefits ("savings available") over available alternatives for consumers in that area with the relevant consumption characteristics. But additionally, consumers may differ in the weights they apply to current price differences as opposed to other factors. For example, some consumers may feel that British Gas will be forced to move its prices swiftly into line with competitors' tariffs. Also, in making a decision, some customers may place more weight on their existing supplier's reputation⁵ than do others. Those who are constrained to using a prepayment meter make relatively small, if any, financial savings by moving away from the incumbent⁶.

The costs come under two heads, search and switching costs and, to some extent at least, we can distinguish between these. In our earlier analysis, we concluded that the cost of changing supplier is positively related to employment and age, and negatively related to income, on search cost grounds. But the latter relationship is potentially complex. A higher income implies a higher opportunity cost of deciding and executing the decision, so a lesser

⁵ This might alternatively be considered as a (dis) benefit or as a switching cost.

⁶ This is exacerbated by constraints on switching for some of these consumers because they are in debt to their current supplier

likelihood of changing. However consumption increases with income, but less than proportionately (Bennett, Cooke and Waddams Price, 2000), so the link between income and propensity to change may well be non-linear. Also, a higher income is likely to be related to a higher educational attainment level (and hence, presumably, a quicker grasp of the essential issues), so it is important to allow for educational differences. Search cost is also likely to be negatively related to experience of switching previous services, particularly the telephone supplier, since it implies experience with a similar decision. In addition to this, studies of branded-product switching behaviour indicate that loyalty is important.

In our empirical analysis we use the information about the different suppliers providing telecom services in order to investigate the role of loyalty in the decision to switch. We identify people using only British Telecom as a telephone service provider and those who use other suppliers as an alternative to, or in addition to, BT. This allows us to capture the effect of a 'natural' attitude towards switching together with the effect of positive experiences of changing suppliers in other markets⁷. We are not able to measure loyalty directly, since prior to 1996, consumers were forced to be "loyal"; however our survey provides information about the importance attached to a supplier's reputation (for brevity, "supplier reputation") when making the decision to change supplier. We would expect that people who consider reputation as an important factor in this decision are likely to be loyal to their existing supplier and therefore less inclined to take advantage of the savings available from changing supplier. In addition to this, the evidence that a consumer has changed their car or household insurance, as well as their switching behaviour concerning telephone service supplier, is indicative of a consumer with a relatively low degree of loyalty.

So far as switching costs are concerned, the main factors that can unambiguously come under this head are consumers' estimates of time required to switch, ease of switching supplier, and loyalty.

⁷ From a methodological point of view it could be argued that the variable identifying people who are exclusively BT customers might be correlated with some unmeasured factors such as an 'inclination to be loyal'

To summarise we may write the probability of changing supplier as:

$$C = c(\text{Savings available, Price expectations, Supplier reputation and expected behaviour, Importance of savings; Income level, Various consumer characteristics, Previous switching experience; Estimated time required, Ease of switching}) \quad (3)$$

where the first set of factors relates most closely to gross benefits, the second set to search costs, and the third set to switching costs.

By using the double hurdle model, examining the switching decisions and propensities only of those who are already aware that they can choose supplier, we can isolate the effects more clearly. In contrast to our earlier work (Parmar et al, 2000), we have dropped any attempt to capture risk and in this study we use consumption directly rather than relying on household size (as an indirect measure).

3. Data and Results on Changing Supplier

Our data come from two separate but connected surveys, both specific to this project. The first group of observations relates to “survivors” of our first survey of consumer switching behaviour⁸, namely people who agreed to be re-interviewed and were contacted by telephone; observations of this group form a two-stage panel. To these was added a booster sample of randomly selected consumers. The questions asked of this second group generated similar information on personal characteristics (income, educational attainment, housing tenure, etc.) to those we already know about for the first set, and were identical so far as switching information is concerned. The questionnaires asked about consumption of gas (via detailed questions about their bill), factors which respondents considered important in changing supplier, savings which respondents required in order to switch, the time they anticipated it would take to switch, and switching of other types (e.g. telephone supplier).⁹

causing mis-specification problems. This is unlikely to be the case in our analysis since we believe that we can satisfactorily capture the ‘loyalty’ effect through the supplier’s reputation variable, as discussed below.

⁸ The results of this are reported in Parmar, Waddams Price and Waterson (2000).

⁹ We also asked equivalent questions about electricity. At the time of our survey, not all customers had the opportunity to switch electricity supplier. Details on the specific questions asked are available by request from the authors.

Table 1 sets out the relevant broad characteristics of the groups in our surveys. Round 1 is part of an Omnibus survey undertaken by the Office of National Statistics, a stratified sample designed to achieve national representativeness of respondents. The sample reported here is slightly smaller because it is restricted to heads of households who purchased gas. Nevertheless the full round 1 sample is the most likely to be representative of gas-consuming households.

Table 1 – Characteristics of the samples			
	Round 1	Survivors from Round 1	Booster sample
Number of respondents	1685	863	483
Own house/mortgage	1134 (67%)	644 (87%)	305 (63%)
Finished compulsory educ	1374 (82%)	749 (87%)	264 (68%)
BT only customer	1280 (76%)	655 (77%)	401 (83%)
DD payer	532 (32%)	304 (35%)	162 (34%)
PPM user	155 (9%)	57 (7%)	24 (5%)
Connected to gas	1354	692	411
Aware they can switch	NA	597 (86%)	354 (86%)
Switched gas supplier	[80 (6%)]*	140 (20%)	83 (20%)

*This figure is not directly comparable with those in columns 2 and 3, since round 1 was undertaken a year earlier than the later surveys on which this paper is based.

House owners and those with higher educational qualifications amongst the full round 1 sample are more likely to have ‘survived’ to round 2, and those using prepayment meters less likely to have done so, reflecting variations in mobility. Prepayment meter users are also under-represented in the booster sample, as are those who have finished compulsory education¹⁰. In other ways the three samples seem broadly similar. The changes in the structure of the sample in the two rounds of interviews make it difficult to draw direct comparisons between the results of our analysis and those contained in Parmar, Waddams Price and Waterson (2000). However the main purpose of this work is not to compare

¹⁰ In one sense, under-representing prepayment customers is no bad thing assuming they are less likely to change supplier, since the smaller the proportion of switchers, the less weight they have in the regression analysis.

switching behaviour at different stages of development of competition, but rather to address different aspects of the decision to change fuel supplier. This is reflected in the fact that different questions were asked in the two rounds of the survey, such as the degree of awareness and the importance of financial considerations in the decision to change supplier.

All the consumer data used in our estimations below come from this second round of questioning. On the supply side, information on the timing of the opening up of the regional markets to competition came from Ofgas/ Ofgem, and the tariffs of the market participants were obtained from the Which? (Consumers Association) web site.

Table 2 lists the key features of the decisions customers in our sample have made, and compares this with the results of a MORI survey undertaken for Ofgas and the National Audit Office in August 1998, shortly before the time of our survey.

Table 2 Comparative descriptive statistics		
	Whole sample (round 2)	MORI survey August 1998
Number of respondents	1103	2511
Aware they can switch	951 (86%)	2360 (94%)
Number of switchers	223 (20%)	350 (14%)
Switched to Eastern Nat Gas	32 (14%)	22% ca.
Switched to Northern Energy	22 (10%)	0
Switched to Calortex	21 (9%)	7% ca.
Switched to Scottish Power	17 (8%)	7% ca.
Switched to Powergen	15 (7%)	7% ca.
Switched to Swalec	14 (6%)	7% ca.
Switched back to BG	19 (9%)	NA
Switched to others	83 (37%)	50% ca.

Just over 20% of our sample had switched gas supplier away from the incumbent, the same proportion as estimates suggest was the case in the population as a whole at this time (see NAO, 1999). However only 86% of our sample were aware that they could switch, compared with 94% of the MORI sample, perhaps because the question was worded differently in the two surveys. In this paper we focus on the degree to which the market is developing, in terms

of explaining the degree of awareness and the decision to switch (or not), together with the issue of the extent of savings which would be required in order to switch supplier.

We now turn to the empirical results. The next three tables are based on a Probit model regression analysis aimed at identifying some of the main determinants of a dependent variable which only takes values of zero and one. The modelling strategy for the empirical analysis is based on the adoption of a general-to-specific approach, according to which all the variables relating to the factors listed in equations (1) and (3) are initially included in the regression equation and then eliminated from the analysis if not significant. Only the parsimonious specification for these regression equations is reported in tables 3 to 5.

Table 3 shows the results of modelling consumer awareness, along the lines of equation (1) above. Tables 4 and 5 examine the switching decision conditional on this (equation (3)), both in terms of whether consumers who were aware of the choice had switched and whether they were willing to switch suppliers.

One or more stars next to the coefficient value identify those variables whose effect was significant at the conventionally accepted levels. For what we considered to be borderline cases (significance levels between 10 and 15%) we report the value and sign of the coefficient since we believe that they provide a useful indication of the direction of their effect. For those variables which are significant only in one of the regressions (say for the whole sample but not for ‘survivors’) we do not report a coefficient but mark their cells with the symbol NS (not significant) in the relevant column.

In general, these results provide strong support for the idea of an investment model of decision taking and give a clear picture of the important factors influencing a consumer’s decision. The results are also largely comparable between the “survivor” subgroup and the entire set of observations, so we focus our discussion on the latter. We consider first the awareness results.

Table 3 Double hurdle model of switching behaviour

All Probit estimations				
Dependent variable: awareness of ability to switch amongst gas consumers				
	Round 1 survivors and booster sample (connected to gas) (1103)		Survivors from Round 1 (692)	
Explanatory variable	Coefficient	Mean	Coefficient	Mean
Gas consumption	0.87 **	0.22	NS	
Housing tenure	NS		0.56 **	1
Education level	0.18 ***	0.76	NS	
No. of OAPs	NS		-0.25 *	0.18
DD payer	0.15	0.4	NS	
Stage of gas compet	0.12 ***	10.2	0.12 ***	10.3
Stage of compet ^2	-0.003 ***	146.6	-0.003 **	148.5
PPM user	-0.36 **	0.07	-0.52 ***	0.08
BT only customer	NS		-0.23	0.74

NS = not significant (significant at 15% level or above).

*** significant at 1% level

** significant at 5% level

* significant at 10% level

Awareness of switching possibilities is positively related to consumption, direct debit payment (an opt-in method of payment), and home ownership, all of which indicate the importance of gas to the consumer. Educational attainment exerts a strong positive influence, and age a negative influence, in the survivor sample. Awareness is also strongly related to the length of time which has elapsed since competition was introduced in each consumer's area, though this awareness tails off. This is an important finding, indicating that as time passes more people will become aware that they can switch supplier, but this tails off in a pattern reminiscent of diffusion. After a further 12 months of the market being open to competition, we would expect the proportion of the population who is aware to have risen significantly. In other words, time itself should resolve lack of awareness about the development of competition.

Given the natural evolution of awareness, though at a decreasing rate, we consider next the choices of those who are aware they can switch. Many of the respondents believed that the process of changing supplier would take a significant amount of time (the average assessment, across the sample, was that it would take 1 day or more, whereas for most consumers in practice it would take far less). Therefore consumers view this as a significant decision, not to be taken lightly. We model two dependent variables: actually having

switched supplier, and willingness to switch as indicated by having done so or being willing to consider it. These results are reported in tables 4 and 5.

Table 4. Decision to switch conditional on being aware

All Probit estimations				
Dependent variable: Has switched supplier, if aware of possibility				
	Round 1 survivors and booster sample (connected to gas) 951		Survivors from Round 1 597	
Explanatory variable	Coefficient	Mean	Coefficient	Mean
Income level	-0.59 **	0.70	-0.5	0.75
Square income	NS		NS	
Savings available	-0.02 *	3.4	NS	
Housing tenure	-0.35 **	0.93	-2.1 ***	1
PPM user	-0.58 **	0.07	NS	
Changed car or hhld insr	0.29 **	0.09	0.3 *	0.14
BT only customer	-0.32 ***	0.76	-0.35 ***	0.73
Est time required	NS		-0.07 **	22
Supplier reputation	-0.22 ***	2.22	-0.3 ***	2.24
Importance of savings	0.26 ***	2.38	0.25 ***	2.4
BG reluctant to match	0.92 ***	0.09	0.92 ***	0.09

NS = not significant (significant at 15% level or above).

*** significant at 1% level

** significant at 5% level

* significant at 10% level

Table 5. Decision to consider switching conditional on being aware

All Probit estimations				
Dependent variable: switched or would consider it				
	Round 1 survivors and booster sample (connected to gas) 951		Survivors from Round 1; 597	
Explanatory variable	Coefficient	Mean	Coefficient	Mean
Income level	-0.57 **	0.70	-0.5 *	0.75
Square income	0.2 *	0.63	0.19 *	0.78
Savings available	-0.02	3.4	NS	
Housing tenure	-0.36 **	0.93	-0.61 *	1
PPM user	-0.56 ***	0.07	-0.36	0.07
Changed car insur	0.21	0.11	0.22	0.17
BT only customer	-0.38 ***	0.76	-0.46 ***	0.73
Supplier reputation	-0.27 ***	2.22	-0.31 ***	2.24
Importance of savings	0.41 ***	2.38	0.41 ***	2.4
BG reluctant to match	1.14 ***	0.09	1.06 ***	0.09

NS = not significant (significant at 15% level or above).

*** significant at 1% level

** significant at 5% level

* significant at 10% level

As expected, income does indeed have a complex effect on willingness to switch. The negative coefficient suggests that the opportunity cost of searching and switching is higher for high income groups, but the fact that this effect tails off at higher income levels may reflect higher educational levels, making the decision much quicker, and greater benefits through higher consumption (as revealed through “savings available”). Homeowners are less likely to switch, provided that the consumer is aware of the possibility of switching.

Those who have switched telephone supplier are also more likely to change gas supplier, as expected. For these people there is, presumably, no conceptual leap involved¹¹, and they may also have a better idea of how complex (or straightforward) the process is. Similar conclusions can be drawn for people who have changed car and/or household insurance who are also more likely to have switched. These results indicate that the decision to change fuel supplier is strongly influenced by previous experiences of changing suppliers for the provision of other services.

We attempted to capture the effect of the consumers’ loyalty to the incumbent supplier by including in our regressions a dummy variable for those who attach great importance to the suppliers’ reputation when making the decision to change suppliers. All the regression results indicate that this group of people is less likely to switch. In addition, since we believe that consumers’ expectations about the incumbent’s pricing behaviour are an important factor in the decision to switch we also included in our regressions a dummy variable for those who expect that British Gas, the incumbent supplier, will not match the new entrants’ prices. In line with our expectations we find that this group is more likely to change supplier.

The importance of the supplier reputation and expectations about the incumbent’s prices, together with the importance of expected savings, represent the most significant factors in all our regressions in explaining the observed extent of switching in the residential energy market. Indeed those who attach a greater importance to financial considerations in the decision to switch are more likely to do so. This result is supported by the evidence that prepayment meter users are less likely to switch, which reflects the lower potential savings available for this group of consumers from switching. There is weak evidence that switching

¹¹ For this reason we find it surprising that no significant effect of this factor was identified in the regression equation modelling awareness.

is inversely related to the estimated time required, though this is only significant for some of those who have switched.

4. Savings required to switch and their implications

At the time of our surveys, only a small proportion of customers had switched supplier, whilst others had contemplated it but not made the move. Of our 880 non-switchers, only 93 answer positively that they would consider switching. However, when faced with the (hypothetical) possibility of particular levels of savings as a result of switching, significant numbers do consider it, and we use this more specific response in our further analysis. For example, assuming monthly savings of £6 per month or more, 384 of our sample (almost 35%) say they would switch supplier. An amount of £6 per month represents a feasible expectation both at the time the survey was carried out and at the time of writing, although the actual amount of savings available for each customer will depend on consumption, payment method and current supplier. Nearly 42% of those who had already switched at least once would switch again for savings of £6 per month or more.

We first address the question of whether the market could be considered competitive with only, say, a third of consumers actively considering a new supplier, by analysing the particular monetary values for which consumers are willing to contemplate switching and the likely behaviour of suppliers. In Table 6 the information we gathered about consumers' willingness to change supplier is used to assess the profitability of an incumbent which keeps its prices above those of the new entrants. This exercise is aimed at providing some quantitative measure of the extent of the monopoly power held by the incumbent, resulting from exploitation of the costs that consumers attach to changing supplier.

Columns a and b in Table 6 show the numbers who, according to our survey, would switch for particular monetary amounts. By subtraction, column c shows the increment of consumers who would switch away as a result of the increment in incumbent price above the level of an entrant's price. This in turn yields the marginal revenue for the incumbent from successive price increases above any given level, that is the difference between the supplier's gains through higher margins from the consumers who remain with it (column d), and the

losses from those who leave for another supplier (column e)¹². Until the monthly saving from switching supplier goes beyond £8, the net gain for the incumbent is positive, and thereafter negative. Suppose that the lowest price an entrant can charge is a competitive one, reflecting marginal cost at current material prices ; the incumbent will find it profitable to maintain a price £8 per month, or almost £100 per year, above that level. Around 59% of customers will remain “loyal” to such an incumbent.

Therefore, a majority of customers will be paying a price around 33% above the competitive level, even on the most favourable assumptions. This is hardly the hallmark of a strongly competitive market, a similar conclusion to the one drawn in Green (2000)¹³. Our analysis is conducted for all consumers, a fraction of whom were not aware of competition when the survey took place; this offers some limited hope for improvements as more consumers become aware of the options over time.

¹² For simplicity, this calculation assumes that the consumers who leave are in some sense average consumers. This may slightly overestimate the revenues to the incumbent, since consumption pattern does have some effect on likelihood of switching, as the results in tables 4 and 5 show. However, those results also show that the main factors in identifying a switcher are not consumption pattern, so the impact of this simplification is likely to be minor.

¹³ In that sense, we provide an alternative, arguably more direct, answer to the question examined by Green (2000).

Table 6: Benefits for British Gas of keeping price above competitors' price levels (derived from numbers of consumer switches at various monthly savings levels compared with BG prices).					
Monthly Saving, £	Would Switch away	Additional Switchers	Incumbent's gain from raising price	Incumbent's loss from raising price	Net gain from raising price above previous level
A	b	c	d	e	d-e
1	16				
2	58	42	1045	42	1003
4	197	139	1812	278	1534
6	384	187	1438	748	690
8	454	70	1298	420	878
10	711	257	784	2056	-1272
12	736	25	734	250	484
14	759	23	688	276	412
16	809	50	588	700	-112
20	854	45	996	720	276
Sample	1103				

Source: Direct calculations from survey results. It can be readily confirmed that it is not profitable for British Gas to widen the differential above £8 per month.

Nevertheless, the willingness of consumers to remain with the incumbent even with considerable price differentials suggests considerable market power for the incumbent in the market as a whole. Moreover there are concerns that such power is particularly strong amongst groups for which the regulator has special responsibility, i.e. those who are disabled or chronically sick, of pensionable age and with low income¹⁴. To identify any differential market power over these groups, we examined the effect of these characteristics on a consumer's willingness to switch for savings of £6 per month or more. We interpret lower willingness to switch as coincident with greater market power for the incumbent, and potential vulnerability to exploitation. The full results are shown in table 7.

¹⁴ The data do not allow us to identify directly those customers who live in rural areas or those in receipt of disability benefits. However we intend to carry out further analysis of these groups of customers in future, based on information available in the data set.

Table 7 Probit model of the decision to switch for savings of £6 per month

Dependent variable: would switch for £6 savings per month or more (0/1)				
	All observations (connected to gas mains) 1103		Survivors from Round 1 692	
Would switch	N=384		N=265	
No of switchers	N=93		N=65	
Explanatory variable	Coefficient	Mean	Coefficient	Mean
Consumption level	-1.11 ***	0.22	-1.2 ***	0.21
Tenure	-0.35 ***	0.93	-0.8 ***	1
Education level	0.25 ***	0.76	0.35 *	0.89
No. of OAPs	0.3 ***	0.13	0.6 ***	0.17
Proxy for risk avers	NS		0.07 *	-1.2
DD payer	0.46 ***	0.42	0.36 ***	0.44
Stage of gas comp	-0.01 *	10.2	-0.02 **	10.3
BT only customer	-0.19 **	0.77	NS	
Swd*income	NS		0.54 *	0.14
Swd*cons	-1.2 *	0.04	NS	
Swd*risk	NS		-0.17 *	-0.26
Swd*tenure	0.5 ***	0.19	-1 **	0.2
Swd*stage	NS		0.0 **	2.2
Swd*hh ins	-0.46 *	0.02	-0.7 **	0.03

NS = not significant (significant at 15% level or above).

*** significant at 1% level

** significant at 5% level

* significant at 10% level

Of the groups for which the regulator has special responsibility, we note that old age pensioners are more likely to switch for a given sum, perhaps because they have more time in which to make the decision; but we have noted that they are less likely to be aware of the possibility, perhaps accounting for the apparently contrary result in earlier studies. A higher level of education means a person is more likely to switch for a given amount of savings, or in other words those of lower educational attainment are more likely to remain with the incumbent. Amongst other characteristics, we note that those who have switched telephone supplier are also more likely to move for a given amount, presumably because they are temperamentally disposed to switching or have had positive experiences of switching in other markets. Direct debit payers, who have made a conscious decision regarding their supply contract, are more inclined to switch for a given sum. As competition develops, people are less likely to switch for a given saving, maybe because the more inclined have already switched.

Finally, there are some differences between those who have switched and those who have not, in terms of behaviour concerning subsequent switches. Those with higher income who have switched are more likely to do so again, for a further saving of at least £6. Our analysis does not allow us to identify any significant effects of income for people who have not changed supplier. However it is possible that the effect of income is captured by our education level variable given the positive correlation between them. We also know that consumption levels, a significant variable in our analysis, are related to income although they do not grow proportionally (see comments on page 6). These results suggest that those of pensionable age are not especially vulnerable to exploitation by the incumbent, but those on low incomes may be.

5. Concluding Comments

We conclude the paper by returning to examine the questions raised in the introduction. Most people, it seems, are unlikely on present trends to change their gas supplier. In the main, this is because although they know they have the opportunity, they find the *search* costs too high relative to the benefits to tempt them to make the move. A subset of people are temperamentally predisposed to making a change, but this group is not large enough to make a big impact on the incumbent's entrenched position. A significant group of customers is willing to tolerate the incumbent's prices being substantially above entrants' prices. As a result, the market is unlikely to become very competitive because the incumbent left to itself will have an incentive to keep prices high.

This is a rather pessimistic scenario, since it implies a somewhat friction-ridden operation of the market mechanism in an important area of consumption for most people. On our results, a major part of the problem for smooth running relates more directly to search costs than switching costs.¹⁵ Moreover, some of the more vulnerable not only have the least to gain from shopping around (because of the payment methods available to them) but may also a lower propensity to make a switch, even if equal gains were available to them. If the market is to work better, the process of finding a new more competitive supplier needs to become more streamlined, in particular search costs need to be reduced, and consumers made aware that the process is not, generally, beset with difficulty. Both Oftel and Ofgem publicise

¹⁵ Of course, the regulator has made deliberate attempts to reduce *switching* costs.

comparisons both of price and quality provided by different suppliers¹⁶. Our analysis suggests that this is a valuable service, but additional effort to reduce search costs is necessary, along with continued regulatory surveillance of the incumbent's considerable market power.

¹⁶ However, so far as gas and electricity are concerned, these would be made more direct if consumers could input their own consumption pattern directly and obtain a readout of, say, the three best suppliers in their area.

Appendix- Variables description

Variable name	Description
Consumption level	Estimated level of monthly gas consumption (KWh) based on size of bill and relevant tariff applied by supplier
Income level	Gross yearly personal income of respondent in £, divided by 10000
Square Income	Squared value of income level
Housing tenure	1 if respondent owns house outright or owns with mortgage, 0 otherwise
Education level	1 if respondent has completed compulsory education, 0 otherwise
No. of OAPs	Number of people above 65 years of age in the household
DD payers	1 if gas payments are made by direct debit, 0 otherwise
PPM user	1 if gas prepayment meter is installed in the house, 0 otherwise
BT only customer	1 if telephone services are provided only by British Telecom, 0 otherwise
Changed car or hhld ins	1 if respondent has changed company providing car or household insurance in the last 12 months, 0 otherwise
Stage of Gas competit	Number of months since competition was introduced in the area where respondent lives
Stage of compt^2	Squared value of number of months since competition introduced
Savings available	Difference between current monthly bill and alternative bill that would have to be paid if supplied by cheapest supplier, based on range (low, medium, high) of consumption levels, area, and current payment method.
Est time required	1 if estimated time required to change supplier is less than an hour, 6 if half a day, 12 if 1 day or more
Supplier reputation	1 if respondent considers the supplier's reputation as a very important/important factor in deciding whether to change supplier, 0 otherwise
Importance of savings	1 if respondent considers the level of savings offered as a very important/important factor in deciding whether to change supplier, 0 otherwise

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