

SWITCHING COSTS AND PRICING STRATEGIES OF INCUMBENT SUPPLIERS ON THE BRITISH RETAIL ELECTRICITY MARKET

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ABSTRACT

Within British electricity liberalisation and the end of regional supply monopolies, supply businesses have seen their activity extended to a national basis. Therefore incumbent electricity suppliers have widened their playfield. Customers bear high switching costs when they change their electricity supplier. These switching costs can be split into informational, transactional, strategic and new supplier related quality costs (Mollard [2004]). Given the main features of the British retail electricity supply market and the importance of customers' switching costs; we set up two indicators that help us to assess four potential pricing strategies of incumbent suppliers. Suppliers use price strategies, which mix price aggressiveness when they invest new markets and different pricing policies towards their own customers. However, analysing pricing strategies of incumbent suppliers without taking account of customers' switching costs does not seem to be the good way to proceed since they are important and they have non negligible effects on pricing (Klemperer [1987]). We approximate the level of customers' switching costs and propose a framework that includes them. We show that incumbent suppliers do not compete aggressively among themselves, that they use the market power provided by customers' switching costs to help their entry on other regional markets and that they tend to converge toward a national pricing policy. Incumbent electricity suppliers have learnt what retail competition is and the strategic importance of switching costs.

KEYWORDS

Switching costs, Search costs, Pricing strategies, Electricity, Retail market.

1. INTRODUCTION

Competitive reform of the European electricity industry is still on progress. Full market opening will be achieved on July 1st 2007: the second Electricity Directive, 2003 / 54 EC, forecasts that all customers will be able to choose freely their electricity supplier at that date. Great – Britain was the first country to open its electricity industry and introduce, gradually, customer choice. Full customer choice was achieved in May 1999.

However customer choice does not guarantee an effective competition on the retail electricity supply market. Customers bear switching costs when they change supplier. Switching costs impact the development of retail electricity markets and also the competition on these markets (OFGEM [2003] and [2004]). Customers' switching costs are present in every industry and are not specific to the electricity industry. Defining what are customers' switching costs is not straightforward. The Office of Fair Trading gives a

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standard definition of switching costs “as the real or perceived costs that are incurred when changing supplier but which are not incurred by remaining with the current supplier” (OFT - DTI [2003]). Mollard [2004] identified four relevant categories of customers’ switching costs that arise in the retail electricity supply market: informational costs (or search costs), transactional switching costs, strategic switching costs and a supplier’s quality related switching cost. The literature on switching costs started with Klemperer. He was the first to analyse markets with switching costs. He mainly looked at the effects switching costs can have on the competitiveness of a market, their impact on entry decision and on particular pricing, which occurs on markets with switching costs.

The British electricity market has been widely studied. Most of the studies focused either on an econometric evaluation of customers’ switching costs and on some strategic decisions of suppliers. Their main objective is to shed some light on discriminatory practices of suppliers between customers using different payments methods, having different consumption levels and being competitively supplied or not. Econometric studies mainly focus on the switching costs level and on their determinant variables (Sturluson [2002], Waddams – Price [2004]). Other studies that focus more on suppliers’ behaviour are related to the way retail prices are constructed (fixed or variable rates, standing charge or not, etc.) and discrimination issues between customers’ categories (Salies and Waddams – Price [2004]). Suppliers’ strategic choice is also analysed after mergers and acquisitions to determine, whether or not, to implement any new price strategy (Brigham and Waterson [2003]).

Our paper aims at characterising the potential behaviours of incumbent suppliers on the British retail electricity supply market. In section 2, we will determine the pricing strategies of former incumbent suppliers on the British retail electricity market² and propose two indicators to allow us to find, which strategy an incumbent follows. Then in section 3, we will present customers’ switching costs in electricity retail markets and approximate their level for England and Wales according to Giuletti, Otero and Waterson [2004]. Finally in section 4, we show that customers’ switching costs need to be accounted for when you look at pricing strategies of incumbent suppliers. We give evidence of this from the beginning of retail competition in May 1999 and until February 2004. Section 5 concludes.

2. ANALYTICAL FRAMEWORK

Our goal in this section is to shed some light on few basic but crucial features of this market, especially at the retail level. They are related to the market structure of the British retail electricity supply market consequently to the competitive reform of the electricity sector. Then according to these features we develop two indicators to assess the pricing strategies of incumbent suppliers.

2.1 Main features of the British retail electricity market

The British retail electricity supply market has become national, but it is still influenced by the old regional monopolist structure.

2.1.1 From twelve regional markets to a national retail electricity supply market

Before May 1999 the supply of electricity to domestic customers was operated by twelve *Regional Electricity Companies* (RECs), which were also in charge of the distribution network activity. Distribution network and electricity supply activities were still regional monopoly businesses regulated by the regulator OFGEM (Office For Gas and Electricity Markets).

Unbundling between distribution and supply businesses was implemented with the *Utilities Act* in 2000. Since the liberalization of the domestic supply business all customers have been free to choose their electricity supplier. However if domestic customers do not exercise their right to be competitively supplied by alternative suppliers, they rely with one of the twelve *Public Electricity Suppliers* (PES), which are the newly competitive supply business de-merged from the RECs. Once opened to competition these twelve

² We consider only England and Wales and do not look Scotland incumbent electricity suppliers. We study the England and Wales market before the introduction of BETTA, which unifies England and Wales and Scottish electricity markets.

areas have been considered as twelve new competitive regional markets. Each ex-PES has the opportunity to enter the others eleven regional markets: entry on a national level is not mandatory. Moreover new competitors (without link to the old structure of the industry) have also been able to enter the British retail electricity market. Therefore each regional market has had, at least, eleven potential competitive suppliers. Entry of former regional monopoly supplier in the twelve distribution areas of England and Wales has contributed to the creation and emergence of a national retail electricity supply market³.

2.1.2 Key points of the British market structure

We will now look at some basic features of the British retail electricity supply market with a focus on former electricity monopoly suppliers. The old monopolistic structure of the supply business had strong implications for the development of the actual retail market.

The first feature is the lock – in of customers. The former monopolies suppliers, de-merged from the RECs, have kept the bulk of their historical regional customers. This can be seen through the regional market shares of incumbent suppliers in their former monopoly area: it remains between 89% in September 1999 and 46% in September 2005 in areas where competition is the strongest. In average 91% of domestic customers are still with their historical supplier in September 1999 and 52% in September 2005 (OFGEM [2006])⁴. Incumbent suppliers are endowed with a substantial customer base and most of the domestic customers are locked – in with their historical suppliers.

The second feature is the proportion of new customers on the market. New customers are customers who have not already been supplied by any supplier⁵. Is there a constant arrival of new customers on the retail electricity market? As shown previously incumbent suppliers entered the competitive retail electricity market with the same customer base as they have before the reform. According to Shapiro and Varian [1999] the customer base is a strategic asset in network industries. So the renewal of the customer base is an important issue because pricing strategies will depend on the relative weight of new customers in the supplier customer base relatively to old customers. On the British retail electricity market, each former regional monopoly supplier automatically supplies each new customer in the area (for example house moving): there was no competitive auction to supply these customers because the regulator appoints incumbent suppliers as default supplier and often as supplier / provider of last resort (PoLR).

The third fundamental feature of the actual British retail electricity supply market is increasing supplier concentration. Since opening to competition there have been a consequent number of merger and acquisitions in the supply business mainly between 2000 and 2003 (Brigham and Waterson [2003]). This trend results from a constant increase in the estimation of the optimal size of the retail supply business in order to benefit of economies of scale and scope in the supply business. This size was firstly estimated around three millions of customers and it is now reviewed between five and six millions of customers (OFGEM; Electricity Association [2000], [2001], [2002], [2003] and [2004]). Figure 1 shows the level of concentration in the British supply market since opening to competition.

Last but not least, customers' switching costs remain the most fundamental feature of retail electricity supply market (OFGEM [2004]). Switching costs arise when a customer decide to change its supplier and can be defined as *“the real or perceived costs that are incurred when changing supplier but which are not incurred by remaining with the current supplier”* (OFT – DTI [2003]). Switching costs are not a specificity of retail electricity markets. They can be found in many other markets: insurance, financial, telecoms, cars, gasoline, etc. (Valletti [2000] and [2004], Farrell and Klemperer [2004], Green [2000], Borenstein [1991], Jones, Mothersbaugh and Beatty [2000], Shy [2002], Kim, Kliger and Vale [2003], Knittel [1997]). Sturluson [2002] distinguishes search costs from switching costs and highlights their importance in the Swedish retail electricity market and give an econometric estimation of their level⁶. In retail electricity markets there are different kinds of customer switching costs and they can be split between *“natural”* and *“strategic”* switching costs. The first ones refer to information issues, contracting process and procedures when switching between suppliers and commercial quality of service of the new supplier (supply commercial quality standards see CEER [2001] [2003] and [2005]). The strategic ones result from suppliers' actions. They are related to

³ We will neither look at the technical harmonisation process between distribution networks nor at the establishment of a unified system for data transfer when customers switch suppliers.

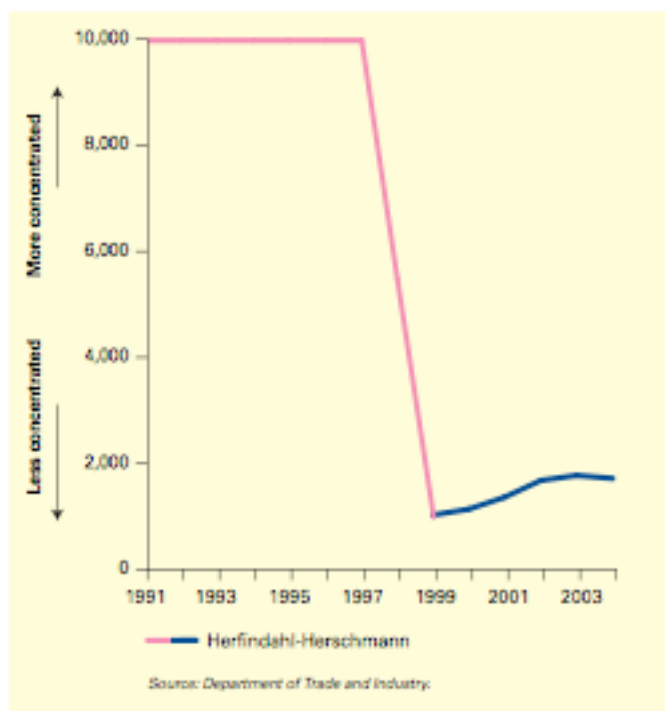
⁴ See the annex for detailed regional data.

⁵ Any supplier means either the incumbent supplier of the area or any incumbent supplier of another area.

⁶ Search costs are assumed to be four times larger than switching costs in the Swedish retail electricity market.

reward schemes, characteristics of the supply contracts (minimal length of supply contracts, termination fee, etc.)⁷ (Mollard [2004]). The existence of switching costs is an explanation of the lock-in of customers to their historical supplier. They also have strong implications concerning the competitive outcome of the market (Waterson [2003]).

Figure 1. Concentration in the domestic retail electricity supply market



Source: DTI – UK Energy Sectors Indicators 2004, chart E7.4 p. 81

Although the British regulator does not define the retail electricity market as a mature market⁸ (OFGEM [2003]) we believe however that its structure is relatively well established and quite static now: very few or no new customers, increasing supplier concentration and high degree of lock – in of the majority of domestic customers. Furthermore we think that this stability is assured by customers' switching costs.

2.2 Framework for analyzing pricing strategies of incumbent suppliers

We identify two different pricing strategies for incumbent suppliers: a national pricing versus a regional pricing. In order to assess which option the incumbent follows, we set up two indicators evaluating the aggressiveness of price competition (ICI indicator) and the price behaviour adopted towards historical customers (IIMP indicator). According to these two indicators we define four potential pricing behaviours for regional incumbent suppliers when the market becomes national (figure 2).

2.2.1 Investing in new markets versus focusing on historical customers

Given the structure of the British market, incumbent suppliers can choose between two opposite pricing strategies: they can focus on their former monopoly areas or they can try to expand it nationally. If they concentrate on their historical customers, they adopt a passive strategy. Although they can operate nationwide, they do not aim at gaining customers and do not price accordingly: they use a uniform pricing. On the other side, they can also decide to try to attract customers outside their area by an aggressive pricing strategy. This latter strategy has been identified as “two tier pricing” behaviour by the regulator.

⁷ A detailed presentation of customers' switching costs in the electricity industry is done in section 3 of the paper.

⁸ We believe that the OFGEM statement is a political one. If a market is declared and qualified as a mature one, new suppliers have very few incentives to invest in this market.

With the introduction of retail competition, pricing strategies of incumbent suppliers become of crucial importance to determine their competitive position relatively to alternative suppliers. First of all, incumbent suppliers have to determine the price they will offer on the other markets they wish to enter. The choice of the price level is a strategic variable to enter new regional markets. With a standardised and homogeneous product as electricity supply, a supplier will have to price under the incumbent's price of each regional market. Secondly, the price behaviour of an incumbent in its area will determine the level of attractiveness of the region for competitive suppliers. Two extreme behaviours can appear: low prices for historical customers in area to deter entry, or relatively high prices in area if the supplier believe that customers' switching costs are high enough to deter supplier switching.

Market penetration strategy refers to the first option for incumbent suppliers. It indicates incumbents' strategy by assessing the reciprocal aggressiveness of incumbent suppliers between each other. Pricing behaviour towards historical customers will inform us of the use of any market power given by customers' switching costs in order to help entry on other regional markets.

2.2.2 Indicators of the strategy followed by incumbent suppliers

Two indicators allow us to characterise the strategies the incumbents follow. This first deals with price aggressiveness and indicates a degree of competition on the market. The second indicator refers to the degree of use of switching costs' related market power by the incumbents in their pricing strategy. The following indicators aim at showing which strategy (or mix of strategies) is followed by the incumbent suppliers.

These indicators were realised with data from Energywatch⁹, which is the consumer protection body in the United Kingdom. Data concern retail prices to domestic customers. We choose to focus our paper on *Direct Debit* customers with an average consumption of 3300 kWh per year. Direct Debit customers have their bills paid by automatic transfers from their bank account. This category of customers has been chosen because they are the main target of competitive suppliers: the supply costs of *Direct Debit* customers are the lowest (Littlechild [2005]) and the level of switching is the highest (relatively to others types of customers that are *Standard Credit* and *Prepayment* customers) (OFGEM [2003] and [2004]).

In addition to retail prices, we also gathered transmission and distribution costs. These costs contribute to around 35 to 40% of the bill paid by domestic customers (OFGEM [2003] and [2004])¹⁰. We were not able to get the transportation costs for Scotland. Scotland was divided into two transmission and distribution networks and supply areas, which are owned and operated by two vertically integrated companies (*Scottish Power* and *Scottish and Southern Energy*). The Scottish areas are organized and regulated in a different way as of England of Wales: therefore we will exclude them from our study¹¹.

We set up two indicators for the twelve areas of England and Wales for the following periods: June 1999, December 2001 and February 2004. This allows us to evaluate the modifications in incumbents' strategic behaviour since retail market opening in May 1999. Furthermore, ex-PES suppliers have been constrained by a price cap, in their former monopoly areas, until April 2002 (for customers using *Direct Debit* payment, and till April 2001 for other payment methods). Our references periods give us the opportunity to take account of this major regulatory change and look at its consequences on retail pricing strategies of incumbent suppliers.

The first indicator deals with the degree of competition in each regional electricity supply market. The main objective of this indicator is to determine the level of discount, if any, proposed by an incumbent supplier when entering new regional markets. We call it: Indicator of Competition Intensity (ICI). This indicator is constructed the following way:

$$(P_{ij} - P_{jj}) / P_{jj}$$

With:

P_{ij} represents the price of an incumbent supplier "i" in the area "j"

And $i = \{1, \dots, 12\}$;

$j = \{1, \dots, 12\}$.

P_{jj} represents the price of an incumbent supplier "j" in its own former historical area "j"

And $j = \{1, \dots, 12\}$.

⁹ <http://www.energywatch.org.uk>. I would like to thank Caroline McNabb, from Energywatch, for providing me these data.

¹⁰ This proportion does not vary much with time.

¹¹ We consider the British market before the introduction of the BETTA, which has unified England and Wales and Scotland.

The retail prices are the prices paid by the domestic (end users) customers. Therefore they include several components: the price of energy (generation cost), the transportation and distribution costs (network costs), the supply costs (metering and billing) and the retail margin. The price used in this indicator are not corrected of any of these components because all firms wishing to supply in any area will have to bear most of these: namely the network (transportation and distribution) costs. Moreover the generation cost (price of energy) will also be born but could vary between suppliers according to their sourcing (from a generation affiliate company or via the spot market). Domestic customers are assumed to switch supplier principally according to the retail price they are offered (OFGEM – MORI [2001]). Therefore, price discounts offered are a good reflect of competition on this market.

With this indicator we can distinguish two extreme degrees of competition intensity:

- The degree of competition intensity in the British retail electricity supply market is assumed to be low if the new company (in any area) does not offer a discount relatively to the incumbent supplier price. The ICI indicator will be equal or close to zero.
- The degree of competition intensity in the British retail electricity supply market is assumed to be high if the new company offers (in any area) a significant discount relatively to the incumbent supplier price. The ICI indicator will be positive and important. It represents voluntary entry behaviour of suppliers in each others former monopoly market, and it is shown by the price offers. Customers have a gain to switching supplier.

The second indicator deals with the degree of market power of incumbent suppliers over their historical customers. We call it: Indicator of Incumbent Market Power (IIMP). The objective of this indicator is to determine, whether or not, the incumbent of any area use strategically its customer base in area to help / subsidise its entry on other regional retail markets. This indicator is constructed the following way:

$$(P_{ii} - N_i) - (P_{ij} - N_j) / (P_{ii} - N_i)$$

With:

$i = \{1, \dots, 12\}$ and,

$j = \{1, \dots, 12\}$.

The retail price is composed of four components: $P = E + N + S + M$

With:

P is the retail price,

E is the price of energy,

N are the network costs (transmission and distribution),

S are the supply costs,

M is the retail margin.

The Indicator of Incumbent Market Power (IIMP) uses the final retail price corrected of the network costs. Therefore the $(P - N)$ correspond to the price of energy with the supply costs and retail margin. The $[(P_{ii} - R_i) - (P_{ij} - R_j)]$ determine the retail price (corrected) of an incumbent supplier “i” in its own area “i” minus the price (corrected) he offers in the “j” area. All the prices have been corrected of the network costs to set up the IIMP indicator. This is because the ratios take retail prices from different network areas (so different network costs for suppliers), which can explain some divergences in retail prices.

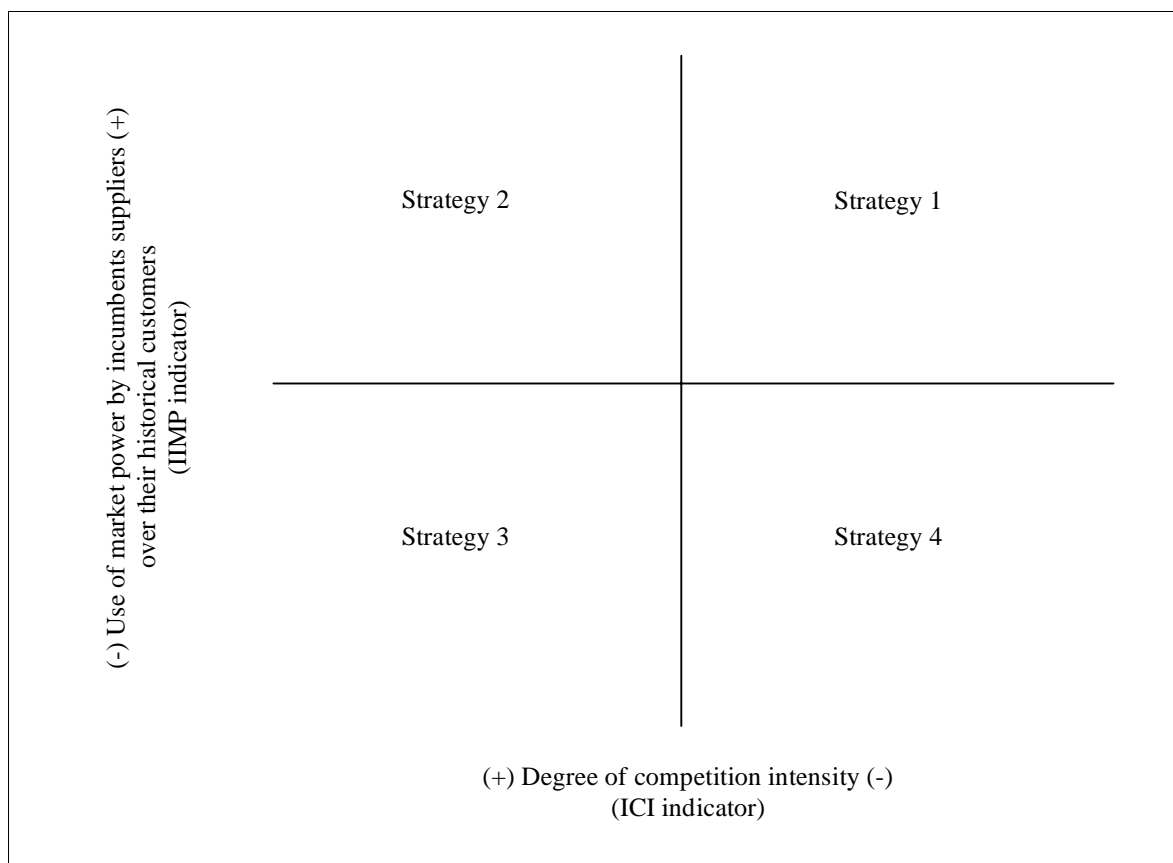
If the indicator IIMP is different from zero and significant, we can say that incumbent suppliers have some market power over their historical customers and that they are using it to favour their own entry into other regional retail markets.

Given the two indicators presented above and dealing respectively with strategies to invest new markets (ICI) and the strategic use of incumbent customer base (IIMP), we are able to present four basic behaviours of companies on retail electricity supply market.

2.2.3 Identification of four main behaviours

When we combine the two indicators ICI and IIMP, we arrive to four basic behaviours of incumbent suppliers on retail electricity markets (figure 2). It allows us to evaluate entry of incumbent suppliers in new markets through their pricing behaviour (discount offered or not, and eventually the level of the discount) (ICI) and see if this entry was possible because of the use of their market over their historical customers (IIMP). We will now look at the characteristics of the four behaviours identified.

Figure 2. Entry pricing strategies of an incumbent supplier in a mature market (formerly regional and now national)



The first strategy identified corresponds to incumbent suppliers investing in new markets without price aggressiveness. They use their market power in order to enter into new geographical markets. However this entry is not really competitive because the price offered does not include any discount relatively to the incumbent supplier they are trying to compete against; the price are even sometimes higher. This is possible because they can price above the competitive level in their own regional market and earn extra profit, which give them the opportunity to price above the incumbent in the markets they are trying to enter. This kind of behaviour is possible because of the existence of the customer base from which they withdraw a rent. It can be argued that this behaviour is close to unfair competition because they use their customer base to enter new markets with fewer risks. However the entry is not really aggressive (no or little price discount). Consequently the entry reflects more an obligation than a real strategy. The main objective here is only to invest the market, to be present. According to Shapiro and Varian [1999], this is the main strategic action to take in retail mass markets in network industries, which is the case of the electricity industry. The incumbent supplier enters new geographical markets only to be present but he prefers to focus on its own customer base. Relaxing our assumption on incumbents' price aggressiveness leads us to the second strategy. The ICI indicator is at a high level: it can be interpreted as a sign of willingness to enter new markets. Incumbents set their price aggressively in these markets and offer a substantial discount. The companies behave as real competitors in order to attract and gain customers from the incumbent. As in the previous case this strategy relies on the possession of a customer base. It procures a protection to the incumbent supplier in his former monopoly area. Customers' switching costs give him some market power and he uses it strategically with

high prices in his area. This behaviour allows him to offer competitive prices in other regional markets. However, unlike the first strategy identified, the operators use their customer base in order to be able to offer a price discount in the new market. These first two strategies correspond to some strategic behaviour of incumbent suppliers willing to expand their playfield outside their former monopoly areas. They both reflect the advantage, and the use of it, of being an incumbent supplier. The customer base is recognised as a valuable strategic asset (Shapiro and Varian [1999]).

The third strategy is characterised by an intense and real price competition between all the actors on the market, which can be assumed to an ideal of retail competition. The competition is two fold: price competition and non - use of market power over historical customers¹². First, there is effective price competition: price discounts are available. And secondly, this active price competition by operators is not *subsidised* by over pricing to their historical customers (the IIMP indicator is low). The fourth and last strategy refers to a non-aggressive entry with no use of market power by the incumbents. A parallel can be drawn with a public service situation: price is not the discriminatory variable and entry is not made to the detriment of incumbents' customer bases. The last two strategies seemed to be some idealised options. Given the possible existence of incumbents' market power, it is far from reality that they will engage in a tough price competition, which will results in zero profit.

With this analytical framework it seems relatively easy to understand and study the behaviour of incumbent suppliers on the retail electricity supply market. However customers' switching costs are of relative importance in this market and could modify our understanding and analysis of suppliers pricing strategies (OFGEM [2003] and [2004]). Customers' switching cannot be ignored in retail electricity supply market: they have to be incorporated as the primary analytic variable (Mollard [2004]).

3. APPROXIMATION OF CUSTOMERS' SWITCHING COSTS IN THE BRITISH RETAIL ELECTRICITY MARKET

We now define customers' switching costs in the retail electricity market and show that they must be incorporated to understand incumbent suppliers' behaviour. Then using Giuletti, Otero and Waterson [2004] method we prove their existence and give a rough quantitative approximation of their level.

3.1 Relevant customers' switching costs in the British retail electricity market

Most of the domestic customers in the England and Wales market are still locked-in with their former regional monopoly suppliers. On mature markets customers' switching costs are important because they modify the expected behaviours of firms: homogenous good, as the supply of electricity, become heterogeneous after their purchase (Klemperer [1995]). According to Mollard [2004] there are four relevant customers' switching costs in retail electricity markets. They can be transactional switching costs, informational switching costs, strategic switching costs and new supplier's quality related switching costs.

Transactional switching costs are the costs born by customers when they go through the switching process. They arise from the mandatory procedure customers have to follow to be supplied. The supply of electricity to customers is a subscription activity, which led to an important contractual document. Hence switching implies some specific procedures for customers. In England and Wales they have to notify, by letter, their intention to switch with a 28-day notice period¹³; they have to take a meter reading on the day they switch and they have to pay any outstanding bills to their old supplier¹⁴.

Informational switching costs, or search costs, are also very important in this market. Informational switching costs principally refer to the discovery of new suppliers and their different offers (Coase [1937]). This is due to the old regional and monopolistic structure of the supply market. Before the reform, electricity supply was a regional monopoly: therefore domestic customers only knew their incumbent supplier in their area. Customers are even not aware that they can switch their electricity supplier and they have to acquire information about alternative suppliers (Giuletti, Waddams – Price and Waterson [2000]). Informational

¹² It does not mean that incumbent suppliers do not have market power.

¹³ This is the 28-day rule, which allows any domestic customer to change its supplier every 28 days.

¹⁴ These measures are the standard ones and we can find some variations between customers groups, payments methods, etc.

costs are specific in the sense they are born whether the customer switches or not. Information is also related to the quality of the new supplier but we will develop this point later in the paper.

Strategic switching costs derive from incumbents companies' actions. The main objective of this category of switching costs is to maintain, or increase, the degree of lock – in of customers towards their current supplier. These costs can be split into two sub categories: switching costs arising from technological complementarities and from reward schemes. First, the strategic switching costs arising from technological complementarities are the results of a non-inter operability and non-compatibility of standards¹⁵ (Economides [1996]). This feature can also be found in the retail electricity supply market. Compatibility and complementarity's issues arise with meters. Incumbent suppliers can decide to provide their historical customers with complex and smart meters that allow a more precise metering and therefore the opportunity to propose more advantageous offers. New suppliers will have to offer a new meter to the customers they want to attract and be sure that they are compatible with the norms established by the *Distribution Network Operator* (DNO) for the data transfer and settlement process (for the allocation of exact consumption to each customer). Therefore the ownership of meters is of crucial importance and contributes to maintain and even increase the customers' switching costs. The second sub category deals with reward schemes and fidelity programs developed by the companies. These programs refer to partnerships between industries; monetary gains (or free supply of a good or service) increasing with the level of consumption (the fidelity program *Fréquence Plus* established by *Air France*). One example of partnerships in the electricity industry is the link between the incumbent supplier *Scottish Power* and the food chain *Sainsbury*.

Switching costs also arise from the quality¹⁶ of the new supplier (delay of intervention, quality of the call centre, etc.): these are new supplier's quality related switching costs. Electricity supply is an experience good: the quality of the service provided and the new supplier are only discovered after the service has been consumed (Nelson [1970], OFT - DTI [2003]). Experience goods lead to an uncertainty cost, which cannot be overcome by the resolution of the information problem exposed earlier.

Electricity supply is a rather complicated business. It is at the end of the network and must be well coordinated with all the upstream activities (generation, transportation and distribution). The more complex the service supplied, the more the consumers' protection bodies (regulatory bodies, competition authorities, consumers association, etc.) will take actions and impose standards, which aim is to protect customers. Despite their laudable actions, it can deter customer switching by imposing too many constraints on the process. Let us assume that the level of customers' switching costs is not impacted by any changes in the retail electricity supply market regulation. Given the market characteristics and the types of customers' switching costs on the market, we can say that their overall level is high. Information costs are at a high level due to the impact of the old regional monopolistic supply market structure. However, the information costs are probably decreasing with time and experience of retail competition and switching. Transactional switching costs are also high because it is the first time customers are given the opportunity to change supplier: all the procedure has to be established and contractual details (and arrangements with upstream stages of the network) are complex. Strategic switching costs could be relatively low at the beginning of retail competition, but on a rocketing trend as soon as incumbent suppliers (and other suppliers) will have realized the advantage they can withdraw from them. The new supplier's quality related switching costs are also very high but we assume there is a learning effect with switching and that customers' experience will spread across the market. So uncertainty arising from quality costs will probably be decreasing with time and experience.

3.2 A basic approximation of customers' switching costs through price differentials

How can we take account of these customers' switching costs in the analysis of the pricing strategies of incumbent suppliers? One solution is to make the following hypothesis: customers' switching costs are included in the retail prices paid by the customers. Giulletti, Otero and Waterson [2004] have developed a number of ratios in order to prove the existence and approximate the level of customers' search and

¹⁵ One good example is the problem between razor and razor blades.

¹⁶ The quality of supply of electricity is dependent of the distribution network. The Distribution Network Operator is the only actor responsible for it and he can be fined if he does not meet the distribution quality standards set by the regulator. Here we refer to the commercial quality of electricity supply (CEER [2001], [2003], [2005]).

switching costs. Their method relies on the following hypothesis: they study the case of the first switch, which means the switch from the incumbent supplier; and they assume that companies are aware of customers' reaction when they set their prices, i.e. they know that customers bear switching costs. Four ratios are established:

G, the Gap. It corresponds to the price differential between the lowest price supplier and the second lowest supplier on the market,

R, the Range. It is the difference between the more expensive and the cheapest of the alternative suppliers to the incumbent for each distribution area,

M, the Median. It refers to the price difference between the incumbent supplier of any area and the median price of all the others suppliers that have entered the regional market considered,

B, for *British Gas*, which was the national incumbent gas supplier. It measures the difference between the price of *British Gas* and the price of the incumbent supplier of the area.

All these ratios are calculated for each former regional monopoly market as we are interested in the first switch made by a customer: we look at the situation when a customer decide to leave its incumbent supplier.

The variables G and R are representative of consumers' search costs: they correspond to the exploratory and discovery costs of the market (Coase [1937]). If consumers' search costs exist on the market therefore the market is not totally explored by the customers and, as a consequence, price differentials can persist. If there were no consumers' search costs all prices would be discovered and known without cost by all customers. Any supplier with a price offer above others would not attract and gain any customers since price is the main reason for switching on retail electricity supply market (OFGEM – MORI [2001]). G and R prove the existence of consumers' search costs on the market. These ratios also give a first gross approximation of the general level of these costs. However we make some improvements to these indicators. This is due to the market we are interested in: we focus only on former incumbent suppliers and therefore we do not take account of new entrants¹⁷. New entrants and the former national gas supplier are excluded of our calculations and analysis because our aim is to shed some light on the pricing strategies and dynamic of incumbent electricity suppliers.

The following tables 1 and 2 display the results for June 1999, December 2001 and February 2004. The level of customers' switching and search costs is estimated in £ Sterling per year.

Table 1. Approximation of customers' search costs in England and Wales

Variable R			
Customers' search costs			
Distribution area	Highest price of alternative supplier – lowest price of alternative supplier		
	June 1999	December 2001	February 2004
Eastern	20	11	11
East Midlands	22	16	14
London	21	17	18
MEB	23	21	24
Manweb	25	34	10
Northern	27	40	35
Norweb	19	13	8
Seeboard	20	17	18
Southern	16	19	26
Sweb	21	21	21
Swalec	40	19	16
Yorkshire	22	34	31
Average	23	22	20

M and B variables concern consumers' switching costs. We see it the way these ratios are constructed. They try to minimize the influence and effect of customer search. The use of the median price instead of the mean price is a good example of that. Choosing the median price is equal to a random choice: a customer will

¹⁷ Real new suppliers that have no experience in the retail electricity supply business or *British Gas*.

have the same probability to pick up a price above or below it: search therefore is eliminated; or maintain at its lowest level. So the only remaining costs can be assimilated to switching costs. Moreover, choosing *British Gas* as electricity supplier is synonym of a substantial reduction of search costs for the customer: *British Gas* is already known by everyone as the former national monopoly gas supplier in England and Wales (and is now the first electricity supplier with 25% of the domestic national market share (OFGEM [2003] and [2004])).

Table 2. Approximation of customers' switching costs in England and Wales

Variable M			
Median customers' switching costs			
Distribution area	Incumbent supplier price – median price of alternative suppliers		
	June 1999	December 2001	February 2004
Eastern	14	23	29
East Midlands	2	12	25
London	13	11	16
MEB	12	20	18
Manweb	17	26	15
Northern	24	34	19
Norweb	4	26	34
Seeboard	20	23	15
Southern	4	23	20
Sweb	13	21	16
Swalec	0	14	12
Yorkshire	20	22	17
Average	12	21	20

We keep the variables M and R as relevant indicators of the existence of customers' switching and search costs and as an approximation of their overall level. The variable B, related to *British Gas*, is not used because we study only electricity incumbent suppliers. Moreover we do not keep the variable G, which tries to look at who is the lowest new supplier, which is not our aim here. From tables 1 and 2 above we will see how our analytical framework to understand and analyse pricing strategies of incumbent suppliers is modified when we take consumers' switching costs into account.

4. HOW DO INCUMBENT SUPPLIERS TAKE CUSTOMERS' SWITCHING COSTS INTO ACCOUNT IN THEIR PRICING STRATEGIES?

Pricing is modified by the existence of customers' switching costs. Two effects have been identified: *bargain then rip-off pricing* and *invest or harvest principle* (Klemperer [1987 a], [1987 b], [1995]). But customers' switching costs are not included to explain the strategic choices made by suppliers. We will give evidence that this is needed and look at pricing strategies of incumbent suppliers on the British retail electricity market since June 1999.

4.1 Theoretical predictions in presence of switching costs

Pricing on markets with customers' switching costs, and its effects, has been widely studied by Klemperer [1987 a], [1987 b], [1995], Farrell and Klemperer [2004]¹⁸. On these markets two main manifestations can be seen and associated with customers' switching costs: *bargain then rip-off pricing* and *invest or harvest principle*.

¹⁸ For a literature survey on pricing behaviour of firms on markets with switching costs, see OFT – DTI Discussion Paper 2003, prepared by NERA.

The first phenomenon identified in presence of switching costs consists in offering low prices (even under marginal cost) in a first period to attract customers: this is known as an *introductory price offer*. Once customers are gained and locked in, the supplier will raise its price, even above the competitive level. This practice can only be used when customers face substantial switching costs otherwise they would switch again when the supplier raises its price. Very low price in a first period is necessary: the price differential has to be substantial in order to overcome customers' switching costs. The price differential must be enough to cover the switching costs and provide an economic incentive for the customer to switch. This kind of pricing looks like predatory pricing but when you account for switching costs, two period pricing is logic and usual.

The second phenomenon deals with a strategic choice that the company has to make: will she try to gain new customers (*invest* in market share), or will she focus on her customer base and milk (*harvest*) it according to the protection created by the switching costs? Regarding this issue, the decision criterion is the suppliers' market share. Two cases are distinguished in the literature:

- If a supplier is dominant in the market, he will focus on harvesting its customer base. Doing this, he will loose a proportion of customers (those with the lower switching costs) but it is still profitable for the company. Waterson [2003] shows that an incumbent supplier can maintain its price 8 £ Sterling per month upon competitive suppliers and still be better off than to react and compete on price.
- If the supplier is not in a dominant position, there is a high probability that he will focus on attracting customers: he is in an *invest principle*. However, this behaviour depends on the level of customers' switching costs. If they are too low or too high, this strategy is risky. If the switching costs are low, the incumbent supplier will react aggressively to protect its established customer base: this is mandatory because customers will move at any discount offered. If the switching costs are too high, the necessary discount to attract customers will have to be too important and financially dangerous for the company.

4.2 Introduction of customers' switching costs in the analytical framework

Apart these basic principles that concern *usual* price behaviours on markets with switching costs, the role of customers' switching costs to understand companies' pricing strategy has not been studied. Using our analytical framework previously presented (figure 2), we will add the customers' switching costs we have estimated and see if incumbent suppliers take them into account when they set their prices (figure 3). The analysis of incumbent suppliers' pricing strategies will be impacted by the introduction of switching costs.

The level to determine the price aggressiveness of an offer is modified when you account for switching costs. This is easily understandable. Switching costs procure a protection for the incumbent suppliers, so competing suppliers will have to offer a larger price discount to interest customers and hope to attract some of them. In our analytical framework this is symbolised by a shift to the left of the vertical line, which separate aggressive and non-aggressive pricing strategies. On markets with switching costs, pricing behaviours that are usually admitted to be aggressive (on other markets) may just be the norm (Klemperer [1987]).

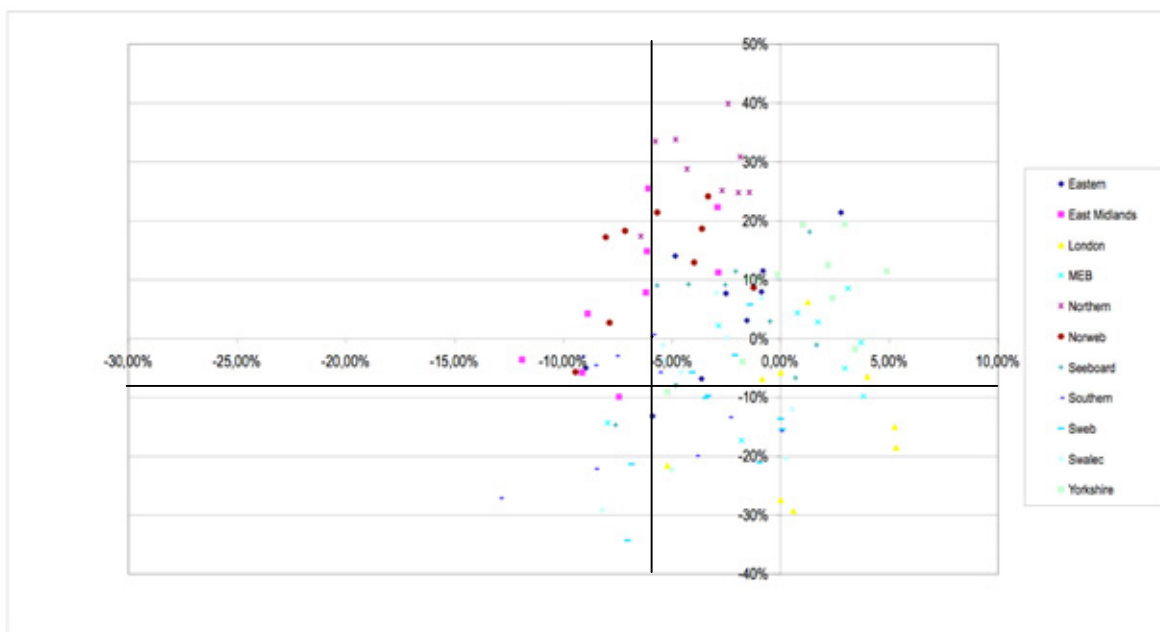
In the same way the use of their market power by the incumbents will be easier and less risky in markets with switching costs. This is graphically represented by a shift downward of the horizontal line representing the use of market power in the pricing strategy. For the incumbents, the starting point to use their market power is at a lower level: they can use it earlier than on markets without switching costs.

The cases representing the four main behaviours identified earlier in this section have their shape modified: they can increase or decrease. A bigger place is given to the use of market power (without being sanctioned by other market actors). To sum up in retail mass market with a stable organisation, 1°) huge price differentials can exist and reflect incumbents' market power, and 2°) the degree of aggressiveness of price competition has to be carefully estimated.

The lines which approximate customers' switching costs and search cost are placed on the graphics using the average of the percentage value of M and R shown in table 3 above. The averages are respectively 6,705%, 9,675% and 7,90% for June 1999, December 2001 and February 2004. The graphics represents the degree of competition intensity on the abscissa. A high degree of competition intensity (+) corresponds to the importance of the discount offered, which is represented by a negative value on the axis. The higher the negative value the higher the discount and the higher the degree of competition intensity. On the Y-axis is represented to use of market power of incumbent suppliers over their historical customers. A high value means they are using it.

Graphic 1 propose an overview of the strategic price positioning of incumbent suppliers just one month after the opening of domestic markets to competition. From this graphic we do not see any particular logic or real strategic behaviour of incumbent suppliers at this time. However we can outline some characteristics. A majority of incumbent suppliers choose to focus on harvesting their own customers (even when they are present in other regional markets). The incumbent supplier *Northern* is the one who harvest most its customers to enter new regional markets: it goes from 18% to 40%. Despite this extreme, all suppliers do it (completely or partially). Price aggressiveness is not really important when you incorporate switching costs in the picture. Very few suppliers offer price discounts higher than the average level of switching costs. The old regional market structure is still dominant. The existence of an overall regional strategy of suppliers is apparent on the graphic. If a supplier adopts a national strategy, he will not have difference between the twelve distribution areas: each supplier would therefore have only one spot on graphic 1. This does not correspond to what is shown on graphic 1: each supplier has many spots (corresponding to its entry on other regional markets) and these spots are not very concentrated, which implies a regional focus rather than a national one. It is clear from graphic 1 that in June 1999 incumbent suppliers do not have adopted any precise strategy: they remain focused on their old historical monopoly area. Moreover, switching costs are not used to determine pricing behaviour and strategy: incumbent suppliers are present nationally but not aggressive when you think of customers' switching costs. The beginning of domestic retail competition in England and Wales seems to follow a smooth starting pace. There are more suppliers that retain a higher market share of domestic customers in their area than the national in area market share of incumbent suppliers.

Graphic 1. Incumbent suppliers' pricing in the British retail electricity market – June 1999



How does the situation look like in December 2001? Graphic 2 gives a new snapshot of retail pricing eighteen months after the introduction of retail competition. At that time, concentration in the retail market has increased and there are only seven suppliers left relatively to twelve in June 1999 (Electricity Association

[2003])¹⁹. From graphic 2 it is clear that incumbent suppliers have learned what is retail competition and how it works. There has been a clear strategic move from June 1999. If we look at the new positioning of suppliers without taking switching costs in consideration it might seem to be condemnable: historical customers are used to allow aggressive pricing, with significant discounts, in other regional markets. However, when you allow room for customers' switching costs, this kind of pricing is coherent. Price aggressiveness is not exceptionally high, just in the mean level with switching costs. It is possible given the protection incumbent suppliers have in their markets according to the switching costs. However, suppliers adopted have different approaches in December 2001. *Npower* and *Powergen* seem to target a national strategy: their spots are more concentrated on the graphic; they are harmonising their pricing between areas.

Graphic 2. Incumbent suppliers' pricing in the British retail electricity market – December 2001



The graphic 3 depicts the situation in February 2004, which confirms our first findings. Concentration has continued to increase: there are now five suppliers for 25 millions of domestic customers. This phenomenon has simplified the choice for incumbent suppliers. When a supplier acquires another one through merger or acquisition, he also gains its incumbent supplier status and its valuable customer base²⁰. Customer base valuation has been increasing since May 1999 to reach 300 £ per customer at most (almost 500 euros) (Bunn [2004] p. 16). In February 2004 pricing strategies of incumbent suppliers on the England and Wales retail electricity supply market seem to be well established and quite static now. Price aggressiveness is not very intense when you take account of customers' switching costs. Incumbent suppliers seem to offer price discounts, in new markets, in respect to the level of customers' switching costs: price competition has softened and is even quite low. Harvesting historical customers is usually the case. Suppliers tend to focus on their respective customer bases: they seem to have adopted *the harvest principle*. Competition for acquiring customers is low, which led us think there is some collusion between incumbent suppliers in Great – Britain. However, do switching costs provide enough incentives to establish and maintain collusion? The answer is not evident and further investigation is needed (OFT – DTI [2003]). National pricing is, on average, the trend in England and Wales now. The former regional incumbent suppliers have integrated the extension of the supply market on a national level and they have adapted their prices accordingly.

¹⁹ *British Gas* and new entrants are not included in our analysis.

²⁰ Brigham and Waterson [2003] have shown that a “legacy trap” can arise after a merger or acquisition: it shows that the harmonisation of prices between old and new customers acquired is not straightforward and easy.

Graphic 3. Incumbent suppliers' pricing in the British retail electricity market – February 2004



Still with our hypothesis of neutrality of regulatory action to influence the level of switching costs, we look at the question of the removal of price – cap for incumbents in area for *Direct Debit* payment method. This price – cap was removed in April 2002. How did it influence pricing of incumbent suppliers? The main result is that suppliers increased their prices in area substantially without losing many customers. This has contributed to create a less competitive environment (Giulletti, Otero and Waterson [2004]). They benefit from customers' switching costs and they have learnt how to use them strategically.

5. CONCLUSION

Analysing pricing strategies of incumbent suppliers on retail electricity supply market is complex. First, it is necessary to make some assumptions concerning the main features of the market where these suppliers operate. In our case, the old regional monopolistic organisation of the British electricity sector has strong impacts on the actual market: suppliers evolve in a relatively rigid market, most of the domestic customers are locked – in with their incumbent supplier and incur high switching costs when they switch supplier. These features led to the development of different pricing strategies for incumbent suppliers. We identified four potential pricing strategies that mix price aggressiveness when entry in new markets and pricing policies towards locked – in customers. Secondly, we show that analysing pricing strategies of incumbent suppliers need to take account of customers' switching costs otherwise we would not be able to understand why firms behave the way they do. Moreover incumbent suppliers have learnt how to price in respect with customers' switching costs: they have experimented retail electricity competition and have discovered the fundamentals on which it relies.

However the inclusion of customers' switching costs is mandatory to understand pricing strategies of incumbent suppliers, we also take them into account for every supplier (new entrant and supplier of any related market who decide to invest another market). According to our case study one limitation would be the growing importance the dual fuel market. Dual fuel offers consist in one supplier proposing two products, namely electricity and gas in our context. Studying pricing strategies of suppliers (electricity incumbents, gas

incumbents and new entrants) on the dual fuel British market is a very important and challenging area of work. Papers like Green [2005] initiates the path of such study with an econometric evaluation of customers' switching costs between single fuel and dual fuel.

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