

Working Paper No. 5

June 2007

This version, july 2008

GIS
larsen

Laboratoire
d'Analyse
économique des
Réseaux et des
Systèmes
Énergétiques

Retail Competition in electricity markets

Christophe Defeuilley

June 2007. This version, july 2008

Retail competition in electricity markets.

Christophe Defeuilley¹

Abstract : The introduction of competition into retail electricity supply gave rise to great expectations. However, to date its performance has proven less than stellar, owing primarily to the theoretical concepts underpinning this reform, which draw heavily on the Austrian school. Neither consumers' decision processes nor this sector's technical paradigm were adequately accounted for, leading to an uncorrect estimation of the expected impact of opening to competition. Short- and medium-term prospects for the evolution of retail markets must be reconsidered from the perspective of greater stability : not a generalization of competition, but rather a persistent segmentation between active and inactive clients ; not a large and rapid diffusion of radical innovations in commercialisation, with the potential for undermining the incumbents' positions.

¹ LARSEN and EDF R&D. The views expressed herein are strictly those of the author and do not necessarily represent those of EDF. This work benefited from input and comments from Raphaël Boroumand, Dominique Finon, Matthieu Mollard, Fabienne Salaun and two anonymous referees, whom I thank.

1. Introduction

The opening to competition into retail electricity supply gives the opportunity to residential consumers to choose their own supplier. This measure, first tested in Norway, then in Britain, was applied in all countries of the European Union, in some U.S. states, in Australia, and in New Zealand. It constitutes one of the major features of the reforms in the electricity sector. The removal of price controls and other regulatory constraints should have enabled to set the market's price formation process into action. The introduction of competition should have increased consumers' choices, reduce the barriers to entry and thereby encourage innovation and lessen prices.

However, the current situation of retail electricity markets reveals that the expected results did not always materialize. To date, the proportion of active consumers is rather limited in many countries, new entrants experienced difficulties to compete against the incumbent companies, few salient innovations have been successfully introduced. Is it the effect of remaining barriers to entry that stymied the full manifestation of retail competition? It ought to be stressed that in the large majority of cases market prices co-exist with regulated tariffs. Remaining end-user price regulation is one of the factors which hinders equal access of all suppliers to customers and impedes retail market competition from developing (ERGEG, 2007). But in other cases, end-user price controls and other regulatory constraints have been suppressed (NAO, 2008). These measures have obviously given an impetus to the competition in retail (high switching rates, pressure on prices), but with some important limitations. What should we conclude? This article suggests that the effects of the introduction of competition in the retail electricity supply have been uncorrectly estimated.

This misestimation is due to the partial relevancy of the economic arguments providing their rationale. The introduction of competition was largely inspired by ideas originating from the Austrian school¹. This approach left its mark on the electricity sector thanks to the intermediating work of M. Beesley and S. Littlechild, two Austrian scholars who were also intimately associated with the design of the reforms (Helm D., 2003)².

With its emphasis on analyzing competition as an *entrepreneurial driven process*, the Austrian School conveys a vision of the market that lacks behavioral and technical depth. As a consequence, it neglects to account for two main phenomena that reduced the impacts from introducing competition in the retail electricity supply: cognitive bias affecting consumer's decisions to switch, technological paradigm reducing innovation opportunities in commercialization.

¹ While we don't want to trivialize the profound differences that exist among economists belonging to the Austrian School, and the notable developments it has experienced between the initial work of Carl Menger (1871) and today, we here present a simplified version of the key Austrian conceptions of the nature of competitive process.

² This influence is stressed by S. Littlechild himself: "[Kirzner] writings in this area [nature of competition and entrepreneurship] were influential in the development of my own thinking about privatization, competition and regulation of the utilities. Subsequently, the regulation of the British electricity industry reflected his and other Austrian ideas" (Littlechild S., 2002a).

This paper is organized as follows. After presenting the arguments advanced by the Austrian school to support the opening to competition (Section 2), then sketching the state of electricity retail markets (Section 3), we analyse the factors that explain the discrepancy between the current reality and expectations as they were initially formulated (Section 4). Several concluding remarks follow, underscoring the importance of rethinking the prospects for the evolution of retail markets (Section 5).

2. Theoretical background

The introduction of competition was not an obvious decision to make. Two of the main traditional functions of retailers, largely elude electricity suppliers. In the first place, intermediation - the organization of the transmission and distribution of goods from producers (generators) to consumers - falls outside of their control. Indeed, electricity transmission is technically constrained (the virtual impossibility of storing it, the need to maintain and modulate voltage levels) as well as economically (the natural monopoly character of transmission and distribution grids). Therefore, grid operators (TSO, DSO), not suppliers, manage the organization of intermediation.

In the second place, for a good as homogeneous as electricity, opportunities for transformation and marketing (presentation and packaging, bundling, co-branding) are limited. This is the reason why retailing represents only a small percentage of total electricity bills. These distinctive features generate three effects that mitigate the likely impacts of the introduction of competition.

- The potential demand for an electricity supplier to meet is limited by low revenues generated by the retailing activity.
- Since the intermediation role was historically assumed by the incumbent generating and/or distribution companies, the retail market must be created *ex nihilo*. Consumers, having long-standing relationship with their incumbent company, cannot exercise their freedom of choice without supporting switching costs. It may be costly to change supplier. These switching costs can be decomposed into three broad types: search costs (identifying suppliers, comparing their offers), learning costs (relations with the new supplier) and transaction costs (contracting, negotiating). All of these costs are in part attributable to the fact that each consumer makes a specific investment when entering into a relationship with a supplier. He or she is learning to use the product or the service, is becoming familiar with the menu of contracts its supplier may propose, the rewards it may offer for repeated purchases, etc. A consumer having learnt to use a product or a service delivered by a company, has therefore a strong incentive to continue to buy from that company. Products that are *ex ante* homogenous become, after the purchase of one of them, *ex post* heterogeneous (Klemperer P., 1987). For instance, in the electricity retail market, consumers are familiar with the service supplied by the incumbent company, have a long-standing experience of the quality of service delivered, know approximately the average bill they have to pay. The creation, but also the breach of a client-supplier relationship generates switching costs which can be considered as barriers to entry. These barriers to entry are making consumers less prone to switch even when the new entrant offer is beating the incumbent price (the price elasticity of consumer's demand is weak).

- The homogeneity of the product makes it difficult to offer any differentiation. The potential to create value-added services is therefore limited ¹.

Limited potential demand, switching costs involving the creation of barriers to entry, and little room left for product differentiation : the retail electricity market does not provide sound profit opportunities for new entrants.

In this context, is it really valuable to open retail markets to competition ? The potential benefits for consumers may be negligible and there is a risk of incurring additional costs (marketing, advertising and promotion expenses). Especially if the consumers are not adequately protected from exploitation by new entrants trying to take advantage of the confusion and the poor information misleading consumer's choices. Would it not be better to seek out other solutions allowing retail consumers to really benefit from electricity competition, as it is notably advocated by P. Joskow (2000) and other leading energy economists (Littlechild S., 2003) ? As P. Joskow suggests, the incumbent company could provide a basic electricity service (BES) allowing residential consumers to buy directly from the wholesale market at the spot price. Retail consumers could therefore benefit from wholesale competition while being protected from the drawbacks of retail competition (exploitation by the suppliers). It would also suppress the wasteful marketing and advertising costs that could increase final prices. Alternative suppliers could still enter the market and will succeed to generate sound positive profits if they are able to bring value-added services to consumers "over and above" what can be realized through direct purchasing at wholesale through the incumbent company. The benefit will be double : to protect consumers from supporting additional costs (the basic electricity service would be used by consumers as a hedge and a benchmark to help comparison with competing offers) while incite new entrants to enhance consumer services (Joskow P., 2000).

In spite of these doubts, the European Union, Norway, and other OECD countries have chosen to introduce retail electricity competition for the domestic consumers². This choice was largely inspired by "Austrian" concepts regarding the nature of competitive mechanisms and its allegedly positive outcomes.

In the Austrian approach of market process, economic agents are facing not only risk, but also radical uncertainty and sheer ignorance (Kirzner I., 1997a). Their decisions have to be made in ever-changing market circumstances. Technological possibilities, tastes, products, costs and demands are neither "given" and constant, nor known to all market participants. Therefore, as long as useful economic information remains undiscovered or poorly disseminated, market imperfections created by artificial barriers to entry, exercise of market power, productive or allocative inefficiency may be experienced, creating excessive profit opportunities.

¹ The two first arguments are less relevant to industrial clients.

² An analytical and well-documented comparison of the social net value of the different organizational forms of retail electricity supply (full competition, BES option, strong regulatory constraints on price formation, etc.) is outside of the scope of this paper. See for instance Littlechild S. (2003) for an extended discussion about the costs and benefits associated with the BES option. Our purpose is to cast some light upon the current situation in the European retail markets and their prospects of evolution in the near future.

In these circumstances, economic agents, spurred by these profit opportunities, will seek to discover more efficient ways to produce and to meet consumers' requirements, better technologies to use, new organizational forms to adopt, etc. Anomalies or disequilibria in prices, illustrating market imperfections, provide the incentive for their elimination by economic agents discovering information, developing innovative processes and adopting new technologies (Thomsen E., 1992). Market participants tend to learn from their successes and mistakes in their attempts to adopt better courses of action. In consequence, over time there is a tendency for dissemination of efficient technologies, organizational forms and most wanted goods and services. As a result of learning and competition by rival firms, disequilibrium prices tend to be replaced by prices reflecting efficient costs of production.

These economic agents, gaining advantage of the opportunities provided by new knowledge and ideas that are not fully exploited by incumbent companies, are termed by the Austrian School "entrepreneurs". Entrepreneurs (simple company founder, manager of small, family-owned firms) are distinguished from other agents by their behaviors : they are innovative, flexible, dynamic, risk-taking and creative. Their "alertness", their "judgment" in business decision-making allow them to discover new opportunities, and to envision new ways of using assets to produce goods and services (Kirzner I., 1997b ; Endres A., Woods C., 2006 ; Foss N., Klein P., 2004). The Austrian approach assigns a pivotal role to entrepreneurship. Entrepreneurial discovery is seen as gradually but systematically pushing back the boundaries of sheer ignorance. For the Austrian School, competition is thus considered as a « discovery procedure » (Hayek F. 1945, 1968) driven by an entrepreneurial and learning process.

Applied to the retail electricity supply, this approach of competition as an *entrepreneurial driven process*, should provided the following social benefits (Littlechild S., 2000).

- **Reducing market imperfections.** Entrepreneurs entering in the retail market will seek to reduce costs at all stages of the supply chain. They are expected to expose the true costs of commercialising electricity (previously aggregated into the costs of generation and transmission) and to reduce market imperfections by entering in geographical zones or niches in which the incumbent company gain extra-normal profit. These market imperfections exacerbate the inertia of consumers, increase market segmentation and create price anomalies (Waddams-Price C., 2004). Reduction of market imperfections should benefit to all consumers. In a competitive market, those consumers who become engaged in the market process will force suppliers to become more efficient, with the benefits being passed on to all consumers, even those who are not actively engaged (NAO, 2008).
- **Discovering new products or price/service quality combination** that best meet consumer's needs. Retail suppliers are expected to provide an enhanced array of retail service products, risk management (hedging), and new opportunities for service quality differentiation to better match individual consumer preferences. The discovery of valued and hitherto "unappreciated attribute" of an existing product constitutes an economic improvement from the customer's perspective (Littlechild S., 2002a).
- **Stimulating the alertness of consumers** to the availability of better offers than those proposed by the incumbent. Retail suppliers alert consumers to the existence and potential merits of alternative offers. They can provide accurate information about prices of these alternatives. They help consumers

to become active participants in the market process. Once active, consumers could better evaluate what was on the offer and what would best suit them. They could follow more accurately market evolutions, learn from their past experiences and make better informed choices.

- **Stimulating competition in generation.** A vibrant retail electricity market will ensure that wholesale power markets operate efficiently. Producers will be incited to make efficient investment choices and entry will be easier in wholesale generation markets. Retailers can not only stimulate better prices responsiveness from consumers but also encourage the development of forward contracts, which can reduce the incentives for generators to withhold supply capacity and increase liquidity (Littlechild S. 2000).

The introduction of competition in the retail electric supply should provide the products that consumers really want, reduce the barriers to entry, encourage innovation, reduce prices, and stimulate competition in generation. From this perspective, the consequences of the introduction of competition in the retail electricity supply could go far beyond the reduction of commercialisation costs supported by consumers. Therefore, the solution advocated by P. Joskow - price regulation designed to ensure that wholesale prices are passed on to final customers - cannot replicate the entire effects of the competition process and yield the same results. The Austrian view of competition as a discovery process involves that no one can predict the new services that a new entrant might profitably provide (Littlechild S., 2002b).

S. Littlechild stressed the importance of entry of small, newly created companies, in order to stimulate competition in the retail electricity market and to impede incumbent companies to increase prices, to put aside innovation and to enjoy a comfortable life at the expense of residential consumers (Littlechild S., 2005). This statement can be interpreted as an illustration of the driving role assigned by the Austrian School to entrepreneurship in the competitive process.

3. Retail electricity markets : current situation

Has the opening of the electricity retail market triggered an influx of new entrants stimulating innovative processes, challenging the incumbents and ensuring a renewal of supply ? In order to obtain a first picture of the development of competition in the retail markets, the following indicators are examined : the consumers' switching , the evolution of consumers' mobility, the switching costs (as a proxy of barriers to entry), the number of electricity retailers (new entrants) and the innovations which successfully passed the market test (see also NERA, 2007).

3.1. General picture : still barriers to mobility

This first indicator to be considered is the percentage of customers who are active on the market, i.e. who exercise their freedom of choice. This can be measured by adding several groups of consumers : those who have changed supplier (expressing a switching rate), those who renegotiated their contract with the incumbent (but without switching), and those who made inquiries and compared the different suppliers, but then stayed over. Unfortunately, a part of these active consumers fall into categories that are partially or totally non-

observable. Essentially, those are the ones who do not end up switching supplier (Loomis D., Malm E., 1999). It is therefore difficult to obtain a precise estimate of the percentage of active clients on electricity retail markets¹. Given the available information, the rate of active consumers in retail markets is approximated by the rate of switchers².

Table 1. Switching rates since the opening of retail markets

| European Countries | Year of opening of retail markets | Switching rates |
|--------------------|-----------------------------------|-----------------|
| Great Britain | 1999 | 47% |
| Sweden | 1999 | 32% |
| Norway | 1997 | 28% |
| Spain | 2003 | 7% |
| Finland | 1998 | 11% |
| Belgium | 2003 | 12%** |
| Netherlands | 2004 | 15% |
| Germany | 1998 | 7% |
| France | 2004* | 6% |
| Denmark | 2003 | 2% |

| Other countries / states | Year of opening of retail markets | Switching rates |
|--------------------------|-----------------------------------|-----------------|
| Victoria (Aus.) | 2002 | 45% |
| Texas (USA) | 2002 | 36% |
| South Australia (Aus.) | 2003 | 34% |
| New-York (USA) | 1999 | 11% |
| Ohio (USA) | 2001 | 8% |
| Massachussetts (USA) | 1998 | 7% |
| Pennsylvania (USA) | 1997 | 3% |
| Connecticut (USA) | 2000 | 2% |
| Maine (USA) | 2000 | 1% |

2006 data, except for Sweden and Finland (2005). * Non residential (open as of July 2007) : small I&C consumers ** Flanders exclusively. Sources : national regulators, KEMA, Alliance for retail choice, PUCO, Pennsylvania and Maine Public Advocate Offices, NERA, Cap Gemini, RWE, Joskow P. (2006).

The incumbents' shares lie between 85 and 95 per cent in most European countries³. Globally, customers are not very disposed to change supplier, and the incumbents are not challenged by competition from new entrants (see below). In Italy, Denmark, France, Germany, the Netherlands, and Belgium, switching rates remain below 10 per cent. They are slightly above 10 per cent in Finland and Spain. Only three countries exhibit net switching rates exceeding 20 per cent : Great Britain, Sweden and Norway. In Great Britain, by the end of 2006, 47 per cent of customers had left their electric incumbent company since the opening to competition in 1999 (OFGEM, 2007).

¹ To our knowledge, only two European countries, Norway and Sweden, provide information on the rate at which clients renegotiate with their incumbent company : 5 per cent for the former, 18 per cent for the latter (Nordreg, 2005).

² We here refer to net switching, i.e., the (cumulative) percentage of clients having left the incumbent company since the opening of the market. This is below the gross rate of switching, which captures all movements : customers having changed supplier several times or having returned to the incumbent.

³ Conversely, businesses frequently opt for an alternative supplier : their market share fluctuates between 35 and 50 percent, depending on the country.

In the US, only ten or so states have opened their retail market to competition (essentially on the east coast and in Texas) : they represent around 56 million eligible consumers. On this total, 12% (roughly 6,7 million) have left their historical supplier by the end of 2006. This means strong disparities. Most of consumers who have exercised their freedom of choice are from Texas and the state of New York. (see tab.1). Results from other states that have opened their retail market are not evidential in terms of switching (see also Joskow P., 2006).

To encourage retail's competition, Texas implemented a price control on historical suppliers. They had to offer a standard rate for their consumers, or a "Price to Beat", set by the Public Utility Commission¹. This Price to Beat remained in effect for five years (until January 2007), but the incumbent companies could begin to offer a rate lower than the "price to beat" within their respective distribution service areas after three years or until 40% of residential and small business customers are served by alternative providers. This rate was designed to give customers of the incumbent companies a discount (a six-percent rate reduction at the start of competition), and allow alternative suppliers and new entrants the opportunity to offer lower rates and to gain market shares (Adib P, Zarniakau J., 2006). More than 70 firms have entered the market. The number of offers has been multiplied and switching rates reached almost 40% (PUCT, 2007). The dynamic of this retail's competition in Texas has been fostered by regulated prices' levels which favour new entrants².

This is also the case in several Australian States (South Australia, Victoria), where incumbent companies are required to offer electricity at standing regulated prices (NERA, 2007). These tariffs are set to allow competition to develop (Menezes F., 2005). This regulation leads to high switching rates (34% in South Australia, 45% in Victoria) and encourage new companies to enter in the retail markets³.

In Europe and the US, markets with low switching rates are often suffering from several hindrances : regulated tariffs below market prices or switching barriers of various kinds (ERGEG, 2007). The conditions for competition are not always met because price controls have not been removed or because the regulators haven't taken appropriate action to help consumers to take advantage of competition, for example, by ensuring that consumers can switch easily between suppliers (duration, complexity, execution and costs of the switching and cancellation procedures). In order to empower consumers to make the right decisions, information about suppliers and their offers needs to be easily accessible, trustworthy and comparable (NAO, 2008 ; ERGEG, 2008). In many countries, these conditions are not met and switching barriers remain high (ERGEG, 2007). But numerous countries, notably in Europe, are now taking appropriate measures to improve the situation and to foster competitive dynamic in retail.

¹ Price to beat is a variable price which is dependent on the cost of fuel used to generate electricity (mostly natural gas), which can be adjusted twice a year.

² Since 2007, in a context of high wholesale prices, Texan newspapers echoed about the difficulties encountered by several new entrants obliged to cease their business because they failed to meet their financial obligations to the Texas power grid or indicated that they could not do so (see for instance, The Star Telegram, June 16, 2008 ; The Dallas Morning News, June 5, 2008).

³ As in Texas, these regulated tariffs are set to provide a transition to full retail competition. Their phasing-out has begun at the end of 2007 (NERA, 2007).

3.2. The exceptions : Great-Britain, Sweden and Norway

Three European countries exhibit switching rates above 25% while having removed all major regulatory controls (including regulated tariffs) : Great-Britain, Sweden and Norway. Despite high switching rates and pressure on prices for at least a part of the consumers, competition in these retail markets is not performing as it was expected.

Switching dynamics. At a first glance, we may consider that initial low switching rates are the consequences of the relative novelty of the opening to competition. The first years yields weak results owing to the inexperience of clients, the potential need for strategic adjustments by new entrants, and possible flaws in the regulatory rules. From this perspective, switching rates should rise over time with the dismantling of barriers to mobility that impede competition and the development of learning effects. However, this is not what we observe.

In Great Britain, the evolution of the electricity retail market can be divided in two periods : 1999–2001 and 2002–2006. During the first period, nearly 32 per cent of consumers (or 8.5 million) chose to leave their incumbent, representing a mean of 240 000 departures per month. This flood tapered off as of 2002, as 3.6 million consumers opted for an alternative supplier between the beginning of 2002 and the end of 2006, corresponding to 60 000 monthly departures, on average (OFGEM, 2007). The pace of switching fell to a quarter of its former value.

In Sweden, the evolution of net switching rates does not appear to have followed the same trajectory. The number of clients leaving their incumbent was between 150 000 and 300 000 annually on average between 2000 and 2006 (i.e. between 3 and 6 per cent of all residential consumers), but the pattern of annual fluctuation does not describe any falling or rising trend during this period (Littlechild S., 2006). The situation is similar in Norway, where no clear-cut trend stands out - years characterized by the greatest activity being followed by more stable years. Globally, the switching rate in Norway is lower than in Sweden, with an annual mean of 2 to 3 per cent of departures during the period 1997–2006¹. The dynamics of retail markets are not identical from one country to the next and switching rates do not automatically grow over time.

Switching costs are not decreasing. Competition should lead to a downward trend in switching costs, owing to the efforts undertaken by new entrants to discover the most profitable market segments, to penetrate them and to challenge the incumbent company's position. Switching costs should also decrease as a consequence of the intensification of learning effects that allow consumers to reduce the risks and uncertainty associated with their decision².

This reduction of barriers to mobility that impede many consumers to choose an alternative supplier should have two main effects. First, the number of active consumers should grow while the competitive game is intensifying. Second, the prices set by the various suppliers (new entrants as well as the incumbent

¹ Sources: Statistics Sweden, www.scb.se; Norwegian Water Resources and Energy Directorate, www.nve.no.

² Accumulated experience, better information and knowledge of how to compare between suppliers, how to switch rapidly and adequately.

company) should gradually convergence towards the cost of entry¹. However, once again, this is not what we observe.

In Great Britain, where consumers are switching the most repeatedly, prices are not converging. The difference between the average price offered by the incumbent and the mean offer from the best alternative supplier has not declined significantly since 2000: It continues to fall within a spread ranging from 12 to 17 per cent (OFGEM, 2007)². This is also the case in Norway. Incumbent companies' prices may exceed the best available offers by 10-15 percent (Von der Fehr N-H., Vegard Hansen P., 2008).

This result suggests that two distinct retail markets can be observed : an "active market", bringing together consumers who have already switched supplier at least once, and an "inactive market", involving consumers who remain loyal to their incumbent. The active consumers, those who are participating in the market are in position to benefit from a vibrant competition. In this market segment there is a variety of suppliers and prices are closely related to costs. Competing suppliers cannot set prices below the average price without loosing market shares. This is not the case in the inactive segment. The inactive consumers are paying prices that exceed costs by non-negligible amounts (Von der Fehr N-H., Vegard Hansen P., 2008 ; OFGEM, 2007).

This market segmentation allows retail suppliers to implement strategies of price discrimination based on geographical location. Retail suppliers set a cheaper basket of prices for their active consumers (i.e. consumers living outside supplier's historical geographic zone) than for those who are inactive (i.e. living in their historical zone). They can also offer a set of different contracts, the first ones being only available to their local consumers' base, the other ones for consumers in other regions.

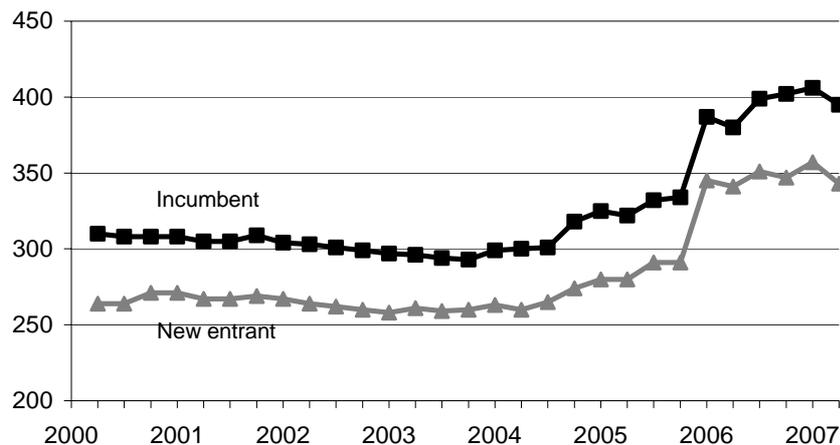
Active and inactive segments do not react in the same way to price signals. In Great Britain, as in Norway and Sweden, mobility within the "active market" accelerated during periods of prices spikes (especially in 2006 for the former and during the winter of 2002–2003 and also in 2006 for the two latter). The overall movements within the active market increase or remain at high levels, consumers who have already switched, switched again, choosing another new entrant or going back to the incumbent company.

Active consumers seem to be very sensitive to the evolution of price. On the contrary, inactive consumers do not respond to price signals. In these three countries, the pace of consumers' loss of the incumbents do not accelerate during the prices spikes episodes. Sticky consumers remain loyal, information conveyed by price is not sufficient to stimulate them to exercise their freedom of choice. This inertia leaves the door open for the incumbent (who benefit from a sticky customer base) to maintain higher prices on a portion of its clientele.

¹ Since electricity is a homogenous good, we assume that significant qualitative differences in the nature of the good or the forms of commercialization cannot explain this price spread.

² In an econometric analysis based on a paneldata containing detailed information about electricity supply prices over the period 1999 to 2006 in the UK, Giulietti M. *et al.* (2007) show that prices are remaining dispersed among suppliers. They conclude that there are still significant potential benefits to consumers from searching alternative suppliers.

Fig. 1. Price differential between incumbent and best offer in GB



Comparison of the mean bill from an incumbent and the best mean alternative offer from a new entrant. In pounds sterling. Source : OFGEM, 2007

The setback of new entrants. In most countries, the opening to competition was followed by a two-fold inflow. First, newly created independent companies (start-ups) entered in the electric retail market, experimenting a new business model. They focused their activities on retail supply (branding, consumer relationships, value-added services), trying to take advantage of a low-cost, reactive and flexible organisational structure. Second, incumbent companies originated from other industrial sector (gas) or from other geographical zones (regions, countries) expanded into the domestic electricity market, competing with their regional or national counterparts. The first category of new entrants failed to succeed in their efforts to attract a significant number of consumers and to validate the relevance of their business model¹.

Even at their peak in 1999–2001, these low-cost companies were unable to attract more than approximately 500 000 consumers in the United Kingdom, or about 2 per cent of the market (Littlechild S., 2005). In other countries, the result was even less impressive. With few exceptions, they were unable to survive and run into difficulties. They either bankrupted or were acquired by the electricity or gas incumbents. In Norway, the attempt made by Statoil, the major Norwegian oil and gas producer, to enter in the electric retail market, was unsuccessful. Many other companies share the same experience and exit the market. Two independent suppliers, which both succeeded in building up a considerable customer base, were acquired by incumbent companies (Von der Fehr N-H., Vegard Hansen P., 2008). In the most active retail markets, the bulk of the competition is now driven by new “incumbent” entrants (gas or regional electric utilities).

In Great Britain, the gas incumbent has been the major entrant into the retail electricity market. Low-cost new entrants are primarily constrained by economic and financial factors. The low rate of entry in the most vibrant European retail markets (Great-Britain, Norway and Sweden) is not the consequence of

¹ Except in Texas and Australian States (South Australia, Victoria). As indicated below, incumbent companies are required to offer electricity at standing regulated prices. These prices are sufficiently high to allow competition to develop and encourage alternative suppliers to enter in the retail market.

institutional or regulatory barriers, energy regulators have taken steps to remove the most relevant ones. Without physical and financial adequate hedging, these firms were exposed to the evolution of wholesale purchase costs and faced huge risks, endangering their profitability. Relying on wholesale markets via either spot purchases or longer-term contracts is not an accurate risk management strategy for new entrants in retail. Up-stream integration in generation continues to be a strong mean of risk diversification and permits to reduce the volatility of their earnings (Chao H-P. *et al.*, 2008). This is why the few surviving independent low-cost firms are now adopting strategies of upstream integration.

Reproducible innovations. The first years following the opening to competition saw a great deal of experimentation, mainly done by new entrants. These innovations offered a potential for redefining the frontiers of the market by initiating a convergence with other activities. New channels of retail supply (sales over the Internet) and joint offers (dual fuel, sales of energy associated with telephony or Internet access) were developed and commercialised. These experiments, though ambitious, did not pass the market test.

Since 2000–2001, the innovations that appear to have become truly entrenched are more limited in scope : the combined sale of electricity and gas (dual fuel), the enlargement of menus of contracts (duration, payment type, origin of the electricity including clean energy products, pricing options) and the development of some value-added services (demand monitoring, advice, energy efficiency options), using new technologies, such as web-based auditing and energy management software (Littlechild S. 2006 ; OFGEM, 2007, NAO, 2008)¹. These innovations certainly expand consumers' choices, provide consumers new and innovative tools to manage and monitor their demand and foster competition between electric retail suppliers (NERA, 2008). Nevertheless, they neither do involve a broad redefinition of retail market attributes nor challenge incumbents' business models by disqualifying their offers both technically and commercially. These new products, tools and contracts, are easily reproducible from a supplier to another one and may be quickly disseminated among all market participants. They seem unable to give a clear-cut and long-lasting competitive advantage to an innovative new entrant in the retail market. To date, this new entrant is not in position to create, what J. Schumpeter coined a temporary monopoly position, from which he will gain overprofit and exploit his competitive advantage at the expense of the incumbent companies.

4. Why this discrepancy ? Two analytical insights

The current situation of retail electricity markets reveals that the expected outcomes did not always occur. Two elements, which were supposed to drive the entrepreneurial competitive process, seem to have been overstated : firstly, the ability of consumers to make appropriate choices and, secondly, the nature of innovative processes.

¹ To date, the primary innovation in Great Britain has been the introduction of dual fuel (OFGEM, 2007). Fixed price contracts, online, green tariffs and free energy monitor have also been introduced recently (NAO, 2008) In Scandinavia, innovations are essentially related to contract durations and prices. In Sweden, fixed-price contracts for one to three years and variable-price contracts, in Norway, fixed-price contracts for one year or more and contracts indexed on the spot price (Nordreg, 2005).

4.1. Information, decision and choice

As previously noted, the discovery of information should lead to a progressive elimination of price anomalies and to convergence of prices towards the marginal cost. However, we observe that price differences between suppliers persist on electricity markets, even years after the introduction of competition. The Austrian approach implicitly assumes that consumers make fully rational decisions and choose the supplier that best meet their preferences. They respond perfectly (or, at the least, satisfactorily) to the incentives and information transmitted by price signals.

Research in the field of behavioural economics cast some doubt on that assumption (Rabin M., 1998 ; Kahneman D., 2003). In many cases, consumers' decisions do not react adequately to price-signals. Their decisions can be affected by various biases that act as a wedge between the choices they should make to maximize utility and the choices they actually do make.

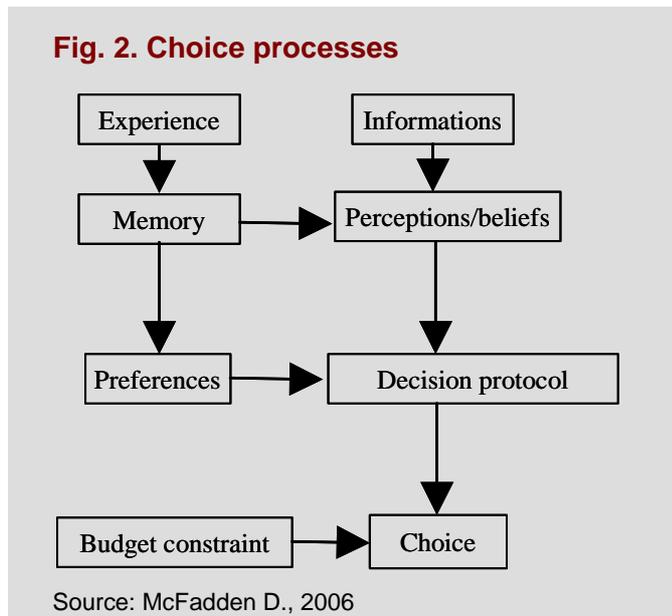
The decision-making processes prove less simple than they appear (McFadden D., 1986). They arise from the preferences expressed by consumers and the decision protocols they use to make their choice. These preferences, in turn, depend on general values (degree of altruism, moral attitudes) and perceptions of the gains from switching. These perceptions, in turn, are constructed from several elements. In the first place, they draw upon each consumer's past experiences and memory, especially as they relate to similar choices (for example, switching in another sector : banking, insurance, telephony).

Second, they spring from information available on the type of choice and on the attributes of the good or service (number of competing offers, degree of comparability of the products, quality of the deliverable). Thus, the manner in which consumers perceive their participation in market transactions affects their decision of whether or not to exercise their choice (McFadden D., 2001).

This is not only a matter of risk aversion. Decision biases are not solely attributable to consumers risk perception, but also to inappropriate decision protocols, which may yield anomalies. Laboratory experiments have allowed several types of these anomalies to be identified. Preferences can be affected by the framing of decision problems (i.e. alternative descriptions of the same problem can lead to alternative choices). Decisions can be made on the basis of truncated or misinterpreted information and on the basis of a selective memory (imperfections in remembering facts). Economic agents can also exhibit a "status quo bias", because they tend to value more a good they own. They would demand a considerably higher price for a product that they own than they would be prepared to pay for it (this bias is also coined the "endowment effect" or "loss aversion") (Rabin M., 1998; Kahneman D. et al., 1991).

Economic agents may find choice overwhelming, and "routinely use procrastination, precommitments, habit, imitation, social norms, defaults, and superstitions to avoid confronting choice. [Agents] pass up trading opportunities, particularly in unfamiliar situations" (McFadden D., 2006) because they consider that choice is a stressful experience. They can also be influenced in their decision-making process by the context and by their social environment, and by unconscious thought mechanisms (Wolozin H., Wolozin B., 2007).

Last but not least, it should also be noted that learning effects do not always reduce or eliminate these anomalies. On one hand, this is because routines of choice are often well-established,. On the other hand, this may be because a consumer, confronted with new information discrediting the validity of a choice, may tend to be inattentive to it, minimize its extent or simply ignore it. Such “anchoring” phenomenon may lead economic agents to misread the new information as an additional support for their initial choice (Rabin M., 1998).



Consumers' risk perceptions biases in decision processes may curb their incentives to switch supplier or lead them to make inappropriate choices. C. Wilson and C. Waddams-Price (2007) analyse the results of two surveys, conducted in 2000 and 2005 (the latter made by the authors), on consumer's choices on the British electricity retail market. They show that British consumers having switched for a new electricity supplier only appropriate between 37 and 44 per cent of the average maximum gains available. A mere 14 to 18 per cent of clients select the cheapest supplier, while 25 to 31 switched to a more expensive supplier¹. As C. Wilson and C. Waddams-Price (2007) pointed out, “the extent to which consumers' choices appear inaccurate is puzzling”². The two surveys also reveal that accumulated experience is not much help for appropriating the potential gains offered by mobility. Customers having switched for a new gas supplier prior to select a new electricity provider do not fare much better.

¹ Maximum gains available refers to the change in surplus that would have been realized by a switcher has he switched to the cheapest alternative supplier.

² It does not seem that is result is a consequence of measurement errors or methodological bias. See C. Wilson and C. Waddams-Price (2007) for a detailed explanation. In a more recent paper, Tina Chang Y. and Waddams-Price C. (2008) made a more precise statement about the determinants of consumers' choices. “While a model of utility maximisation provides some explanation of consumers' market activity, the influence of expected gains and time involved is relatively small. Many other factors, in particular the confidence with which consumers hold their estimates of gains and costs, are important influences. And much remains unexplained, suggesting that consumers both maximise utility and display *behavioural* characteristics in deciding whether to search for better deals and switch providers”.

Table 2. Choices on the British electricity market. Results of two surveys

| | Survey 2005 | Survey 2000 |
|---|-------------|-------------|
| Survey population | 2027 | 3417 |
| Total number of switchers | 310 | 523 |
| Number of switchers (sample) | 154 | 318 |
| Average max. gains available (£ per year) | 49.04 | 43.02 |
| Average actual gains made (£ per year) | 17.9 | 19.4 |
| Average actual gains / average max. gains | 37% | 44% |
| Proportion of switchers with perfect gains | 18% | 14% |
| Proportion of switchers with negative gains | 31% | 25% |

Source: Wilson C., Waddams-Price C., 2007

Consumer's choices are not always judicious, even when they can appropriate net gains when choosing to switch. The consumers seem not to always respond adequately. Even if competitive suppliers behave in a way that reduces barriers to mobility, it is possible that consumers will not fully respond. Their decisions are partly conditioned by their perceptions of the risks they are running and by the choice protocols they use. Risk-averse agents, who persist in a routine of immutable choice, or who assign a status quo premium, can remain inactive even when it is in their interest to switch (NAO, 2008).

Are retail electricity markets different from other retail markets like mobile and fixed phone, credit cards, insurance, bank, regarding consumer's choices ? It is beyond the scope of this paper to undertake a genuine comparison with other sectors, but a superficial look may suggest that bias in consumer's behaviors are a common feature in a vast number of markets (see Della Vigna S., 2008 for a recent survey). Electricity retail market is therefore not an exception.

Taking into consideration some of these key features of decision-making processes can be useful to understand the current situation of the electricity retail market.

- Improving the quality and dissemination of information is not, in and of itself, sufficient to multiply the number of active clients, reduce switching costs, and stimulate a vibrant competition in retail. A price shock that is well reported by the media (such as in Norway and Sweden during the winter of 2002–2003 and in Great Britain in 2006), though it may provide an incentive for clients who are already active to switch again, have not triggered a mass migration among inactive customers.
- Learning effects have an unequivocal impact on customers' mobility. Several cases can be experienced. Over time, some clients who are already active improve the efficiency of their decision-making process, stay informed, explore the market, and react to price changes. Risk aversion, which was weak at the beginning, declines, learning effects reduce their switching costs. But, other active clients, having chosen poorly, appropriate negative gains from their switch, or encountered difficulties while switching, are disappointed and decided to renounce to exercise their freedom of choice. Risk aversion, which was weak at the beginning, increases. There are also cases of inactive customers who are reassured in their decision not to switch by the dynamic and reactive nature of the market, rendering the decision making process more uncertain (Giulietti M. et al., 2005). They impute a higher premium to the status quo. Their risk aversion, which was strong at the beginning, increases over

time with the growing number of competitors and with the development of complex, non linear tariff options ¹.

One can argue that consumers interpret new information that becomes available to them in a way that confirms their initial perception. Active clients will consider that a fluctuating market, characterized by frequent price changes, provides a continuous stream of new opportunities, while inactive clients will consider this very same instability as a sign of increased complexity and a greater risk of mistakes. Thus, both groups of consumers find that this information bears their choice out. This type of reaction does not foster market liquidity. It is more liable to progressively reinforce the market segmentation and lock in the positions taken by various categories of clients (active vs. inactive).

4.2. Innovation, technological opportunities and learning effects

Innovation is supposed to be the second driver of competition. It should provide an incentive to invest in R&D programmes, to implement new production processes, and to develop new goods and services. However, to date, the introduction of competition in the electricity retail supply have not led suppliers to successfully develop innovations which enable them to challenge the incumbents' positions. The postulates of the Austrian school suggesting that competition fosters innovative processes has to be reconsidered ².

Competition is not the only driver of innovation. Other factors, like technological patterns and learning effects, are entering into consideration to explain the origins, the nature and the path of innovative processes. Technological opportunities are not identical across sectors. The sectoral knowledge base (and particularly its proximity to the technological frontier) underpins firm's innovative activities in each sector and affects the potential for technological improvements in each domain of activity (Dosi G., 1988). Moreover, innovative processes depend on learning mechanisms that the firms themselves implement through practice and use. These learning mechanisms explain the cumulative aspect of many innovative processes.

The sectoral differences between the organization of innovative processes may be summarized as follow. In sectors characterised by few technological and scientific opportunities, but high appropriability and cumulateness at the firm level, the innovative processes are supported by large established firms. These sectors exhibit a stable core of large firms accumulating technological knowledge and capabilities and a low rate of innovative entry. On the contrary, in sectors characterized by high technological opportunities, but low appropriability and low cumulateness at the firm level, the innovative processes are supported by entrepreneurs and new entrants. High technological opportunities allow for the continuous entry of new innovators. Sectoral characterisation of innovative

¹ This risk aversion can be artificially exacerbated by some retailers which may increase the difficulties faced by consumers to evaluate and to compare the alternative offers. The limited capacity of consumers to choose efficiently between suppliers can be an additional barrier to mobility and reduce their willingness to switch.

² Following Schumpeter, we are assigning here a key role to new entrants in the innovative processes. This is implicitly recognized by S. Littlechild (2005) as a reason to introduce competition into electricity retail supply (in particular, when he emphasizes the central role played by new entrants as vectors of the development and penetration of innovations).

patterns changes over time. A rather stable organization characterized by incumbents may be displaced by a more turbulent one with the entry of new firms using new technologies in case of major technological, knowledge or market discontinuities (Breschi et al., 2000 ; Malerba F., 2002).

The electricity supply sector is a steering example of a stable industry, organised around large incumbent companies implementing cumulative innovation processes. The reasons are twofold.

First, technological change in this industry is largely cumulative. Technical choices in electric generation and transmission exhibit a high degree of interdependency and complementarity (in terms of technological choice, dimensioning, location of infrastructure and equipment) and carried out strong externalities. These interdependencies tend to steer technical progress and innovation efforts in one main direction, i.e. the design and operation of centralized generation units whose energy yield is rising and whose long-term marginal costs are declining, served by grids with increasing capacity. Electricity retail is part and parcel of this coherent and stable technical system organized around large generation units and interconnected grids displaying scale economies. Nevertheless, it has to be mentioned that, for several years, R&D efforts have been targeted at the development of decentralized means of production, mass storage solutions, and an in-depth redefinition of the role and the functioning of the grids – through the integration of technologies from power electronics and intelligent metering systems, as well as the management of information and communications (Jamasb T. et al., 2006 ; EU, 2006). But, considering the lifespan of the current equipment and infrastructures and the strong complementarities binding them, the penetration of one or several groundbreaking technologies would be very incremental, even with a short time to market.

Second, innovative processes in the electricity sector are largely propelled by equipment suppliers rather than by the electrical utilities themselves (Jacquier-Roux V., Bourgeois B., 2002).

Beset by the lack of technological and scientific opportunities that can be exploited in the short term and by a dependence on equipment suppliers, electrical firms often focus on accumulative innovative processes, involving learning by using routines and frequent interactions with equipment suppliers. Consequently, large companies tend to adopt new technologies earlier than smaller utilities or new entrants. Large companies are less averse to risk of earlier adoption (their portfolio of generation units reduce the impact of a bad technological choice on their overall profitability). They are able to benefit from economies of scale. Moreover they can benefit from internal engineering, design and maintenance staffs capable of adopting new technologies (Joskow P., Rose N., 1990). New entrants, conversely, may have an incentive to adopt proven technologies (Jamasb T., Pollitt M., 2005).

In this context, retail competition cannot be, by itself, the main driving force of the innovative processes which are taking place in the electricity sector. On one hand, new entrants in the electricity market are not the main vector of innovation. On the other hand, the suppliers are not in a position to make technical choices independently from those made upstream by the producers and the grid operators. Suppliers are largely constrained in their choices by the overall architecture of the electricity system. Regardless of their talent and imagination, it

seems rather difficult for the entrepreneurs striving to enter the retail market to ignore these limitations.

Nonetheless, electricity retail supply may experience the emergence of innovative processes that are partially dissociated from the technological paradigm within which it is embedded. Indeed, innovation in services - of which retail supply is one - involves other issues : mobilizing competencies and know-how, interacting with customers, solving specific problems, etc. In services, innovative processes are characterized as mechanisms combining improved techniques and competencies (Gallouj F., Weinstein O., 1997). New entrants can innovate by recombining the competencies and techniques used for supplying electricity to residential consumers. This can be done by importing generic or specific techniques having been implemented in other sectors (information technologies, customer management), by incorporating new services (advice, services, demand-side management), or by defining new standards of usage and pricing devices. New entrants in electricity retail supply have a limited capacity to spur radical innovative processes.

To sum up, one can consider that innovation in retail supply is largely dependant of the current technological paradigm of the electricity sector. In the longer term, if the electric technological paradigm evolves towards a greater integration of decentralized generating units, associated with a grid relying on information and communications technologies, opportunities for innovations in commercialization could expand considerably (differentiating the product electricity, dynamic demand management, associated services)¹.

5. Conclusion

In this paper we have tried to understand why the introduction of retail competition did not yield the expected results. We shed some light on the limitations of the Austrian analysis of competition as an *entrepreneurial driven process*. Two issues were inadequately accounted for. First, the complexity of the determinants of choice (perceptions and decision protocols), which may explain why so many consumers remain inactive even when they have a clear-cut interest to switch. Second, the technological paradigm in the electricity sector, which limits new entrants' potential for developing radical innovations. This is not to say that end-user price controls and other regulatory constraints do not play an important role to impede the development of a vibrant retail market. But even in markets where the main barriers to entry have been suppressed, the magnitude of the retail competition have to be re-evaluated.

Short- and medium-term prospects for the evolution of retail markets must be reconsidered from the perspective of greater stability. 1) Not a generalization of competition, but rather a persistent segmentation between active and inactive clients leading to the co-existence of two market segments : a dynamic one, in which price competition is permanent and consumers respond to price-signals, and a more stagnant one, in which price competition is weak and consumers

¹ Smart metering is an example. Advanced Metering Infrastructure (AMI) can play a role in promoting innovation in product offerings. "AMI could provide a platform through which retailers can offer a variety of services based on time of use, pre-payment, direct load control (e.g., thermostat control, A/C cycling), demand response programs" (NERA, 2008). AMI may be a catalyst to develop retail competition by giving new and more proactive roles to consumers, which can take new responsibilities for their energy monitoring and consumption choices.

inertia is strong. This “brand loyalty” gives a market power to the incumbent over its consumers and implies that a firm’s market share determines its profit. In this perspective, it is difficult to evaluate if retail competition leads to an improvement in the overall efficiency of the electricity market. Retail competition create new opportunities for the active consumers and force suppliers to become more efficient. But for the consumers which are unable or unwilling to be active, it is not obvious that the opening of retail electricity markets was a gain. 2) In the short-term, new entrants in retail will face difficulties to offer radical innovative services undermining the incumbents’ positions and paving the way for an enhancement of retail service products and for a sharp reduction of end-user prices.

Bibliography

- Adib, P., Zarnikau, J. (2006). “Texas : the most robust competitive market in North America“, in Sioshansi F., Pfaffenberger, W. (eds.), *Electricity Market Reform: An International Perspective*. Elsevier, New York.
- Beesley M., Littlechild S. (1983), “Privatization : principles, problems and priorities”, *Lloyds Bank Review*, vol. 53
- Beesley M., Littlechild S. (1989), “The regulation of privatised monopolies in the United Kingdom”, *Rand Journal of Economics*, vol. 20
- Breschi S., Malerba F., Orsenigi L. (2000), “Technological regimes and schumpeterian patterns of innovation”, *The Economic Journal*, vol. 110
- Chao H-P., Oren S., Wilson R. (2008), “Reevaluation of vertical integration und unbundling in restructured electricity markets”, in Sioshansi F. (ed.), *Competitive electricity markets. Design, implementation, performance*. Elsevier, New York.
- Della Vigna S. (2008), “Psychology and economics : evidence form the field”, *Journal of Economics Literature*, forthcoming
- Dosi G. (1988), “Sources, procedures and economic effects of innovation“, *Journal of Economic Literature*, vol. 26
- Endres A., Woods C. (2006), “Modern Theories of Entrepreneurial Behavior: A Comparison and Appraisal”, *Small Business Economics*, vol. 26
- Energywatch (2007), *The impact of information provision on behavior change*, research conducted by Ipsos-Mori, Energywatch, London
- EREG (2007), *Status review on end-user price regulation*, European Regulators’ Group for Electricity and Gas, Brussels
- EREG (2008), *Obstacles to supplier switching in the electricity retail market. Guidelines of Good Practice and Status Review*, European Regulators’ Group for Electricity and Gas, Brussels
- EU (2006), *European Smartgrids technology platform*, European Union, Directorate General for Research, Brussels
- Foss N., Klein P. (2004), “Entrepreneurship and the economic theory of the firm : any gains from trade? » CORI working paper, University of Missouri-Columbia
- Gallouj F., Weinstein O. (1997), “Innovations in services”, *Research Policy*, vol. 26

- Giulietti M., Waddams-Price C., Waterson C. (2005), "Consumer choice and industrial policy : a study of UK energy markets", *The Economic Journal*, vol. 115
- Giulietti M., Otero J., Waterson C. (2007), *Price behaviour and competition in the UK electricity supply industry*, Warwick Economic Research Papers, Warwick University
- Glachant J.M. (2005), "Les marchés de détail dans le secteur électrique : un tour d'horizon. 1^{ère} partie : les résultats de la concurrence de détail", GRJM, Université Paris Sud, Sceaux
- Jacquier-Roux V., Bourgeois B. (2002), "New networks of technological creation in energy industries : reassessment of the roles of equipment suppliers and operators", *Technology analysis & strategic management*, vol. 14
- Jamasb T., Pollitt M. (2005), "Deregulation and R&D in network industries : the case of the electricity industry", Faculty of Economics, University of Cambridge, Cambridge
- Jamasb T., Nuttall W., Pollitt M. (2006), *Future electricity technologies and systems*, Cambridge University Press, Cambridge
- Joskow P. (2000), "Why do we need electricit retailers ? Or can you get it cheaper wholesale ?", discussion draft, MIT, Massachusetts
- Joskow (2006), "Markets for power in the United States : an interim report", *The Energy Journal*, vol. 27
- Hayek F. (1945), "The use of knowledge in society", *American Economic Review*, vol. 35
- Hayek F. ([1968], 2002), "Competition as a discovery prodecure", *Quarterly Journal of Austrian Economics*, vol. 5
- Helm D. (2003), *Energy the state and the market. British energy policy since 1979*, Oxford University Press, Oxford
- Kahneman D. (2003), "Maps of bounded rationality : psychology for behavioural economics", *American Economic Review*, vol. 93
- Kahneman D., Knetsch J., Thaler R. (1991), "Anomalies : the endowment effect, loss aversion and status quo bias", *Journal of Economic Perspectives*, vol. 5
- Kirzner I. (1997a), "Entrepreneurial discovery and the competitive market process : an Austrian approach", *Journal of Economic Literature*, vol. 35
- Kirzner I. (1997b), *How markets work. Disequilibrium, entrepreneurship and discovery*, IEA Hobart paper 133, Institute of Economic Affairs, London
- Klemperer P. (1987), "Markets with consumer switching costs", *Quarterly Journal of Economics*, vol. 102
- Littlechild S. (1999), *Privatisation, competition and regulation*, 29th Wincott Lecture, Institute of Economic Affairs, London
- Littlechild S. (2000), "Why we need electricity retailers : a reply to Joskow on wholesale spot pass-through", Faculty of Economics, University of Cambridge, Cambridge
- Littlechild S. (2002a), "Competition in retail electricity supply", *Journal des Economistes et des Etudes Humaines*, vol.12
- Littlechild S. (2002b), *Regulators, competition and transitional price controls : a critique of price restraints in electricity supply and mobile telephones*, Institute of Economic Affairs, London
- Littlechild S. (2003), "Wholesale spot price pass-through", *Journal of regulatory economics*, Vol. 23

- Littlechild S. (2005), *Smaller suppliers in the UK domestic electricity market : experience, concerns and policy recommendations*, OGFEM report, London
- Littlechild S. (2006), "Competition and contracts in the Nordic residential electricity markets", *Utilities Policy*, vol. 14
- Loomis D., Malm E. (1999), "Active market share : measuring competitiveness in retail energy Markets", *Utilities Policy*, vol. 8
- McFadden D., (1986), "The choice theory approach to market research", *Marketing Science*, vol. 5
- McFadden D. (2001), "Economic choices", *American Economic Review*, vol. 91
- McFadden D. (2006), "Free markets and fettered consumers", *American Economic Review*, vol. 96
- Malerba F. (2002), "Sectoral systems of innovation and production", *Research Policy*, vol. 31
- Menezes F. (2005), "Electricity retail regulation", *Australian Competition and Consumer Commission Conference*, Glod Coast, Queensland, july
- Mollard M. (2007), *Théorie des coûts de changement et analyse de la concurrence de détail dans l'électricité. Le cas britannique*, Thèse de sciences économiques, Université Paris Sud, Sceaux
- National Audit Office (2008), *Protecting consumers. Removing retail price controls*, The Stationery Office, London
- NERA (2007), *Review of the effectiveness of energy retail market competition in South Australia*, National Economic Research Associates Report, phases II and III, Sydney
- NERA (2008), *Innovation in retail electricity markets. The overlooked benefit*, National Economic Research Associates Report, Chicago
- NordReg (2005), *Supplier switching in the Nordic countries*, Nordic Energy Regulators, Helsinki
- OFGEM (2006), *Domestic retail market report*, OFGEM, London
- OFGEM (2007), *Domestic retail market report*, OFGEM, London
- Olsen O., Johnsen T., Lewis P (2006), "A mixed Nordic experience : implementing competitive retail electricity markets for household customers", *The Electricity Journal*, vol. 19
- Public Utility Commission of Texas (2007), *The scope of competition in electric markets in Texas*, Report to the 80th Texas Legislature, PUCT
- Rabin M. (1998), "Psychology and economics", *Journal of Economic Literature*, vol. 36
- Rose N., Joskow P. (1990), "The diffusion of new technology : evidence from the electric utility industry", *Rand Journal of Economics*, vol. 21
- Schumpeter J. (1934), *The theory of economic development*, Harvard Economic Studies, Cambridge
- Schumpeter J. (1942), *Capitalism, socialism and democracy*, Harper, New-York
- Tina Chang Y., Waddams-Price C. (2008), *Gain or pain : does consumer activity reflect utility maximisation ?*, CCP working paper, University of East Anglia, Norwich
- Thomsen E. (1992), *Prices and knowledge. A market-process perspective*, Routledge, London
- Von der Fehr N-H., Vegard Hansen P. (2008), *Electricity retailing in Norway*, University of Oslo, Oslo

- Waddams-Price C. (2004), "Spoilt for choice ? The costs and benefits of opening UK residential energy markets", CSEM WP 123, University of California, Berkeley
- Wilson C. Waddams Price C. (2007), "Do consumers switch for the best supplier?", CCP WP 07-6, University of East Anglia, Norwich
- Wolozin H., Wolozin B.(2007), "The uncscious in economic decision-making : convergent voices", *Journal of Socio-Economics*, vol. 36