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Liberalized retail electricity markets: What we have learned after two decades of experience?

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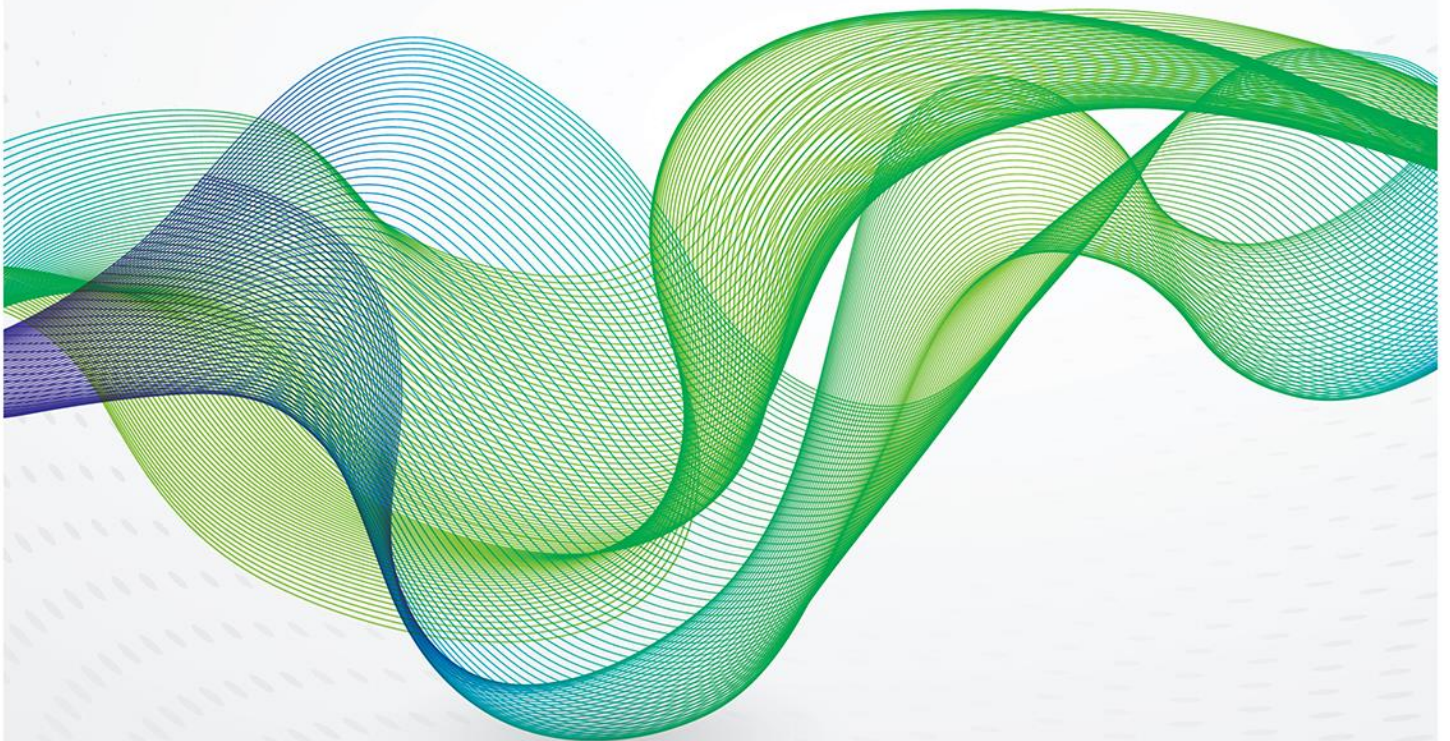
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Liberalized retail electricity markets: What we have learned after two decades of experience?

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Abstract

The retail electricity market, as the key link between end users and the wider electricity system, play a significant role throughout the power sector. This paper argues that the reference design of the retail market in the post liberalization era has not only failed to achieve its original objectives but has also proved to be unfit to keep pace with technological change, consumer preference, and the energy transition. Measures to reduce barriers to entry for new suppliers have distorted competition, put consumers at risk through unsustainable retail business models, and led to an unfair distribution of system and public policy costs. Lack of consumer engagement has been one of the biggest weaknesses of retail electricity markets. The nature of issues that impede engagement – such as complexity of the market and electricity tariffs, transaction costs, perceived barriers, and behavioural biases – have made remedial proposals, based on individual switching, less effective for the most disengaged consumers. The growth of government wedge and policy costs has reduced the size of the competitive portion of the retail tariff. At the same time, the structure of end users' tariffs bears little relationship to the actual cost structure of the electricity system. This lowers the ability of retailers to recover these costs from energy consumption in an equitable manner. The emergence of non-traditional business models, the rise of new players, and a change in the nature of end users' interactions with the electricity system call into question the dominance of the vertical architecture of an electricity market in which retail suppliers act as the hub. This paper concludes that retail market design and regulations need to be rethought to enable innovation and deliver the decarbonised, resilient, and affordable electricity that all consumers need.



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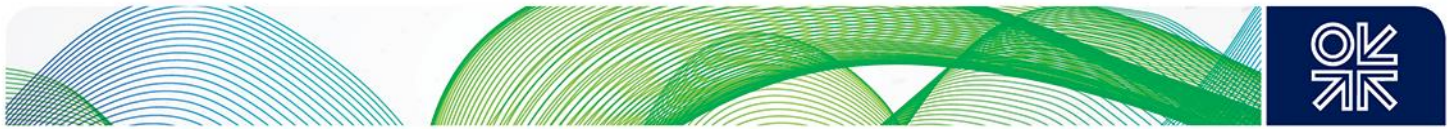
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1. Introduction

Following the liberalization of the electricity sector and the creation of a competitive wholesale electricity market, the question of how to transfer the benefit of the upstream competition to end users was raised. The possibility of creating a market on the retail side – through private retail entities who compete for consumer demand – was envisioned as the most efficient way of maximizing end users' benefit, compared to alternatives such as regulated prices. In this way, retailers become the main point of contact for end users to access the electricity system; with this comes a range of responsibilities and obligations, much of which are instituted in legislations and regulations.

The reference paradigm of a retail business was developed in the form of a decentralized competitive market where retail suppliers have identical sourcing costs, given the competitive spot wholesale market and regulated network charges. Retail competition was expected to put pressure on both the sourcing costs of electricity (including costs of hedging) as well as the operating costs of retail (such as billing, metering, and credit assessment). In the absence of consumers' switching costs, and low costs of entry and exit, retail competition should result in cost reflective end user prices that move with wholesale prices. In theory, therefore, suppliers have no choice but to keep their margin as low as possible and pass savings to consumers when wholesale prices are falling, in order to maintain or enhance their market share.

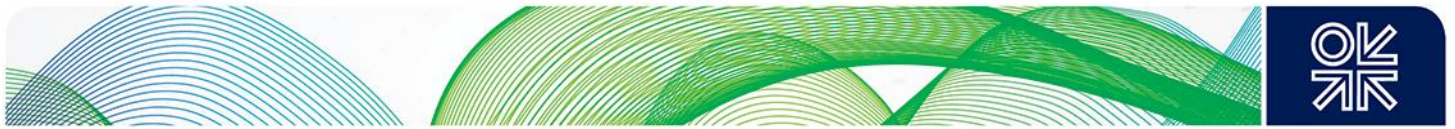
Under such a paradigm, the key objectives of retail electricity policy are to create a market with low barriers to entry for suppliers and low barriers to switching for end users. In this way competition is maximized, prices are efficient, and consumers are protected.

As the retail electricity market plays a key role in the well-functioning of the entire electricity system, it is imperative to understand how these objectives have been realized during the two decades of its establishment. This paper analyses experience of the retail electricity market, focusing primarily on the case of Great Britain (GB), as a pioneering market, but also reflects upon examples from other jurisdictions when this is relevant.

We argue that the reference design of the retail electricity market in the post liberalization era has not only failed to achieve its original objectives but has also proved to be unfit to keep pace with technological change, consumer preference, and the energy transition.

First: measures to reduce barriers to entry have distorted competition, put consumers at risk, and led to an unfair distribution of system costs. The existing regulatory model (which exempts suppliers who are below a certain threshold from social and environmental obligations) has led to the growth of the retail market but at the cost of an uneven playing field for retailers, unsustainable business models, and the disruption of price signals. A large number of new retailers in GB have entered 'supplier of last resort' (SoLR) arrangements over the last couple of years. Moreover, the threshold obligation has incentivized a pricing strategy that has caused the costs of public policies to be recovered disproportionately from a subset of consumers who are loyal and do not switch. The 'supplier in a box' (SIAB) model, as a short cut route to the retail market, has played an important role in supporting market entry, but it can bypass regulatory market entry tests and thus increase the probability of subsequent failure of under-prepared and under-resourced suppliers. This means reducing barriers to entry needs to be balanced with sustainable growth of the market.

Second: lack of consumer engagement has been one of the biggest weaknesses of liberalized retail electricity markets. Currently more than 50 per cent of consumers in GB are still on a default tariff. The nature of issues that impede engagement has made proposals for effective solutions of this issue challenging. The retail market was originally designed on the basis of individual switching and the assumption that consumers will behave in the retail electricity market as they do in other offer markets. In practice, however, a range of barriers to switching – such as complexity of the retail market and electricity tariffs, transaction costs, uncertainty about the service quality of new suppliers, perceived



barriers, and behavioural biases – have contributed to a lack of consumer participation. The lack of consumer engagement has sparked debates about how best to protect consumers against the unilateral market power of retailers, in the presence of consumer inertia. Since January 2019, the GB energy market regulator has applied a controversial price cap on standard variable tariffs across the whole market, to compensate for consumers' disengagement. The application of a direct price control mechanism to protect consumers shows the degree of urgency of this issue in the eye of the regulator. However, there is already some evidence on the distortionary effect of this approach compared to alternatives such as collective switching.

Third: energy, or at least part of its use, is considered as an essential service by sector regulators. The essentiality of energy in modern life has led to it being subject to rules and regulations beyond general consumer laws. In this sense, energy is a unique commodity which provides consumers with a set of defined rights – such as the right to an electricity connection, free-of-charge access to at least one energy comparison tool, the ability to switch without extra charges, provision of clear contract information, and the right of withdrawal. There are also heavy obligations in suppliers' licences to prevent harm to consumers caused by adverse effects of the market. However, these licences are mainly defined around one definition of 'supply', which means that many activities of new players will fall outside this definition. What makes the problem more complex is that many of these new players operate across markets (for example energy and telecommunications) and there might thus be a need for a cross-sectoral regulatory regime. However, the flip side of the coin is that protective regulations must not stifle innovation and should be proportional to the risk that consumers are exposed to. For example, the Universal Service Obligation (USO) in the retail market might prevent new players from specializing and innovating in a customer-specific energy business model.

Fourth: since privatization, the electricity industry has seen significant changes in all dimensions. Consumers are now able to generate, store, and sell back electricity and flexibility to the power system, which is characterized by a high level of intermittency. There are a range of emerging business models, which are often beyond either the operational focus or the competency of traditional suppliers. These include demand response aggregators, community energy service providers, multi-service providers (other services in addition to energy services), switching service providers, prosumers, peer-to-peer market platforms, smart home, and energy management service providers. The problem is that existing rules impose significant complexity and constraints on those who wish to bring these new business models to the market, because they are often unable to align themselves with the requirements of traditional supply licences. Some innovations – such as multi supplier models – would benefit current and future consumers, but they are blocked by the current regulatory framework. Moreover, the complexity of existing regulation governing the retail market is a hindrance to the fulfilment of obligations even for traditional suppliers, let alone new entrants who do not have the same level of resources to deal with regulatory requirements. Furthermore, the emergence of new players and models, such as prosumers and peer-to-peer trading, mean that the architecture of the retail market is changing; vertical structures in which the traditional supplier is the only point of access to the market are no longer the dominant model. It is very likely that future retail markets will see the co-existence of both horizontal structures (prosumer–network–prosumer) and vertical structures (wholesale–network–retail).

Fifth: there is a two-way interaction between the retail market and the network segment of the electricity sector. On the one hand, efficient and cost-reflective distribution network tariff design motivates retailers to design their final tariffs such that they are reflective of network costs and take other actions to help consumers to implement consumption behaviour practices that reduce network costs (because it reduces retailer costs as well). On the other hand, the well-functioning of the retail market impacts the costs of maintaining and upgrading the network, as retailer actions influence how the networks are used by consumers and hence affect future network costs. This means while efficient network tariff design is necessary for optimum utilisation and sizing of the network it is not sufficient as the level competition in retail market also plays a key role. In places that the retail market is not sufficiently contestable it might



be more effective to subject end users to distribution network tariffs directly, rather than the current approach in which the network cost reaches consumers indirectly through the retail tariff.

Sixth: the growth of government wedge and policy costs has reduced the size of the competitive portion of the retail tariff. Unlike network costs, for which retailers can be incentivized through tariffs in order to reduce them for everyone, retailers have no genuine influence over policy costs. However, they can avoid policy costs – though a Power Purchase Agreement (PPA) with distributed generation – when these are levied on energy consumption, and thus increase them for others. Currently, retail tariffs are mainly volumetric, which incentivizes inefficient ‘behind the meter’ installation and creates an inequitable system, as the growth of decentralization lowers the ability of retailers to recover these costs from the energy component in an equitable manner.

These factors all mean that the retail electricity market requires fundamental reforms. These reforms should not only aim at reconciling competition with consumer protection, but also at making the retail electricity market compatible with the growth of decentralization, decarbonisation objective and the rise of horizontal market structures.

The outline of this paper is as follows. The next section reviews the performance of retail electricity market following liberalization. Section 3 discusses the rise of new trends and the changing role of consumers and their implications for retail electricity markets. Section 4 provides concluding remarks.

2. Liberalized retail electricity market

The restructuring of the electricity sector has not resulted in equal outcomes for upstream and downstream. According to Foster et al. (2017), 96 per cent of developed countries and 70 per cent of developing countries have introduced some form of legal provision to support a particular stage of competition in the upstream market (the degree of competition in these countries, however, varies widely from basic introduction of auctions to fully competitive wholesale markets¹). Countries with legal provision for retail choice are mainly located in Europe, where EU liberalization directives and regulations have enabled power markets to evolve. In non-European developed countries, legislation for retail choice exists in Australia, Canada, the Russian Federation, New Zealand, Switzerland, and the USA. Among developing countries, there are just a few jurisdictions with retail choice regulations in Latin America (Argentina, Brazil, Chile, Guatemala, Peru), Eastern Europe (Kazakhstan, Romania, Russia, Turkey, Ukraine), and Asia (India, the Philippines).

However, the presence of legislation does not mean that there is a functional competitive retail market in these countries. Retail competition is non-existent in many of the aforementioned developing countries. In the developed world, there is variation within the same country. For example, most US jurisdictions, except for a few states,² have regulated retail prices; in states where retail choice does exist (except for Texas) it is often limited to large consumers, or the competitive prices are unattractive in comparison with regulated prices (NREL, 2017). This also applies to most Asian, Latin American, and Eastern European countries. Given the significant level of heterogeneity in degree of competition, rather than there being a dichotomy between competition and regulation, retail markets can be best described as being on a spectrum between the two. On one side of the spectrum, we have fully competitive retail markets in GB,³ Germany, New Zealand, and the National Electricity Market of Australia (NEM). On the other side are markets in which retail prices are largely regulated for small consumers, such as in France. There are also markets where retail competition exists along with some

¹ Only 20 per cent of developing countries have some form of power market, whereas this number is 80 per cent in the developed world.

² These include Texas, Illinois, Ohio, Pennsylvania, New York, and Maryland.

³ Ignoring the recent price cap applied in the retail market.



level of government intervention in the form of either setting the default tariff, such as in Italy, or approving tariffs, such as in the Netherlands.

Since the inception of the idea of retail competition, the question of adequate design has been a topic for discussion among policy makers, academics, and practitioners. Retail is a market in which private suppliers of electricity (and gas) are competing for consumer demand. The well-functioning of this market thus depends on the possibility of free entry and exit for suppliers and cost-free switching for consumers. Therefore, from a market design perspective, the key objectives of a regulator with respect to the retail business is to create a market with low barriers to entry for suppliers and low barriers to switching for consumers. There is almost a consensus among economists that realizing these two objectives will result in efficient electricity prices, innovation, and improved service quality. However, in practice, it is not straightforward to achieve a contestable retail market such that new suppliers easily enter the market, and consumers change tariff plan or switch supplier regularly. In particular, the issue of barriers to switching has received significant attention in recent years as consumer disengagement is argued to result in consumer exploitation, an issue that invites government intervention with the aim of protecting consumers. Electricity sector regulators often consider electricity as an essential service that needs to be accessible and affordable to all users. In practice, this means that retail electricity markets are generally subject to regulations beyond conventional competition policies in other markets.

Overall, retail electricity markets are governed by two set of policies: those that aim to promote competition and consumer engagement and those that aim at consumer protection. In the next subsections, we discuss these two key aspects of retail markets (competition and consumer protection) and factors that affect them.

2.1 Barriers to entry and competition in the retail electricity markets

There are various definitions describing a barrier to entry in an industry. Bain (1956) defines it as the advantage enjoyed by an incumbent seller over the potential entrant, which manifests itself in the ability of incumbents to increase their prices beyond the efficient level without facing a threat by new entrants. The alternative definition for entry barriers is given in terms of the cost that a potential entrant to an industry incurs while established sellers do not have such a cost (Stigler, 1968).

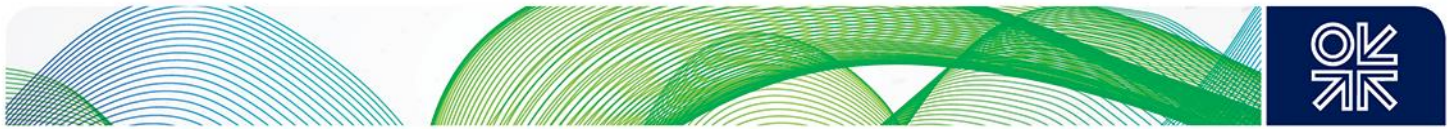
An entry barrier in a retail electricity market is often related to the following four factors:

- (i) economy of scale,
- (ii) economy of scope,
- (iii) sunk costs,
- (iv) social and environmental obligations and regulatory requirements.

A supplier who wishes to enter the retail business might need to serve a certain number of customers before its business becomes profitable (*economy of scale*). The cost of acquiring customers is often high for new retailers, especially if there exists a huge portion of disengaged customers who are not visible to new entrants.

The second issue is related to the scope of competition in retail markets. Although the main activity of a retailer is to procure energy and manage the risk on behalf of its customers, there are sometimes other activities that are subject to retail competition such as metering, billing, credit assessment, bill collection, and outage reporting. A retail market with a wide extent of competitive activities would create economies of scope for established large suppliers, while it creates a barrier to entry for new and small retailers who are not able to provide all those services (*economy of scope*).

The third problem is that entering a retail business entails investment in software, algorithm and computation capabilities, website and call centres to deal with the complexity of participation in the wholesale market, risk management, bill collection, and consumer relationship management. The capital requirement for these investments may thus act as a barrier to entry (*sunk costs*).



Finally, retailers might be subject to certain social/environmental obligations and regulations with which new entrants find it difficult to comply. For example, retailers might be asked to meet certain carbon reduction targets or bill savings for vulnerable customers, with the assumption that they transfer these costs to end users; this is something which is not easy in a competitive market (*social and environmental obligations*).

In addition, the requirements for granting a licence to a supplier might be so complicated and burdensome that potential entrants are dissuaded from entering the retail market altogether (*regulatory barriers*).

In order to promote competition, regulators need to design appropriate policies to deal with the entry barrier issues mentioned above. In different jurisdictions, various measures have been proposed and implemented. For example in the UK, to reduce the costs of acquiring customers to new suppliers and to help disengaged customers, the Competition and Markets Authority (CMA) has asked the regulator, Ofgem (the Office of Gas and Electricity Markets), to develop and operate a secure database which contains information (energy usage and tariff plan) on customers who have been on a default tariff with the same supplier for at least three years (Ofgem, 2019a). This database would then be available to existing suppliers as well as to new entrants.

In order to reduce barriers related to economy of scope, in many US states network companies are required to offer retailers a consolidated billing service with the option to purchase the receivables of retailers (Ros et al., 2018). However, this has been subject to criticism because although a reduction in the scope of retail services might lower entry barriers, it can also reduce the incentive of retailers to innovate, as it affects their revenue stack. Similarly, to help small suppliers enter the market and compete with incumbents, in the UK, retailers with fewer than 250,000 customers are exempted from Energy Company Obligations (ECO) and the Warm Home Discount (WHD) (Ofgem, 2018a). ECO is a governmental energy efficiency scheme which has the aim of reducing carbon emissions and tackling fuel poverty; its most recent project only focuses on Home Heating Cost Reduction Obligation (HHCRO). WHD is a scheme that offers low-income consumers a one-off discount (£140) on their electricity bill during cold months.

In order to ease market entry in the presence of complex licence requirements, the UK regulator allows for an arrangement known as 'white labelling'. A white label retailer is an organization that does not hold a licence itself but instead has partnered with an existing licensed supplier to offer gas and electricity to end users using its own brand (Ofgem, 2015a). This arrangement has the potential to provide greater consumer choice and competition. Another example is 'supplier in a box' (SIAB), which is also known as 'off-the-shelf' mode. This is a model where a specialist utility IT systems vendor gains an electricity supply licence and then agrees to the necessary industry codes. This ready-to-go licenced company is then sold on to the new entrant, the company assets are transferred to the new entrant, and the new company can go through Controlled Market Entry (CME) (Britton et al., 2019).

Experience of the retail electricity market in GB, as a pioneering liberalized jurisdiction, provides some interesting insights on market entry and competition. Figure 1 shows the number of active domestic suppliers by fuel type in this market. As seen from this graph, while at the beginning of this century (2004) there were a little over 10 active suppliers of gas and electricity, this number reached over 70 by September 2018 (the number of suppliers who provide either electricity or gas only is, however, very low, which means that dual fuel supply is more attractive to retailers than single fuel supply). A wide range of businesses entered the UK retail market; this included small and medium-sized suppliers, European utilities, international oil companies, and chain supermarkets (KPMG, 2018). It is expected that such diversity will result in innovations in terms of new and differentiated business models.

The downside of the market's growth is that too many suppliers have come into the market with unsustainable business models. Since November 2016, 16 suppliers in the UK have failed and four have exited the market; a total of 20 suppliers have thus entered into 'supplier of last resort' arrangements (SoLR) (EnergyScanner, 2019). A combination of issues such as low capital requirement,



lack of industry experience, inability to manage risks, high wholesale costs, and the retail price cap have resulted in the insolvency of these companies.

There is a trade-off between lowering entry barriers and having a sustainable retail market. The 'supplier in a box' (SIAB) model has played an important role in easing entry barriers in the GB market. According to Britton et al. (2019), 42 (57 per cent) of the total 74 active suppliers have entered the GB market via the SIAB route. However, this route to market can bypass regulatory market entry tests that are designed to filter out underprepared or under-resourced potential suppliers. In 2018, 30 per cent of suppliers that failed had been set up through SIAB.⁴

From the middle of 2019, Ofgem has planned to introduce tougher entry test for new energy suppliers. Prospective energy supplier need to demonstrate sufficient funding, provide a customer service plan and pass a fit and proper test (Ofgem, 2019f).

Apart from the possible correlation between rapid growth of retail market and failure of suppliers, the significance of the size of a supplier's operation is also very important. Notwithstanding the high number of retailers, the GB retail electricity market is still concentrated. In 2004, the six major utility companies (British Gas, EDF, E.ON, npower, Scottish Power, and SSE – collectively known as the big six) had 100 per cent of retail market share. They still supply around 75 per cent of the market as of third quarter of 2018 (see Figure 2).

The data shows that the structure of the GB retail market is not static and is evolving, but the extent of ease of market share gain is not clear. On the one hand, in spite of having a Herfindahl–Hirschman Index (HHI) of above 1000 for both gas and electricity, retail market HHI⁵ has been on a descending trajectory in recent years (see Figure 3) as the big six have been losing part of their market share to smaller suppliers. On the other hand, no suppliers apart from the big six have reached a market share of more than 5 per cent. As of June 2018, around seven suppliers had a market share of 1–5 per cent, while around 60 retailers had a market share of less than 1 per cent (Ofgem, 2018b). The issue of market concentration is not unique to the GB market. Indeed, across the EU most retail electricity markets are highly concentrated (see Figure 4). On top of that, market consolidation, mergers, and acquisitions might lead to further concentration in the future.⁶

One of the assumption of the retail market is that there is sufficient liquidity in the wholesale market thus access to suitable products is straightforward for independent retailers. However, liquidity can be an issue when the electricity market is dominated by few large vertically integrated companies as in the case of GB. The costs of low liquidity and associated barriers to competition are ultimately borne by consumers. Vertical integration of generation and supply business was a common strategy among utility companies, in the post liberalization era, to hedge against risk on large capital intensive investments. The problem was exacerbated with decentralised electricity market structure of the GB which is based on bilateral contract and thus not price transparent. Overall lack of a reference price for forward products along with liquidity issue made it difficult for independent retailers to access the wholesale market.

⁴ Britton et al. (2019) agree that this does not provide sufficient evidence that this route increases the probability of failure among suppliers.

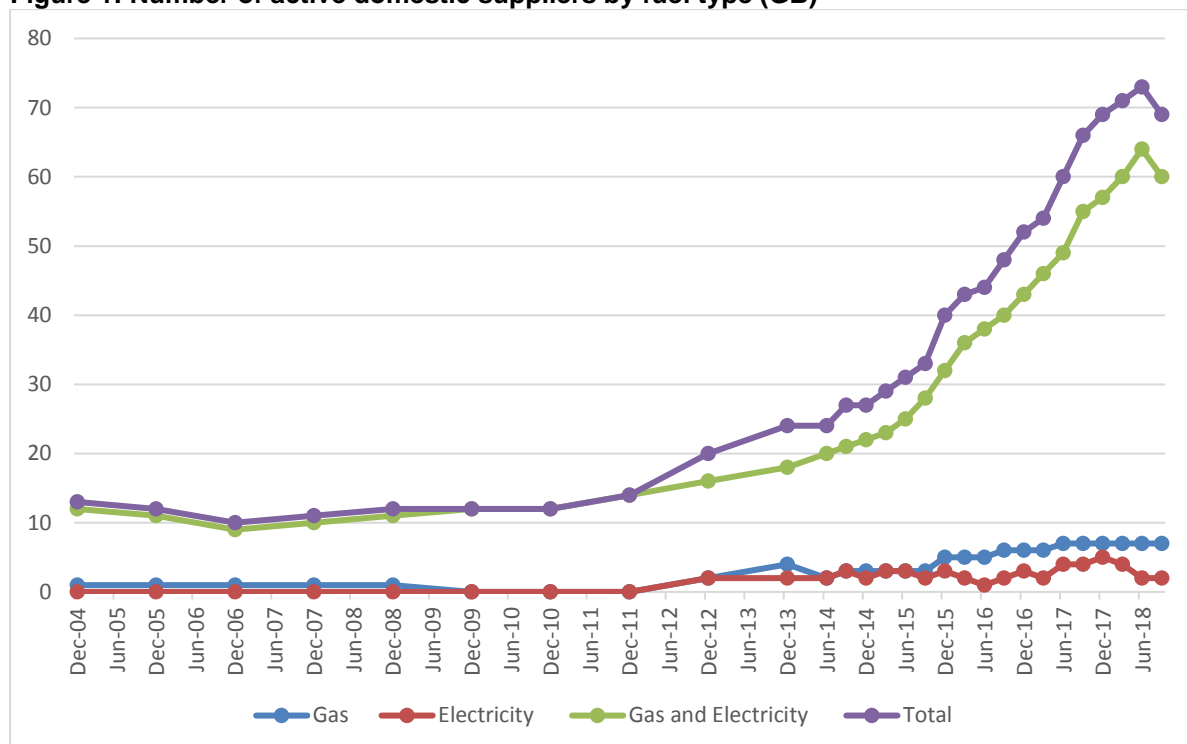
⁵ The Herfindahl–Hirschman Index (HHI) measures market concentration by summing the squares of the market share of each firm. The Competition and Market Authority (CMA) in the UK considers markets with HHI lower than 1000 as unconcentrated, markets with HHI between 1000 and 2000 as concentrated, and markets with HHI higher than 2000 as highly concentrated.

⁶ For example, in 2017, Shell announced the acquisition of First Utility, a UK retail supplier. Also, in the same year, SSE and npower announced a merger of their retail operations with the aim of creating a new independent retail supplier in GB by the first quarter of 2019, although they later scrapped the plan despite having a final clearance from CMA. However, in September 2019, SSE has agreed to sell its retail arm to the UK's largest independent energy supplier, Ovo Group, in a deal valued at £500m.



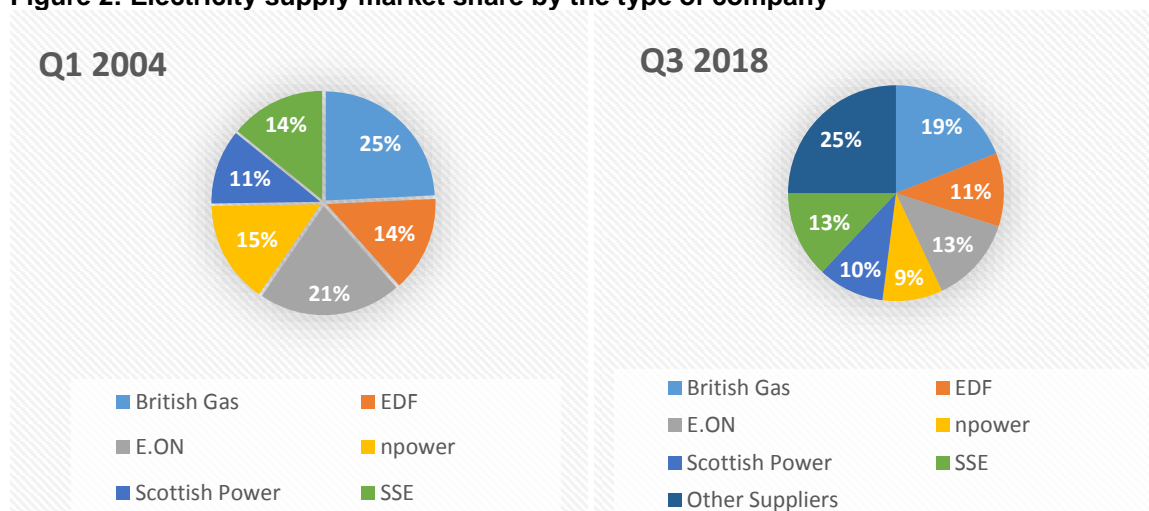
In order to address the liquidity and transparency concerns, in 2014, the GB regulator, introduced Wholesale Power Market Liquidity reform with three objectives. First, a rule called Supplier Market Access (SMA) was introduced to encourage availability of products that support hedging by introducing minimum service standard of trading between eligible suppliers and largest eight generators. Second, a market making obligation was placed on the six largest vertically integrated companies to promote robust reference price for forward products. Third, six largest vertically integrated companies and largest independent generators were required to report their day ahead trading on different platforms.

Figure 1: Number of active domestic suppliers by fuel type (GB)



Source of data: Ofgem (2019b)

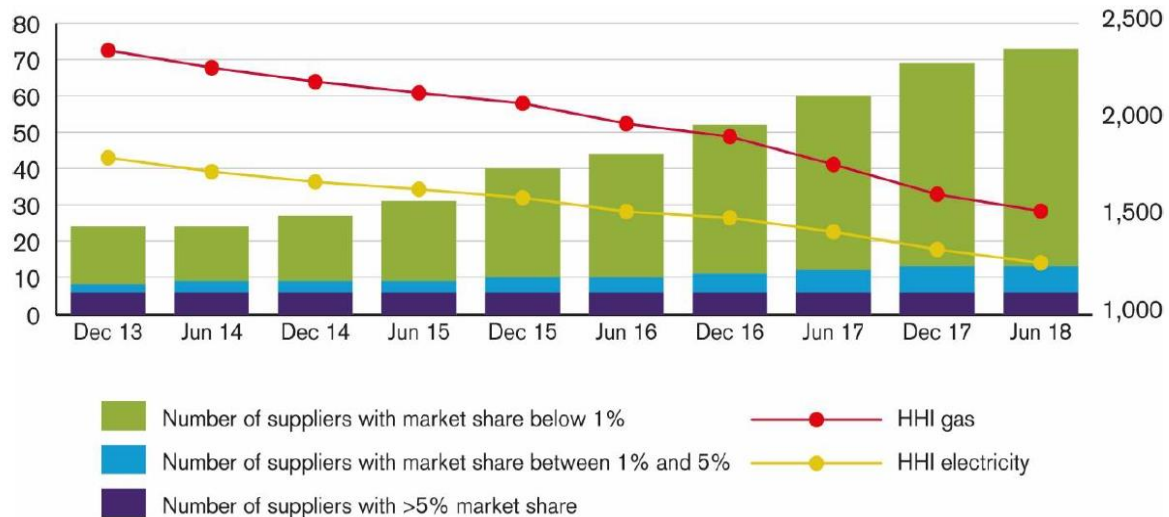
Figure 2: Electricity supply market share by the type of company



Source: Ofgem (2019c)

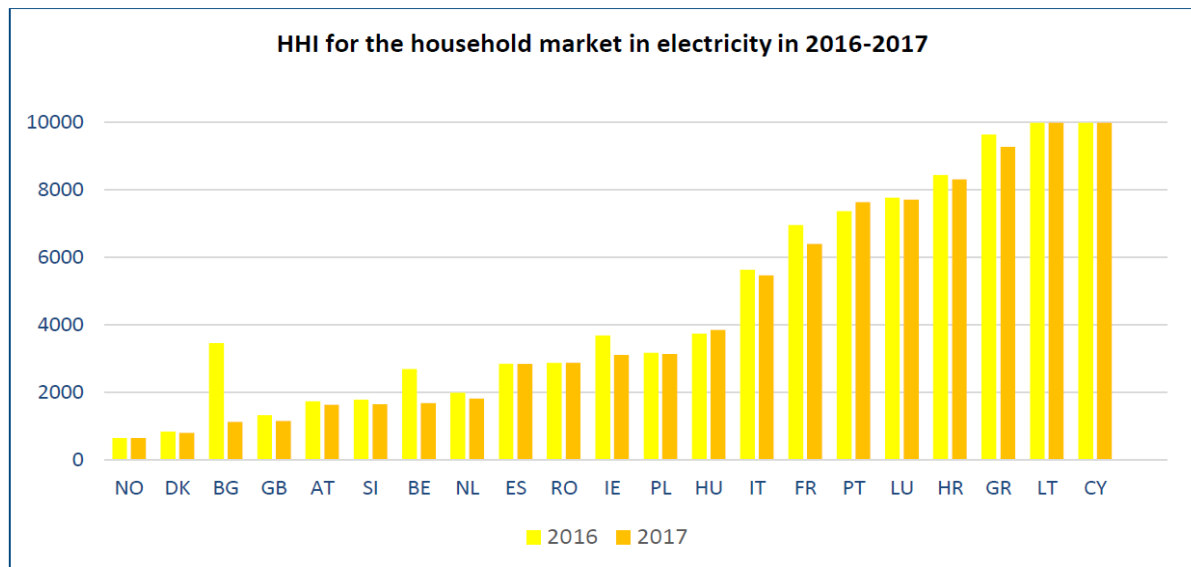


Figure 3: The change in concentration of GB retail electricity market



Source: Ofgem (2018b)

Figure 4: HHI for domestic electricity market in Europe



Source: CEER (2018)

2.2 Consumer engagement and competition in the retail electricity markets

When consumers face switching costs (or barriers), this will not only result in low market entry over time, but also in an inefficient pricing pattern. There can be several reasons for the existence of switching costs.

First, the transaction costs related to leaving an existing supplier can prevent consumers from switching. The process of closing an account with her existing supplier might be complex and lengthy and require several actions on the consumer's part. Sometimes the existing supplier might charge an exit fee if a consumer wishes to change supplier before the end of her contract. Alternatively, the costs of acquiring information on new suppliers and their tariff plans might be higher than any potential gain that a consumer can make from switching.



Second, uncertainty about the service quality of new suppliers might cause some consumers to continue with their existing suppliers. Klemperer (1995) argues that in such a market, a consumer behaves as if she is faced with switching costs equal to the maximum insurance premium that she would be willing to pay to be guaranteed the same service quality that she receives from the existing supplier.

Third, there are sometimes psychological costs of switching that have no economic reasons to support them. For example, a consumer might perceive the switching process as being complex, whereas in reality it might be completely straightforward. In the GB retail market, for instance, the CMA believes that the switching process is relatively easy, whereas many consumers think otherwise (Ros et al., 2018). A recent survey in New Zealand shows that around 13 per cent of consumers do not even know that they have a retail choice and this percentage has varied between 12 and 19 per cent over the much of the past decade (Sapere Research Group, 2018). Unlike other impediments, consumers' unconscious barriers are difficult to address through regulatory intervention.

Fourth, there might be behavioural biases which affect consumer decisions when evaluating energy offers. For example, Ofgem (2011) identified four types of behavioural biases in the GB retail market:

- (i) consumers are usually faced with large amounts of information and have little time and few resources to analyse them (choice overload),
- (ii) consumer often prefer the current options (default bias),
- (iii) some consumers weigh monetary loss more than monetary gain (risk averseness),
- (iv) a consumer might weigh the cost incurred today more than savings that could be achieved in the future (time inconsistency).

Therefore, the market does not automatically promote competition if consumers do not engage with it. An important feature of existing retail electricity markets is that they are designed such that a potentially active consumer would benefit most. An active consumer in this context means a user who is receptive to information provided by suppliers or who has the ability to search and find relevant information, can analyse available choices and react accordingly, or who can bargain for a better deal. Not all small consumers (including households and small businesses) would fit within such a definition. This is why consumer engagement has become one of the major issues of retail electricity markets in recent years.

Similar to measures aimed at lowering barriers to entry, regulators implement various other policies to lower switching barriers in the retail market. These policies often focus on reducing the cost of accruing information, improving transparency, and easing choice for consumers.

In relation to search costs, price comparison websites (PCWs) are a widely utilized tool in competitive retail jurisdictions such as GB, New Zealand, and Australia. By listing the tariff plans of several suppliers in a single place, PCWs do away with the need for consumers to contact several suppliers individually to gather information on their price plans. Indeed, the internet has reduced search costs significantly, allowing end users to compare prices across different suppliers in a matter of seconds, thus intensifying competitive pressures between utilities. There is also some evidence that PCWs improve switching rates. A recent Ofgem survey shows that a big fraction of those who engage with the market find their deals through PCWs (Ofgem, 2017d). The key issue in relation to these websites, however, is whether commercial PCWs are sufficient, or whether the market also needs official PCWs which are established by non-commercial entities such as the regulator. This is because commercial PCWs might not display full market offers if their business model is such that only the tariff plans of those suppliers who pay them a commission are displayed. In order to establish trust and confidence, PCWs preferably need to cover all of the retail market and not just a subset of it, and when they do not, they must let consumers know. This is because compelling PCWs to show all their offers might reduce competition between them.



Another policy in this respect is the promotion of automatic switching websites that lower transaction costs by reducing the number of actions that consumers need to carry out. The user only needs to provide the website with a few pieces of information – such as their existing supplier and tariff plan, energy spending, and postcode. These websites then search the market automatically and present the subscribed consumer with an offer that gives them the highest saving (which, depending on their business model, might be the cheapest option in the market). The website switches the consumer with a click, and there is often a cooling off period during which the consumer can change his mind. There are often two primary business models for these websites.

- Some are free to consumers but charge the receiving suppliers – their referral reduces the cost of acquiring customers to the receiving supplier.
- Others charge a fixed annual rate to the subscriber and carry out a monthly search to switch the consumer only if at least a certain amount of saving (for example £50) can be achieved taking all costs, such as an exit fee, into account.

The difference between these two business models is that subscription-based switching websites cover the whole market, whereas commission-based websites only cover those suppliers with which they have an agreement. This is why it is more likely that a consumer is offered the market's cheapest tariff plan in a subscription-based model, but the downside is that the consumer needs to pay the subscription costs.

In addition to the above aids to switching, some other general policies can be implemented to improve transparency and ease consumers' choice. For example, standardizing the type and structure of retail tariffs can help consumers to make a meaningful comparison between the tariffs offered by different suppliers. However, such a policy needs to be weighed against its possible effect on innovation. Following the 2013 Retail Market Review, Ofgem, in the UK, introduced rules that were known as Simpler Tariff Choices. These imposed a maximum limit of four on the number of tariffs offered by retailers, created a standardized retail tariff structure, and limited the types of discount available to end users to two options (paperless and dual fuel discounts). However, in 2016, the CMA found that these requirements impeded innovation in the retail market and thus asked Ofgem to remove them. In 2017, Ofgem replaced those prescriptive rules with the 'Informed Choices' regulation; this was a package of five enforceable principles, of which three related to tariff comparability (Ofgem, 2017a). According to Informed Choices rules, the retailer must ensure that the structure, terms, and conditions of its tariff plans are easily understandable by consumers. The second rule states that retailers need to ensure that their tariffs are distinguishable from each other. The third rule requires licensees to put in place information – a tool or a service – that enables the domestic consumer to easily compare tariff plans and select the most suitable one, based on his own context and preference.

There are also policies in retail markets around the world regarding marketing tactics, in order to prevent licensees from misleading consumers by using inappropriate sales tactics and inconsistent and unintelligible terms when contacting them. Regulators also routinely monitor the market and collect information from retailers regarding their tariffs. This information is often used to track price movement in the retail market and estimate the cost of supplying an average consumer. Market monitoring by regulator can have an impact on the behaviour of suppliers, as it implies the threat of intervention if the market outcome is not in line with a competitive market.

The advent of smart meters, together with access to consumer data, are also instrumental in relation to consumer engagement and competition in retail electricity markets. Smart meters allow retailers to have a more accurate estimation of the costs of supplying the consumer. They help retailers to offer more appropriate tariffs and provide useful services – such as tariff comparisons and cost projection – for individual consumers. Additionally, by providing feedback information, smart meters create awareness of energy consumption and facilitate the implementation of demand response programmes in which consumers play a more active role, but in a more convenient way.



Switching data for the UK retail market provides some interesting insights on this aspect of consumer engagement (see Figure 5). As can be seen from Figure 5, switching had been rising from 2003 until around 2008 when it started to decline, apart from an exceptionally high switching rate in a single month (November 2013). Since 2014, however, the number of consumer switches has been on the rise. Various factors have contributed to the observed long-term pattern of consumer switching in the UK. According to Littlechild (2014), from the beginning of 2000 to around mid-2008, Ofgem did not interfere in the retail market as such, and thus switching steadily increased from 15 per cent of consumer accounts to 20 per cent. Then, with the aim of promoting competition, from October 2008 Ofgem introduced various policies such as the Non-Discrimination Condition,⁷ the banning of doorstep selling (this excluded some poorer customers), and restricting suppliers to a common standing charge. However, it later became clear that these policies had an adverse effect on consumer engagement. By 2014, Ofgem had ceased or modified these policies and this is believed to have contributed to the subsequent rise in consumer switching. The singular exceptional increase in November 2013 is, however, related to increased media and political attention to retail prices in this period.

In addition to the longer-term pattern over multiple years, the number of domestic consumers in the UK who switch also follows a seasonal pattern (Ofgem, 2019d). It peaks around March and November and then plunges in January and the summer months. Generally, the short-term variation in consumer switching is related to price change announcements by the big six suppliers (Ofgem, 2018b). According to Ofgem domestic engagement surveys, other reasons for switching are receiving a bill, receiving a price increase notice, and changing homes.

The number of those who switch, however, remains poor in the UK. In 2018 around 18 per cent of consumers switched suppliers (of which 7 per cent were first-time switchers) and 14 per cent changed their tariff plan with the same supplier. Saving money has been reported as the key reason for switching, and the risk of higher bills has been mentioned as the key concern of both those who do not switch and those who have switched. Switching to smaller suppliers constitutes a fair share of all switching; in aggregate, the loss of consumers by the big six is slightly more than their gains from switching (individual companies in the big six group might gain or lose consumers differently). For example, between June 2017 and June 2018, around 40 per cent of total switching was related to moving away from big six suppliers to smaller retailers (Ofgem, 2018b). However, in the same period 40 per cent of switching happened between and to big six suppliers; this means that the big six still have a strong grip over the retail market. This is despite the fact that big six tariffs are generally higher than those of smaller suppliers.⁸ According to Ofgem (2018b), this is due to branding and consumer loyalty.

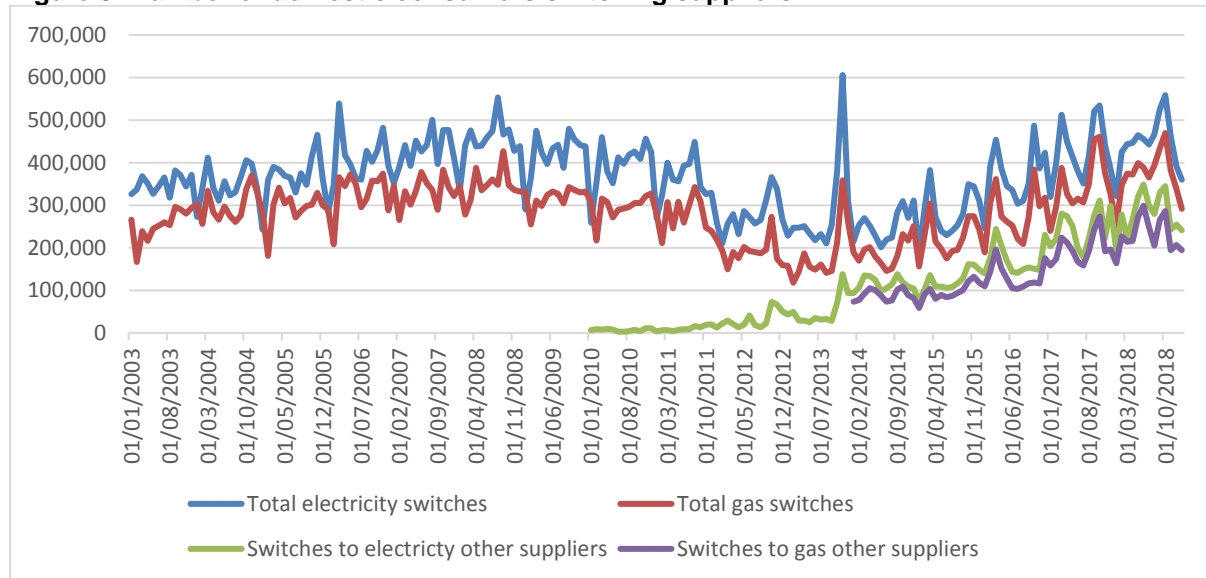
In response to the issues with regard to switching process and its impact on competition, Ofgem has launched a Faster Switching Programme, with the ambition of completing the change of supplier process in one day. This faster and more reliable switching programme is expected to go-live Q2-Q3 2021.

⁷ This condition required retailers not to discriminate between consumers in their core area and those outside, and this reduced prospective gain from switching.

⁸ The remaining 20 per cent is related to moving between smaller suppliers.



Figure 5: Number of domestic consumers switching suppliers



Source of data: Ofgem (2019d)

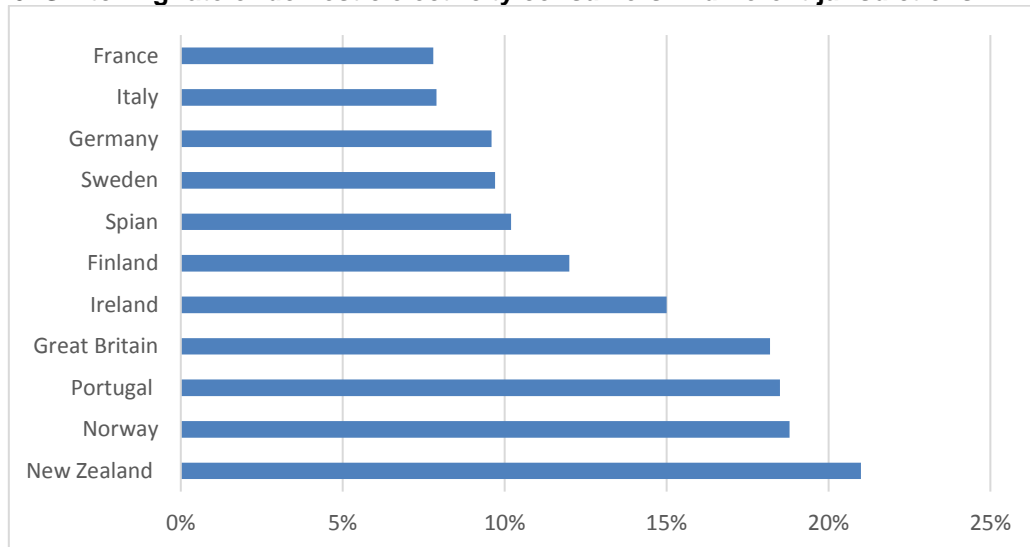
The problem of consumer engagement is not unique to the UK market, it is a characteristic of almost all competitive retail electricity markets. As can be seen from Figure 6, most countries except Norway, Portugal, and New Zealand have a switching rate lower than that of GB. Even in New Zealand, which has one of the most successful retail electricity markets in the world, the switching rate is not significantly higher than in the UK.

The problem of consumer engagement is not unique to the energy sector. According to BEIS (2018), in the banking sector, 90 per cent of customers could gain financially by switching from the standard or reward account to one of the cheapest options available in the market. In the telecom sector, due to inaction (lack of switching) at the end of contracts with their current operator (which include a handset and other services), disengaged consumers ending up paying £130 million more annually. The price of the cheapest broadband contract to a new customer will increase on average by 43 per cent at the end of the initial fixed term deal. Similarly, the price of a fixed broadband and voice service is, on average, £5 more expensive to consumers who are not in contract, compared to those who are in contract. If TV is included in the deal, this difference rises to £9.19.

It is interesting that, despite poor consumer engagement in the GB retail market, electricity is not the sector with the highest detriment as a result of not switching from poor value deals. As can be seen from Figure 7, the mortgage sector has the highest amount of consumer detriment compared to any other sector – including energy, mobile, broadband, banking, car insurance, and home insurance. However, this gains less media attention than potential gains from electricity switching.

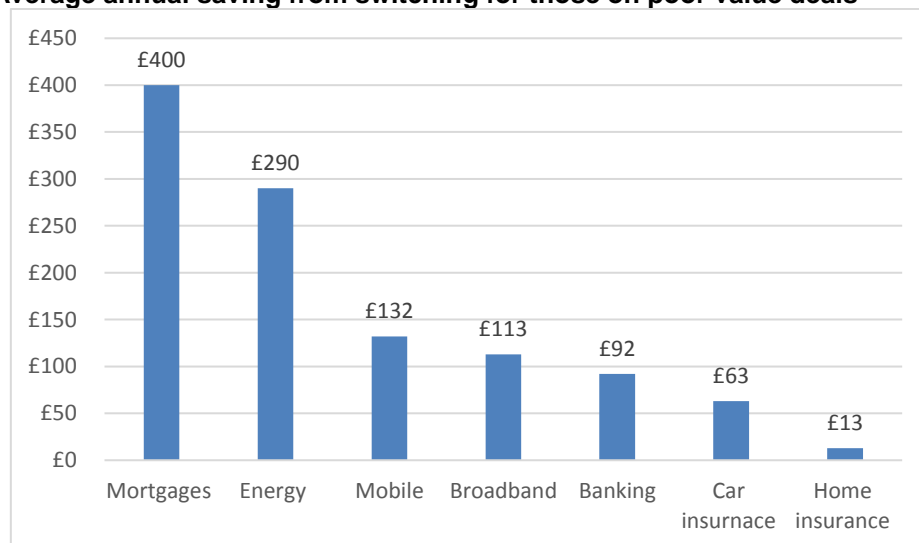


Figure 6: Switching rate of domestic electricity consumers in different jurisdictions



Source of data: compiled from Electricity Authority (2019) and CEER (2018)

Figure 7: Average annual saving from switching for those on poor value deals



Source of data: BEIS (2018)

2.3 Consumer protection in a liberalized retail electricity market

The outcome of a retail electricity market may deviate from that of an efficient market. This arises specifically because of weak consumer response, which give suppliers a position of unilateral market power over an inactive customer base. This issue often leads to government intervention in the retail market and implementation of protectionist policies, as has been observed with the price cap in the GB retail market. Nonetheless, consumer protection in the retail electricity market is not straightforward.

There are two key questions when it comes to consumer protection. First: who should be protected and from what? and second: what is the best way to protect consumers when the retail market is not efficient?



Protectionist policies can aim at specific group of consumers (for example vulnerable or disengaged consumers) or can be universal and include all consumers. Targeted policies to protect a subset of consumers encompass a range of measures such as:

- exemption from disconnection – due to medical circumstances or weather conditions,
- payment plans – offered to consumers who are in debt to extend their bill payment over a longer period,
- energy efficiency support programmes – to help vulnerable customers to reduce their energy usage and, consequently, their bill,
- installation of prepayment meters as an alternative to disconnection for consumers with debt,
- discount on bills,
- a social tariff for vulnerable customers,
- one-off payment of outstanding arrears,
- a reduction of electricity capacity – an alternative to disconnection, such that consumers with debt cannot simultaneously use multiple devices,
- a price cap and/or default tariff.

Protective measures can be designed to include the whole market. There are various policies of this nature, but the most common forms are price cap and default tariff. Default tariffs exist in both liberalized and regulated retail electricity markets. In a liberalized market, the role of a default tariff is to ensure that access to electricity continues under various conditions for multiple consumer groups, such as those who have never chosen a supplier since the market was liberalized, those whose retail contract has expired but who have not signed another contract, and those whose existing retailer ceased operating for any reason. Similarly, price cap is a policy that can be implemented to protect a subset of the market or the whole domestic market. In 2017, Ofgem introduced a temporary cap as a safeguard on prepayment meters, which was extended to other vulnerable customers in 2018. However, from 1 January 2019, Ofgem extended price cap to all domestic customers on a default tariff. With this policy, the GB retail market deviated from a fully liberalized market.

It is also important to determine what a consumer should be protected from. In the case of price cap in the GB retail market, competition authorities were concerned about price dispersion for electricity services. CMA (2016) estimated that consumer detriment from excessive prices to domestic consumers amounted to £1.4 billion per year between 2012 and 2015, with an upward trend reaching £2 billion in 2015. This figure was calculated on the basis of the difference between the actual tariffs of the big six and a benchmark rate based on the tariffs charged by two of the mid-tier new entrant suppliers. However, the key question is whether price dispersion is something that consumers need to be protected from. Alternatively, does a price dispersion in the retail market necessarily point to the abuse of customers by suppliers?

From an economic perspective, price dispersion exists in almost all markets irrespective of whether they are homogenous product markets or heterogeneous product markets. In a homogenous product market, if the degree of price dispersion depends on the buyers' search, it constitutes an undesirable imperfection in the market. This is specifically important for the electricity market because such a situation allows suppliers to exploit information inefficiency by devising pricing policies that charge higher prices to some consumers. Digitalization and information technology allow suppliers to identify and segment consumers into different groups based upon their characteristics, and offer them discriminatory tariffs accordingly (for example to charge some users more than others for the same good and quality of service).

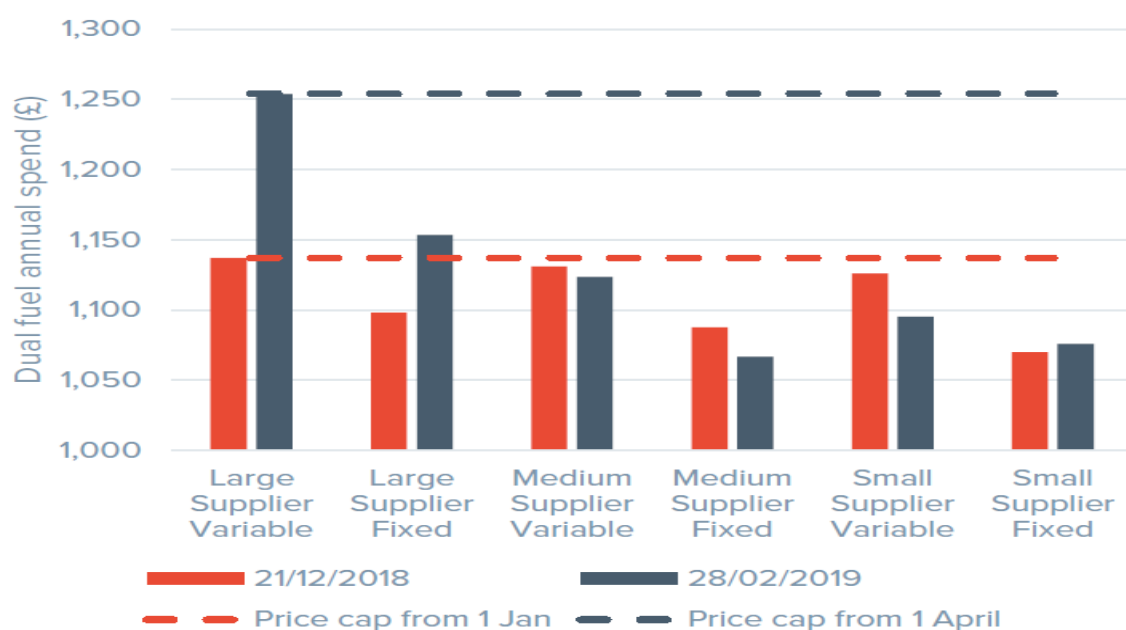
However, not all price dispersion is related to consumers' weak response and information inefficiency. In a differentiated product (or services) market, some degree of price dispersion may naturally exist if



buyers see alternative products (or services) as imperfect substitutes. If price dispersion in a market is the result of supplier costs and consumer preference, then it is a natural outcome of the market and there is nothing to worry about. In the case of the GB retail market, the CMA neither put forward a convincing argument, nor did it present concrete evidence, that the existing price dispersion was entirely the result of consumer disengagement. The CMA argument for consumer detriment was based on the assumption that the low price in the market was competitive and the high price was the result of consumer exploitation (Littlechild, 2018a). However, as pointed out in Littlechild (2018a), such an argument is problematic for several reasons. First: the low price offered by small suppliers is a subsidized price, as small suppliers are exempted from the environmental and social costs that are imposed on larger suppliers. Second: the viability of low prices in the retail market has still not been established (ibid). In 2018 alone, 11 retail electricity suppliers ceased operation in the UK and some of these have cited the government price cap among the reasons that affected their business (UKpower.co.uk, 2019). The third issue is that a price cap requires a complex set of periodical adjustments to account for variable parts of the end user tariff. Moreover, price dispersion exists in all markets and sectors (regulated or otherwise) so demand for price control would be endless if such an approach were to be taken by government in one sector.

An important question regarding the price cap is how it performs in practice. Although it is too soon to investigate the full effectiveness of the wide price cap implemented in the GB retail market, some evidence is already emerging. The cap on the default tariff (also known as the Standard Variable Tariff or SVT) became effective from 1 January 2019 for three months and was then increased by Ofgem from 1 April 2019 to reflect the change in wholesale prices. Two points are observable. First, while medium and small suppliers offer SVT tariffs that are below the cap, large suppliers' SVTs follow the cap closely (see Figure 8). Furthermore, since the cap is on the SVT, in some cases large suppliers' fixed tariffs exceed their variable tariffs – something that was not the case in the past. This may reduce the incentive of existing customers to switch plan or supplier at the end of their existing contract. Moreover, Littlechild (2018b) analyses the cap on prepaid meter tariffs and shows that (except for one) all large suppliers and many of the small suppliers set their tariffs at the level of the cap, and where there seems to be competition below the cap, this is related to subsidized small suppliers.

Figure 8: Announced average fixed and variable tariff costs by supplier type for new customers



Source: Cornwall Insight



In recent years, there has been a growing interest in the idea of collective switching as an alternative to individual switching. In collective switching, consumers fully or partially delegate the task of searching, switching, and monitoring the processes to a third-party intermediary. This approach aggregates a large number of consumers and offers them as a block to suppliers, with the expectation that the buyer power associated with aggregation will deliver a lower price (Deller et al., 2017). It also often involves an auction in which retailers bid to supply electricity consumers with the lowest price.

Collective switching is expected to reduce the search costs and increase the likelihood of low prices offered to consumers by exerting buyer power and exploiting the power of competition through auction. Even in cases where aggregation does not yield buyer power, collective switching provides other benefits such as an easy method of engagement and savings for consumers (Deller et al., 2017).

In the GB retail market, there is a discussion on building a database of disengaged customers by mandating suppliers to share information on the accounts of consumers who have been on default tariffs for more than three years. This database would then be available to rival suppliers and could be used for collective switching initiatives.

Ofgem has already conducted several trials of collective switching to test the effect of some key interventions among the most disengaged consumers. These trials had the same format: a sequence of collective switch letters is sent to participants who are selected randomly from all the eligible customers of one of the larger energy suppliers (which was asked by Ofgem to participate in the trial) and then randomly allocated to different treatment groups⁹ (Ofgem, 2019e). The first letter announces the forthcoming offer plus the opt-out option. The second letter projects savings and encourages customers to contact energyhelpline, a price comparison intermediary which was acting as consumer partner in the trial. The third letter was a reminder, with projected savings and provided a clear deadline. If customers did not opt out after the first communication, their details were automatically passed to energyhelpline, so if the consumer contacted the intermediary, the switching process was straightforward because their data was already there.

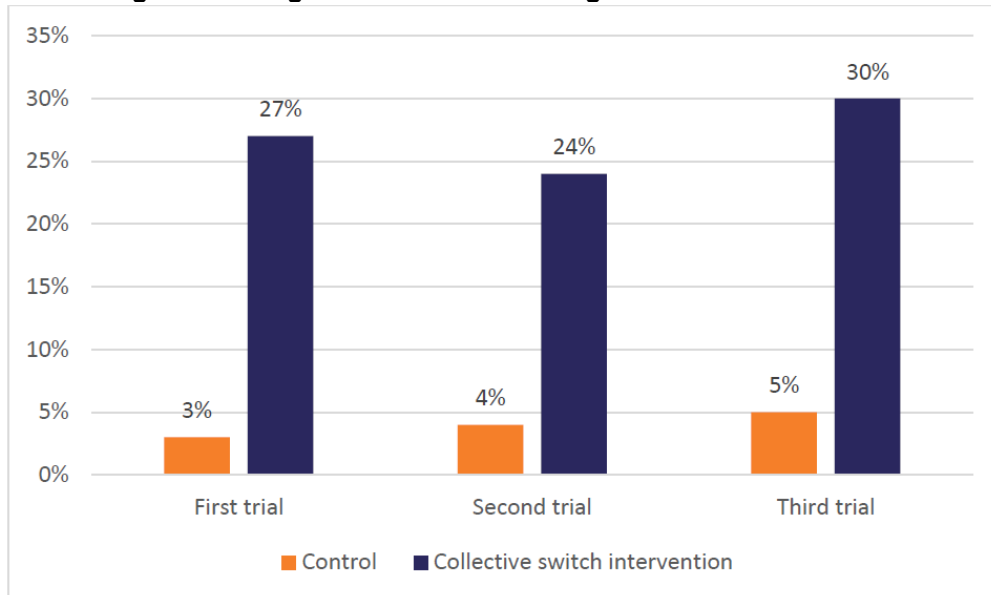
The results of three key trials conducted by Ofgem is presented in Figure 9. These results are not directly comparable as they were testing different interventions. The first trial tested the efficacy of different communication channels: when the letter was sent from Ofgem, as a neutral trusted body, versus the customers' current suppliers.¹⁰ The second trial tested the effect and feasibility of collective switching at scale against a variation which did not include the exclusive tariff (it just offered access to the open market). The third trial was a repetition of the second trial but with a different supplier and after the introduction of the price cap. The results of all these trials show that there is a higher probability that customers who receive the collective switching letter will switch, compared with the control group.

⁹ In the first trial three groups were included. The first arm was a group of customers (supplier arm) that received three communications from their supplier and energyhelpline (n=25,000). The second arm was a group of customers (Ofgem arm) that received three communications from Ofgem and energyhelpline (n=25,000). The third arm was control group who received no additional communications aside from the statutory communications from their supplier (n=5,000). The second trial was also a three-arm randomised controlled experiment. The first arm was collective switch arm where intervention group received three letters from their incumbent supplier and energyhelpline offering access to a Collective Switch tariff (n=90,000). The second arm was Open Market where intervention group received three letters from their incumbent supplier and energyhelpline offering access to an Open Market intervention (n=10,000). The third arm was a control group who did not receive anything beyond statutory communications from their supplier (n=5,000). The third trial was also a randomised controlled experiment where participants were randomly allocated into three trial arms similar to the second trial.

¹⁰ Interestingly, this trial showed that communications from a consumer's current supplier are more effective compared with those sent from Ofgem with the same content.



Figure 9: Switching rates in Ofgem collective switching trial



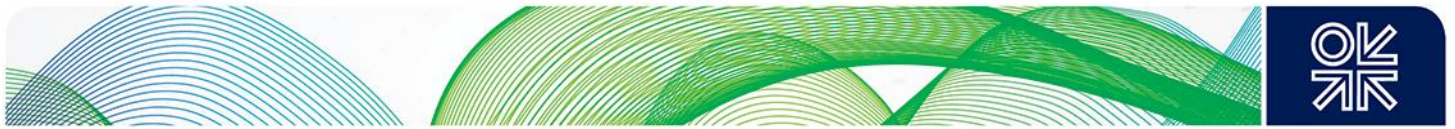
Source: Ofgem (2019e)

Beyond trials, the biggest challenge of the collective switching initiative, however, is its design and the various trade-offs that are involved. The design of such an initiative requires deciding on various parameters of the scheme such as: opt-in versus opt-out, the format of auction, the scope of procurement (only to apply to wholesale energy or to other segments of tariff as well), ensuring the winning deal matches the cheapest deal in the market for individual switching, frequency of auction, and the choice of telephone or paper versus online sign up.

In the opt-in approach, the consumer needs to actively choose to be part of the auction (by ticking a box, for example). It might also require the consumer's consent to be part of the disengaged consumer database, or to be switched to the new tariff after a new supplier and tariffs are determined in the auction. The key benefit of the opt-in approach is that it does not lead to infringement of consumer autonomy. However, the main drawback of this approach is that it requires action on the part of disengaged consumers who have been inactive for a long period. Thus, it is likely that consumers face the same barriers and behavioural biases as in individual switching.

In an opt-out model, the consumer is automatically part of the auction (or database of disengaged consumers) unless he explicitly opts out of the collective switch scheme. The process could be divided into multiple steps (for example: being part of the disengaged consumer database, participating in the auction, accepting the contract afterwards) where all or parts of it are executed on an opt-out basis. The key advantage of an opt-out mechanism is that it can bring benefits to a wider range of disengaged consumers, given that no active participation is required. However, the issue with an opt-out approach is that unless there is a legislative change it is difficult to assign a new supplier and contract to consumers without their knowledge and acceptance of the terms and conditions of a contract. It may also increase further disengagement, as consumers might think that they are always on a good tariff. Furthermore, removing choice from consumers implies that others know what is best for them.

The design of auctions for collective switching also has similar complexities and considerations, as several parameters need to be determined *ex ante*. For instance, the scope of procurement, the size of the block of consumers (too few customers in the block may not create sufficient buyer power – on the other hand too many consumers might be difficult to handle in a collective switching), and the frequency of auctions (annual, semi-annual, or multiyear) all require careful consideration. On top of that, there is



the possibility of flaws in auction design and, consequently, strategic behaviour by bidders. Furthermore, auction design and implementation for collective switching is not cost free and it may affect the market for active consumers.

Collective switching is not just a means to protect consumers; it can also be considered as an alternative retail market design and a substitute for individual switching. Currently it is begin used in Europe, GB, and Australia, along with the existing individual choice mechanism, to address the issue of disengaged consumers. In the USA, however, it is known as Community Choice Aggregation, where it is used mainly as a replacement to individual switching motivated by lack of competition in the supply side of state markets, and the need to counteract this with buyer power on the demand side.

Despite the challenges mentioned regarding the effectiveness and efficiency of price cap and collective switching, consumer protection in liberalized retail markets is a legitimate concern. This again comes back to the question of what is the best way to protect consumers in liberalized retail markets. There are two divergent views here. Some argue that promotion of competition and consumer engagement are the most effective ways to protect consumers. On the other side are those who argue that retail market design should seek to deliver positive outcomes for all consumers, not just those who are highly engaged or tech-savvy. In this view, existing retail markets are designed in a way that requires some level of sophistication on the part of consumers. Thus, those who are well-informed and shop around get the best deals while the rest of the consumers end up paying higher bills. However, opponents of this view argue that most consumers get reasonable outcomes, even if they do not actively search for the best deal, because they are protected by competition on the other side of the market (namely the wholesale market). Littechild (2018b) argues that the emphasis on consumer switching is not very useful, as it only encourages further dissatisfaction when an initial low tariff is combined with a higher priced default tariff in subsequent years. This is because consumers who switch often stay with their new supplier for a longer period than their initial contract. He further argues that it is more useful to put greater emphasis on the longer-term implications of various tariffs beyond the first year, and on customer service.

3. New trends, new structures, and the changing role of consumers in electricity markets

Beyond the challenges of the classical liberalized retail electricity market, power systems in general and electricity markets in particular are undergoing fundamental changes driven by decarbonization objectives, digitalization, and the changing role of consumers due to decentralization. The emergence of 'prosumers' (proactive consumers with distributed energy sources (DERs) and thus the ability to produce, consume, and/or sell electricity to the grid or to other users) is a by-product of the above trends, as well as a sign of consumer preference for greater control over energy usage. The widespread application of digital technologies in the power sector (for example smart meters, smart grid, sensors, software, and other digital network technologies collectively known as the Internet of Things (IoT)) is expected to fundamentally change future electricity systems. With the growth of affordable storage, prosumers can go a step further and become 'prosumagers' by storing excess energy for use at a later time. It is not unrealistic to envision a system in which some users operate almost independently of the grid, while relying partially on the grid for reliability. These potentially disruptive trends have several implications for the traditional structure of electricity markets (especially at the retail level), the role of existing players and their business model, and the nature of traded products. This section discusses the implications of these trends for retail market structure, regulation and competition.

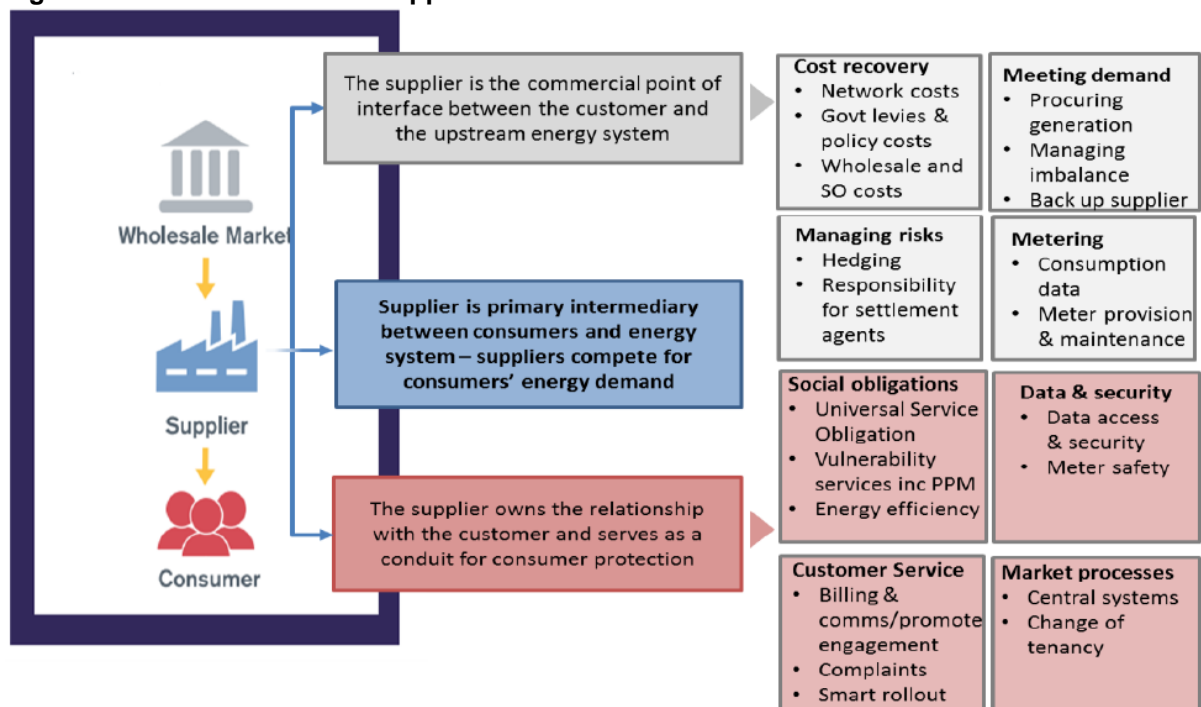
3.1 The rise of intermediaries and change of retail electricity market structure

Since the opening of the retail business to competition, the basic design of the retail electricity market has been such that suppliers have been the primary interface between consumers and the upstream energy system (Figure 10). This means that the main way for consumers to engage with the market has been through their suppliers. However, new players such as PCWs, demand response aggregators,



community energy service providers, prosumers, peer-to-peer market platforms, and home energy management system providers are all on the rise. In particular, the use of PCWs has become widespread, such that according to Ofgem (2017c) more than 50 per cent of those who changed suppliers in recent years have used PCWs. Furthermore, consumers now have the possibility of delegating the task of searching and switching to automatic websites. They can go even further and delegate the control of their energy use and appliances to a third party. This challenges the notion of the supplier as the hub of the retail market.

Figure 10: The central role of suppliers



Source: Ofgem (2017b)

On top of this, there is a range of other issues that indicate inefficiency of the supplier hub model. First, the current retail arrangement is such that only a single supplier can settle the system costs on behalf of the consumers. In other words, the existing retail market prevents the multi-supplier model. This can potentially be an impediment to innovation.¹¹ Second, casting the supplier as a hub in supply arrangements compromises the efficiency of the supply system, as it poses a major hurdle in making use of flexible demand. This is specifically the case with respect to existing integrated suppliers who own generation facilities and thus have little incentive to open the door of the balancing market to demand response, which would raise competition against their own generation fleet. Third, the requirements of the retail supply licence impose significant constraints and complexity on those innovative business models that cannot align themselves with those requirements. Fourth, future business models are most likely to be enabled by data; however, the data available to existing retail suppliers cannot be accessed by other parties and is often of poor quality. Finally, by allowing the current arrangement to continue, the regulator can allow the selection of legacy suppliers as market winners.

¹¹ For example, an electric vehicle manufacturer may wish to offer free electricity to a purchaser (by investing in solar and wind) in a bundled offer.



Obviously traditional retail electricity suppliers are reluctant to dismantle the supplier hub model. They argue that for nearly three decades this model has provided a commercial interface for end users and has ensured that system costs are settled, wholesale market risks managed on behalf of consumers, consumption metered, and social and environmental obligations have been collected and delivered on behalf of the government. It has also been a mechanism for consumer protection through the requirements of the supply licence. Furthermore, abolishing the supplier hub model, in their view, will be time consuming and costly, and will result in consumer disruption and loss of trust in the electricity market.

The other implication of the recent trends is the disintermediation of licensed retailers; this means that the nature of the relationship between customers and energy markets is changing. Traditionally, licensed retail electricity and gas suppliers were acting as the primary interface between customers and the energy system. However, this arrangement is changing in several ways. First, suppliers are losing their prime relationship with customers, as consumers tend to appoint a third party (such as a switching website) to choose a supplier for them based on some predetermined criteria (such as low price). This is already evident in the GB retail market, where the influence of price comparison websites in driving consumer switching has been established, at least for a segment of the market.

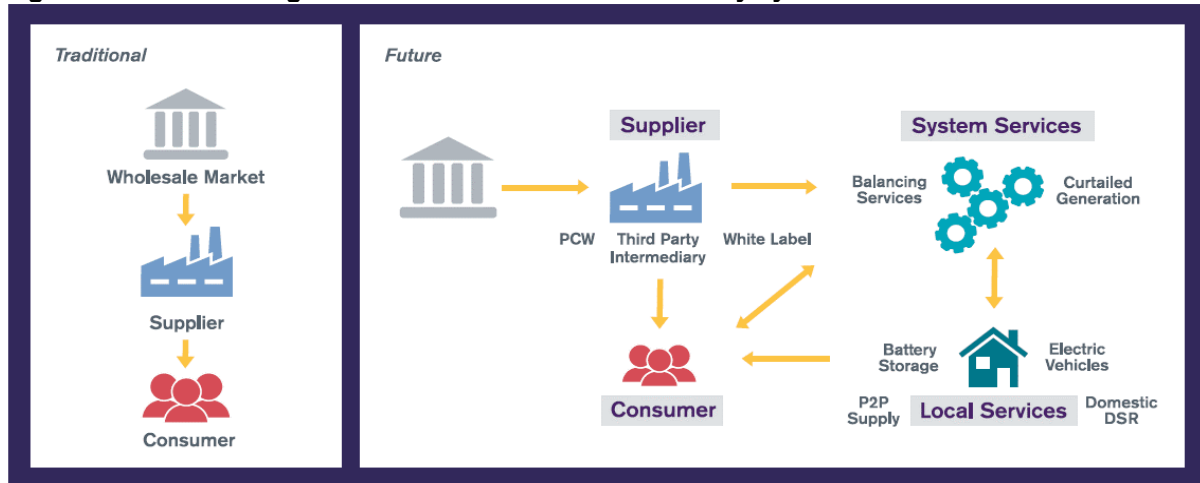
Second, suppliers need to share the relationship they have with customers with third parties – such as independent demand response aggregators. In some markets, such as Belgium, Germany, and Finland, aggregators are required to have a contractual agreement with suppliers before starting a trading relationship with customers (Bray and Woodman, 2019). However, in markets such as France and GB, aggregators can interact directly with consumers to procure flexibility. This not only affects the position of traditional retailers in the market but also their revenue, because of the change in the load profile of consumers made by the aggregators, without the knowledge of the suppliers (who have taken a position in the wholesale market).

One of the immediate consequences of the above trends is that the traditional vertical structure of the electricity sector (wholesale–network–retail) is no longer the dominant model. In future, the vertical structure of the electricity market will need to co-exist with a horizontal structure (prosumer–network–prosumer) (see Figure 11) and these two paradigms will affect each other. The horizontal model can be partly attributed to the emergence of a platform economy that is centred on platform-based business models and is the cornerstone element of the digital economy. The platform economy in the electricity sector has yet to demonstrate its performance, but the emergence of peer-to-peer (P2P) trading of electricity is perceived to be part of this bigger trend. This approach, which uses the network as a platform, has been executed on a small scale in Australia, the USA (for example The Brooklyn Microgrid initiative), and Germany, as well as some other countries.

As a consequence of the increased importance of a horizontal structure, consumers can access the energy market more directly, and rely less on conventional suppliers. Traditionally, most electricity consumers (except self-generators and some large consumers) have had to rely on the hierarchical market structure to purchase electricity services through engaging with licenced retail suppliers. This is mainly because a small consumer (such as a typical household) cannot transact directly with a generator due to the significant 'transaction cost' involved. Contrary to the traditional paradigm, in a horizontal market structure producers and consumers make transactions directly with 'low transaction costs'. It is expected that technological advances in several domains – including renewable generation, battery storage, and IT (for example, blockchain) – will result in a low transaction cost environment which, if scaled up, can significantly disrupt the traditional arrangement of retail electricity.



Figure 11: The evolving role of consumers in the electricity system



Source: Ofgem (2017c)

3.2 New business models, innovations and the need for regulatory reform

Over the last few years, the electricity sector has been witnessing a range of new business models, most of which did not exist when the retail electricity market was designed two decades ago. We now have energy communities, both in the form of Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs),¹² with a focus on reducing energy use, energy management, energy generation, and energy purchase. They also share an emphasis on community ownership, control, and leadership where there is a benefit to the community. We also have energy service companies (ESCOs) which focus on energy services such as heat or energy management. The business model of ESCOs includes financing, designing, building, operating, and maintaining low-carbon energy projects that are offered to customers through either service contracts or performance contracts. There are two key differences between ESCOs and traditional utilities. The first one is that the revenue model of ESCOs is often decoupled from the energy consumption of consumers. The second one is that they are often outside the current regulatory arrangements of the retail market. For example, Ofgem currently does not regulate the providers of heat networks.

There is also storage as a service model, where a company offers storage services to industrial and commercial customers. The storage system can be leased from the service provider company. In return, consumers allow the storage system to be used in a virtual power plant that provides various grid services.

The retail market has seen the emergence of multi-service (or multi-utility) providers who focus on a range of services (as opposed to just energy) including such amenities as energy, telecoms, entertainment, and insurance. These multiple utilities can be provided through a single bundled contract or separate contracts. In some countries, such as New Zealand, the bundling of gas, electricity, telephone, and internet is now a common approach, with providers from both energy and telecommunication industries.

There are next-generation intermediaries that band consumers together in order to enable them to exert buyer power in the retail market. There are also other ranges of brokering services, such as schemes informing consumers of cheaper deals in the market.

¹² The difference between the two models is that CECs are limited to the electricity sector but can use any technology, whereas RECs can be active in all energy sector but can only use renewables. Furthermore, REC members must be in the same place as the renewable energy projects, whereas CECs have no geographical limitations.



We have IOT-enabled home solutions where utility companies partner with insurance companies to offer innovative products. For example, information gathered from smart meters can be used to gauge the risk of burglary (by identifying patterns in the time spent by consumers at home during the day). In addition, internet-connected sensors can be placed on items such as A/C, heating systems, and wires, to identify the risk of fire or water demand from malfunctions.

There are also data-enabled business models, where multiple services are provided through data aggregation. For instance, a company in the UK offers its customers a way to aggregate their data and to switch various services through one channel. This includes not only energy but also car insurance, credit cards, and loans, among others.

On top of these we have aggregators, demand side flexibility providers, peer-to-peer platforms, and niche retailers who operate with a specific business arrangement such as white labelling or who operate in a segment of the market to supply targeted customers. This all means that after two decades of opening the retail market to competition, there has been significant change. Table 1 presents a list of all emerging and non-conventional business models in the retail electricity market.

There are a number of challenges, from a regulatory perspective, with respect to the aforementioned business models. Traditional retail suppliers are obliged to comply with the requirements of their licence and to understand their duties and obligations for each licensable activity. However, these licences are mainly defined around one definition of 'supply', which means that many activities of the new players will fall outside this definition and are thus not subject to any regulation. Therefore, there is no way of ensuring that consumers receive the quality of service and protection from these new service providers, with whom they engage for their energy needs. Currently Ofgem in the UK does not regulate third party intermediaries, and there is a discussion about what is the best way to protect consumers from harm in the new market environment. Various approaches are proposed, such as general authorization with graduated obligations which depend on the scope and scale of supply-related activities. Another proposal is to change current licencing arrangements, or to rely more heavily on wider consumer protection powers. There is also a proposal for a modular approach under which energy retail businesses would be regulated on the basis of the services they offer. For example, if a retail business could focus on only providing customer service or on operating meters, then it would only be subject to the rules relevant to that service.

What makes the problem more complex is that many of these new intermediaries operate across markets (for example energy and telecommunication) and thus there might be a need for a cross-sectoral regulatory regime. Furthermore, the introduction of protection regulation must not stifle innovation and should be proportional to the risk to which the consumer is exposed. There might also be a need to rethink the current Universal Service Obligation (USO) in the retail market. Sometimes value propositions focusing on people, housing stock, or energy networks can be unique to an individual local area, but USO prevents new players specializing and innovating in a customer-specific energy business model.

Sometimes there is a rationale in the bundling of services, as it increases the revenue stack of the companies concerned. However, at other times it might be more helpful to encourage unbundling, as it increases competition and introduces new players, products, and services. It can also enable a linking of the wholesale market with the retail market through, for example, new products such as reliability insurance. There are also situations where bundling is unhelpful to innovation and consumer engagement. For example, when an energy supply contract is bundled with the installation of an asset such as a battery, a home energy management system, a smart thermostat, or a smart EV charging point, the consumer might find it difficult to switch tariff or suppliers if it involves uninstallation costs or exit fees. Regulations thus need to encourage bundling when it makes sense and discourage it when it is harmful to competition and consumer engagement.



Table 1: Emerging and non-conventional business models in the retail electricity market

Community energy	These initiatives focus on reducing energy use, more effective energy management, energy generation, and energy purchase. They also share an emphasis on community ownership, control, and leadership where there is a benefit to the community.
Energy Service Companies (ESCOs)	ESCOs focus on energy services such as provision of heat or energy management. Their business models include financing, designing, building, operating, and maintaining small to medium low carbon energy projects, offering them through either service contracts or performance contracts. There are two key differences between ESCOs and traditional utilities. The first one is that the revenue model of ESCOs is often decoupled from the energy consumption of consumers. The second one is that they are often outside current regulatory arrangements. For example, Ofgem does not regulate providers of heat networks.
Multi-service (or multi-utility) providers	New entrants that focus on a range of services, as opposed to just energy. These include, for example, energy, telecoms, entertainment, and insurance. These multiple utilities can be provided through a single contract or separate contracts. In New Zealand, for example, bundling of services across gas, electricity, telephone, and internet is becoming mainstream, with competition from both energy and telecommunications companies.
Market services	Businesses such as intermediaries and brokers which help new entrants to join the energy market.
Niche suppliers	Entrants who operate with various business arrangements such as white labelling, or suppliers licensed to supply targeted customers. They often do not have profit maximizing objectives and instead aim to offer cheap tariffs to their chosen communities.
Demand-side flexibility	Entities that offer flexibility services such as demand response, energy storage, and EV load management. These entities often utilize advances in digitalization and automation to unlock flexibility resources which previously were absent from the electricity market.
Prosumers	New entities that have emerged out of the evolving role of consumers due to renewable generation technology cost decline and policy support. They are not only consumers of energy but are also producers and are active participants in energy systems. There are innovations in this area such as renting rooftop solar PV as opposed to owning the facilities.
Peer-to-peer (P2P) energy	There are various forms of P2P model. In one form it enables the trade of energy between prosumers through the use of platforms designed for this purpose. This provides an alternative route to market for small producers in the absence of government schemes such as feed-in tariffs. There is another model, which allows commercial customers to choose a mix of distributed resources to meet most of their demand. It often results in a better PPA for generators and a tariff that meets the needs of the purchaser. There is also a P2P model that is geographically bounded within a specific distribution network and involves local balancing. This is different from most other P2P models in which customers and generators in different regions are free to trade.
Next generation intermediaries	Entities that offer various services to customers through organization and information providing. For example, some trusted intermediaries and switching websites band consumers together in order to enable consumers to exert buyer power in the retail market. There are also other ranges of brokering services such as informing consumers of cheaper deals in the market. Although many of these services are currently only available to the non-domestic market, it is expected that they will become available to the domestic market in the near future.



Aggregator	An entity that can alter the consumption of a group of customers by tracking their demand and the system operator's requirements in real time. Not only does this provide a route to market for small and medium sized customers who cannot access the market directly due to transaction costs, but it also benefits the market by offering value through scale, portfolio effect, and simplification.
Storage as a service	A model where a company offers storage services to industrial and commercial customers. It allows consumers to easily shift their consumption and benefit from time-of-use tariffs. Consumers also group together to constitute a big pool of storage capacity that can provide grid services. There is also another model in this category where a utility company collaborates with battery companies to install storage systems in homes. The system can be bought at a discount or leased from the utility company. In return, consumers allow the storage system to be used in a virtual power plant that provides various grid services. It not only provides financial benefits and reliability to those who participate in this scheme, but also benefits those who do not participate by lowering their expenses during peak time through lowering the need for grid reinforcement.
IOT-enabled home solutions	Some start-up insurance companies are using the IOT to offer innovative home insurance products. The consumer installs several third-party internet-connected sensors, which can be monitored through the insurance company app. These sensors issue a warning if, for example, the temperature falls below freezing or water leaks below the sink. It not only detects potential risks but also can also connect the consumer automatically to a repair service. In the same way, utility companies can partner with insurance companies to offer innovative products. For example, information gathered from smart meters can be used to gauge the risk of burglary (by identifying a consumer's pattern of being at home during the day). In addition, internet-connected sensors can be placed on items such as A/C, heating systems, and wires to identify the risk of fire or water demand from malfunctions.
Data-enabled business models	Part of the general trend in the economy where more transparent and cheaper data becomes available, upon which new products and services can be developed. In the electricity sector, with the rise of digitalization and the deployment of smart meters, significant amounts of data are becoming available. This data is already being used by price comparison websites and other companies and intermediaries, to offer services to consumers. Some companies, such as Giffgaff in the UK, offer their customers a way to aggregate their data and to switch various services through one channel. This includes not only energy prices but car insurance, credit cards, and loans, among others.
Challenger brand subsidiaries	Some utility businesses are setting up new companies, which operate entirely based on digital processes, and are independent of the main utility company. These companies develop, test, and optimize new digital services and processes very quickly, as they do not have the complex structure of the main utility company. This allows them to jump over several intermediary stages and innovate at a rapid pace that is not possible in traditional retail business.

Source: compiled from Ofgem (2015b), Deloitte Insight (2019), Hall and Roelich (2016)



3.3 Distribution network services pricing and end user tariffs

There is a two-way interaction between the retail market and the network segment of the electricity sector. The well-functioning of the retail market impacts the costs of maintaining and upgrading the network, as retailer actions influence how the networks are used by consumers, and hence the future network costs. In the existing GB framework and in many other jurisdictions, retailers are exposed directly to distribution network tariffs, and end users pay for the network indirectly through their retail tariffs, which often have a different structure from that of the distribution tariff. If retailers are not subject to sufficient competition, they are not incentivized to reduce their costs, of which network charges are an important part. On the other hand, efficient and cost reflective distribution network tariff design motivates retail competition by providing greater opportunities for retailers to differentiate themselves. In other words, retailers can offer lower tariffs to low cost-to-serve consumers who adapt their behaviour, or they can help consumers to identify low-cost consumption opportunities.

Therefore, two issues are of paramount importance in relation to the interaction between the retail market and distribution networks under the existing framework. The first is the level of competition in the retail market, as it directly influences the network cost. This also means that if the retail market is not sufficiently contestable, it might be better to subject end users to distribution network tariffs directly, rather than the current approach in which the network cost reaches consumers indirectly. This is because it could have a better influence on the efficient usage of network capacity. The downside of this approach, however, is that it exposes consumers to a complex choice, as network tariffs are often more complex when compared with retail tariffs that are designed to be simple and understandable, while at the same time the cost of retailers (including wholesale and network costs) need to be recovered.

The second issue is distribution network tariff design. When distribution networks are cost reflective, the cost to a retailer of supplying a particular customer not only depends on that user's total level of consumption, but also on his consumption at particular times such as peak network capacity. This motivates retailers to design their final tariffs such that they are reflective of network costs, and they take other actions to help consumers to implement consumption behaviour practices that reduce network costs (because this reduces retailer costs). The investment in self generation or batteries, for example, can help consumers to avoid peak capacity and thus lower network costs. However, if retail tariffs do not convey any information about network costs to consumers (such as when they are volumetric) self-generation only reduces the costs for its owner, but increases the cost for everybody else. This means that the network cost will eventually be borne by users as a whole, many of which do not benefit from the services provided by an upgraded network. Currently, in the GB market, network charges (from network companies to suppliers) are not sufficiently cost-reflective. This is the subject of two Ofgem Significant Code Reviews currently underway, looking at residual costs and forward looking & access charges respectively.

When it comes to policy costs (such as the costs of social and environmental obligations) the situation is more complicated. Unlike network costs which, if designed properly, can incentivize retailers to reduce them, retailers have no genuine influence over policy costs. However, they can avoid them and thus increase them for others, if these costs are levied on consumption. In the GB market for example, distributed generators need to rely on suppliers sharing a high proportion of the embedded benefit via Power Purchase Agreements (PPAs) to pull through investment.

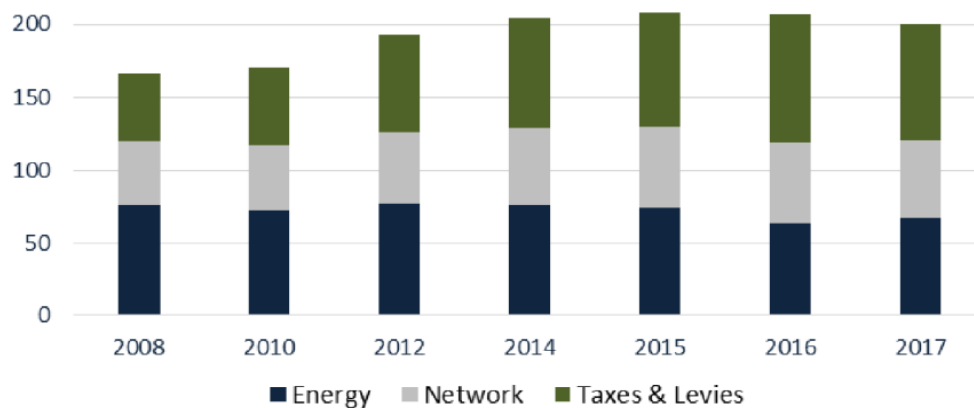
The key issue with respect to policy costs is how to recover them in the least distortionary and most equitable way. The inclusion of social and environmental obligations and innovation costs in retail tariffs, on top of network costs, means that an increasingly higher proportion of actual system costs is fixed. Moreover, with the growth of zero marginal cost power plants in the generation mix, the share of energy costs in total system costs shrinks further. This trend is very visible in the EU region (see Figure 12) but the story is more or less the same in all countries during the transition era.



Figure 12: Components of residential electricity prices in the EU

Breakdown of residential electricity price in the EU¹

€/MWh, 2008 - 2017



Source: EDP

The problem is that while the share of fixed costs in the total cost of electricity supply has increased in most jurisdictions including GB and the EU, retail electricity tariffs have a strong energy component. The mismatch between the structure of power system costs and retail tariffs potentially creates several issues. As can be seen from Figure 13, only those consumers with average consumption levels make a fair contribution towards the system costs, while the rest are either overpaying or underpaying (hence the inequity problem). Furthermore, as shown in Figure 14, with such an incompatible tariff and power system cost structure, an increase of consumption from D1 to D2 raises a consumer's bill by C1 whereas the system cost increases only by C2 ($C2 \ll C1$). In other words, the consumer is exposed to a significantly higher marginal cost than the actual marginal cost of the system (hence the inefficiency problem).

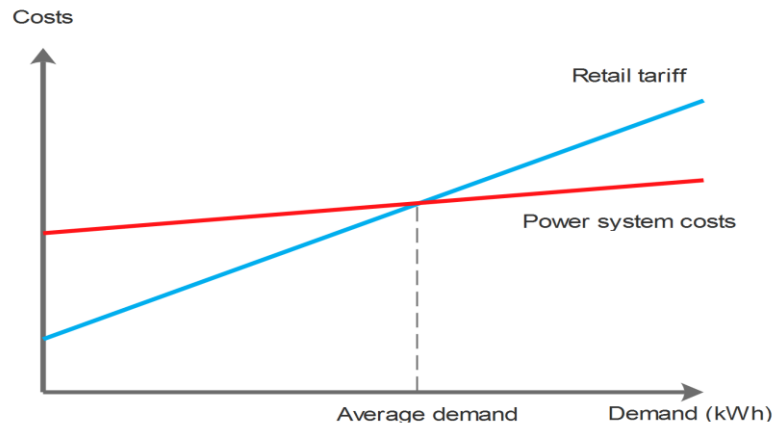
A consequence of such a pricing structure is that it creates a distorted incentive for behind-the-meter installation. Consumers who are exposed to inefficiently high retail prices might invest in self-generation and storage to reduce their consumption from the grid. The incentive is accentuated when there are schemes that purchase consumers' excess supply. The other issue is that high retail prices increase the cost of operating EVs and heat pumps, thus making it difficult for consumers to make investments in the electrification of their heating and transport systems. It is thus in contradiction with existing decarbonization policies in countries like GB.

The adverse effect of incompatible pricing structures is exacerbated when one considers the side effects of other retail market policies. For instance, to reduce market barriers, the GB regulator has exempted suppliers below a certain threshold from passing through social and environmental policy costs. This has led to a situation where it is estimated that 1.5 million domestic customers do not contribute to the Warm Home Discount or ECO, because exempted retailers share the benefit of their low costs with some consumers through lower tariffs. These customers, the number of which is growing due to policies encouraging engagement, are, on average, wealthier than the declining number of customers who have to bear the burden.

The low fixed high variable tariff structure is replicated in Ofgem's default tariff cap, where Ofgem bases the standing charge element on a basket of market tariffs, rather than underlying costs. It is likely that standing charges will need to increase over time to become more cost reflective, but affordability for low income consumers is likely to be an inhibiting factor. It would also be less distortive if policy costs such as ECO were levied on a per-customer basis rather than a per-kWh basis, but this again would raise similar concerns over low income/low consumption consumers.

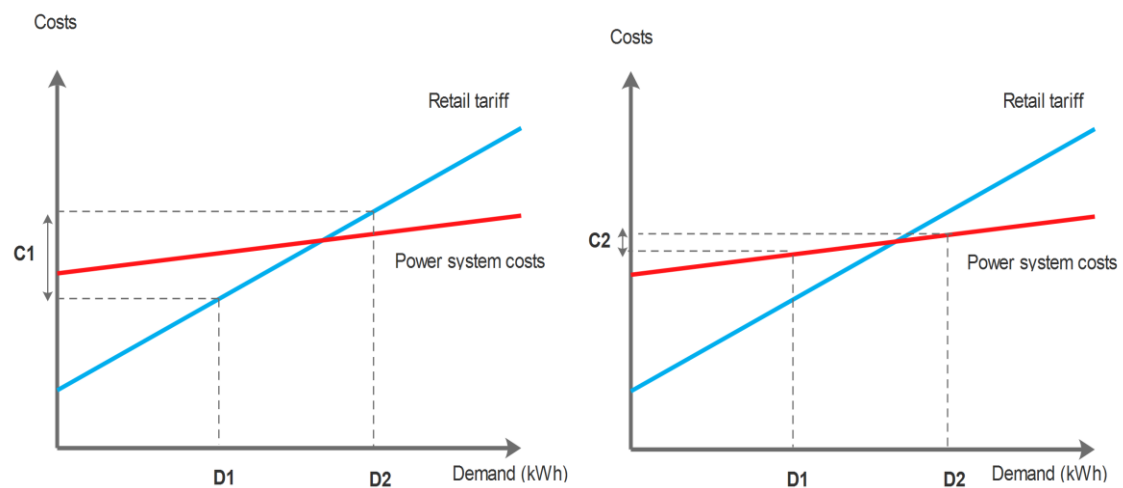


Figure 13: The mismatch between the structure of power system costs and retail tariffs



Source: author

Figure 14: The effect of consumption change on system costs versus consumer costs



Source: author



4. Conclusions

As the retail electricity market plays a key role in the well-functioning of the entire electricity system, it is imperative to understand its performance after two decades of its establishment. This paper analyses experience with the retail electricity market, focusing primarily on the case of Great Britain, as a pioneering market, but also reflects upon examples from other jurisdictions when it is relevant.

We argue that the reference design of the retail electricity market in the post liberalization era has not only failed to achieve its original objectives, but has also proved to be unfit to keep pace with technological change, consumer preference, and the energy transition.

First: measures to reduce barriers to entry have distorted competition, put consumers at risk, and led to an unfair distribution of system costs. The existing regulatory model (which exempts suppliers who are below a certain threshold from social and environmental obligations) has led to the growth of the retail market but at the cost of an uneven playing field for retailers, unsustainable business models, and the disruption of price signals. A large number of new retailers in GB have entered 'supplier of last resort' (SoLR) arrangements over the last couple of years. Moreover, the threshold obligation has incentivized a pricing strategy that has caused the costs of public policies to be recovered disproportionately from a subset of consumers who are loyal and do not switch. The 'supplier in a box' (SIAB) model, as a short cut route to the retail market, has played an important role in supporting market entry, but it can bypass regulatory market entry tests and thus increase the probability of subsequent failure of under-prepared and under-resourced suppliers. This means reducing barriers to entry needs to be balanced with sustainable growth of the market.

Second: lack of consumer engagement has been one of the biggest weaknesses of liberalized retail electricity markets. Currently more than 50 per cent of consumers in GB are still on a default tariff. The nature of issues that impede engagement has made proposals for effective solutions of this issue challenging. The retail market was originally designed on the basis of individual switching and the assumption that consumers will behave in the retail electricity market as they do in other offer markets. In practice, however, a range of barriers to switching – such as complexity of the retail market and electricity tariffs, transaction costs, uncertainty about the service quality of new suppliers, perceived barriers, and behavioural biases – have contributed to a lack of consumer participation. The lack of consumer engagement has sparked debates about how best to protect consumers against the unilateral market power of retailers, in the presence of consumer inertia. Since January 2019, the GB energy market regulator has applied a controversial price cap on standard variable tariffs across the whole market, to compensate for consumers' disengagement. The application of a direct price control mechanism to protect consumers shows the degree of urgency of this issue in the eye of the regulator. However, there is already some evidence on the distortionary effect of this approach compared to alternatives such as collective switching.

Third: energy, or at least part of its use, is considered as an essential service by sector regulators. The essentiality of energy in modern life has led to it being subject to rules and regulations beyond general consumer laws. In this sense, energy is a unique commodity which provides consumers with a set of defined rights – such as the right to an electricity connection, free-of-charge access to at least one energy comparison tool, the ability to switch without extra charges, provision of clear contract information, and the right of withdrawal. There are also heavy obligations in suppliers' licences to prevent harm to consumers caused by adverse effects of the market. However, these licences are mainly defined around one definition of 'supply', which means that many activities of new players will fall outside this definition. What makes the problem more complex is that many of these new players operate across markets (for example energy and telecommunications) and there might thus be a need for a cross-sectoral regulatory regime. However, the flip side of the coin is that protective regulations must not stifle innovation and should be proportional to the risk that consumers are exposed to. For



example, the Universal Service Obligation (USO) in the retail market might prevent new players from specializing and innovating in a customer-specific energy business model.

Fourth: since privatization, the electricity industry has seen significant changes in all dimensions. Consumers are now able to generate, store, and sell back electricity and flexibility to the power system, which is characterized by a high level of intermittency. There are a range of emerging business models, which are often beyond either the operational focus or the competency of traditional suppliers. These include demand response aggregators, community energy service providers, multi-service providers (other services in addition to energy services), switching service providers, prosumers, peer-to-peer market platforms, smart home, and energy management service providers. The problem is that existing rules impose significant complexity and constraints on those who wish to bring these new business models to the market, because they are often unable to align themselves with the requirements of traditional supply licences. Some innovations – such as multi supplier models – would benefit current and future consumers, but they are blocked by the current regulatory framework. Moreover, the complexity of existing regulation governing the retail market is a hindrance to the fulfilment of obligations even for traditional suppliers, let alone new entrants who do not have the same level of resources to deal with regulatory requirements. Furthermore, the emergence of new players and models, such as prosumers and peer-to-peer trading, mean that the architecture of the retail market is changing; vertical structures in which the traditional supplier is the only point of access to the market are no longer the dominant model. It is very likely that future retail markets will see the co-existence of both horizontal structures (prosumer–network–prosumer) and vertical structures (wholesale–network–retail).

Fifth: there is a two-way interaction between the retail market and the network segment of the electricity sector. On the one hand, efficient and cost-reflective distribution network tariff design motivates retailers to design their final tariffs such that they are reflective of network costs and take other actions to help consumers to implement consumption behaviour practices that reduce network costs (because it reduces retailer costs as well). On the other hand, the well-functioning of the retail market impacts the costs of maintaining and upgrading the network, as retailer actions influence how the networks are used by consumers and hence affect future network costs. This means while efficient network tariff design is necessary for optimum utilisation and sizing of the network it is not sufficient as the level competition in retail market also plays a key role. In places that the retail market is not sufficiently contestable it might be more effective to subject end users to distribution network tariffs directly, rather than the current approach in which the network cost reaches consumers indirectly through the retail tariff.

Sixth: the growth of government wedge and policy costs has reduced the size of the competitive portion of the retail tariff. Unlike network costs, for which retailers can be incentivized through tariffs in order to reduce them for everyone, retailers have no genuine influence over policy costs. However, they can avoid policy costs – though a Power Purchase Agreement (PPA) with distributed generation – when these are levied on energy consumption, and thus increase them for others. Currently, retail tariffs are mainly volumetric, which incentivizes inefficient 'behind the meter' installation and creates an inequitable system, as the growth of decentralization lowers the ability of retailers to recover these costs from the energy component in an equitable manner.

These factors all mean that the retail electricity market requires fundamental reforms. These reforms should not only aim at reconciling competition with consumer protection, but also at making the retail electricity market compatible with the growth of decentralization, decarbonisation objective and the rise of horizontal market structures. In the GB market, there is an ongoing BEIS and Ofgem future energy retail market review and recent joint consultation on flexible and responsive energy retail markets to investigate what policy, legal and regulatory changes might be needed to ensure that the energy retail market is fit for the future. However, the extent to which this review addresses aforementioned issues yet to be seen.



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