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Switching costs in the Swedish retail market for electricity

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Abstract

We estimate monetary values for switching costs in the Swedish market for electricity for private household consumers, using two different numerical methods. The electricity providers in Sweden with over 1 per cent market share were studied. Switching costs were estimated to be between 50 per cent and 95 per cent of yearly costs for electricity. Considering that the electricity retail market was deregulated more than 20 years ago, and that the Swedish government continues to facilitate switching for consumers, it is noteworthy that switching costs are still this high. Given that electricity is a homogeneous product where switching costs are mainly due to transaction costs and psychological barriers to switching, it seems likely that switching costs may be even higher in other markets where there are additional barriers to switching.

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1. INTRODUCTION

Consumer decision-making is based on numerous factors. These include personal preferences, price, supply, how many different substitutes there are, and product differentiation. If nothing differentiates products, an economically rational consumer should choose the cheapest option. However, if the good or service was originally purchased through a subscription, such as an electricity contract, the consumer has to make an active effort to switch products. Switching to a substitute would entail switching costs in the form of inconvenience and time spent trying to become familiar with the new product. Lock-in occurs when a consumer sticks to one product, largely to avoid these switching costs, even if the price of a competing firm's homogeneous product is lower (Shy 2002). Thus, switching costs give producers market power that lets them set a price higher than their marginal cost of production.

From a management and marketing perspective, consumer lock-in is often considered as a strategic variable. A consumer who is locked into a certain product is then regarded as loyal, given their continuous consumption of that product. However, from a societal perspective, a locked-in consumer is regarded as having limited consumption choices. These consumers might benefit financially from switching, but switching costs hinder them from doing so.

Sweden deregulated the electricity retail market in 1996, opening it up for competition. The number of active electricity providers has since grown to around 130. The three largest firms, Eon, Fortum and Vattenfall, supply 45 per cent of consumer demand (Ei 2020a).

Consumer activity has increased every year since the deregulation. In 2019 alone, almost 500,000 customers – some 10 per cent of the overall number of household customers – changed providers or contract type. However, many consumers are still paying more than necessary. For example, 10 per cent of the market still pay an assigned price, i.e., the price paid by consumers who have never made an active choice of provider or contract. The assigned price is generally higher than any of the contracts available to clients actively choosing a provider. This suggests that consumer lock-in remains a factor for many Swedish households. From a policy perspective, this is worrisome. Although the recent spike in electricity prices across Europe is primarily due to the Russian invasion of Ukraine, consumer lock-in risks exacerbating the effects of this price spike by reducing competition among providers. More generally, electricity is a homogeneous good, and competition is, ceteris paribus, likely to be higher among electricity providers than among providers of more differentiated goods. Therefore, the indications that consumers are nonetheless reluctant to switch providers has troubling implications for competition in other product markets.

The purpose of this study is to empirically estimate switching costs for private consumers on the Swedish market for electricity by using observed market data. The study uses Shy's (2002) method as well as Salies' (2012) more realistic extension of this method to do so.

2. SWEDEN'S ELECTRICITY MARKET

Since 2011, Sweden has been divided into four electricity trading regions, namely the far north (SE1, which is the largest producer), the north (SE2), the central region (SE3, which is the largest consumer) and the south (SE4). Each trading region has its own prices. These are determined by electricity production and consumption in the respective region, and by transmissions from adjacent regions. Electricity markets in all the Nordic countries – which include Sweden – operate under similar rules and with similar trading regions. Within this system, a difference between the spot prices in two adjacent regions indicates a need to expand transmission capacity. In recent years, and especially with the 2022 energy crisis, Sweden's central and southern regions have often had higher spot prices than their two northern counterparts. Normally, however, the transmission capacity has been enough to ensure that prices are equal across all four regions.

Between 2008 and 2018, taxes constituted 37 per cent of the average electricity cost of a household living in an apartment; this part of the cost is difficult for a consumer to affect. The grid owner earned 33 per cent of the average cost; this part of the cost is also difficult to affect, since electricity distribution is a natural monopoly. Thus, the part of the price that could be affected by consumers themselves, i.e., the 30 per cent paid to the provider, is relatively small. Hence, consumers' incentive to re-evaluate their choice of provider decreases.

The most common type of price contract is one with a variable price. The next most common are fixed price contracts of varying lengths. The usual length is between one and three years, although both longer and shorter contracts are also available. In January 2020, for example, variable price contracts made up 54 per cent of the total, while 25 per cent were fixed price contracts of different lengths (Swedish Central Bureau of Statistics 2021). There are also mixed-form contracts, e.g., with variable prices but with price ceilings.

If a consumer does not actively choose a provider, the electricity grid owner assigns them one. Such assigned contracts almost always entail the highest price per kilowatt hour (Ei 2020b). Although this price can change during any specific year, such changes are often sluggish. To protect consumers, therefore, the Electricity Act was amended in 2017 to incorporate stricter guidelines for assigned contracts. The amendments aimed to ensure that the conditions of these contracts were fair, that their numbers were reduced, and that consumer activity on the electricity market was increased. For example, to prevent consumers from being locked into these higher-priced contracts, the legal notice period has been limited to two weeks; subject to this notice period, customers with assigned contracts can change providers or contracts without any penalty.

The share of assigned contracts has decreased steadily every year since the 1996 market deregulation. In contrast, during 2005–2019, variable price contracts went from being the least to the most popular option. Besides the many websites that offer the consumer comparisons of electricity contract prices, the Swedish Energy Markets Inspectorate (Ei), which is the industry's supervisory authority, also independently runs such a service. Furthermore, all domestic electricity providers are obligated to report their fixed and variable prices regularly to the Inspectorate. This transparency, combined with the protections offered by the 2017 Electricity Act amendments, should now enable the average consumer to make more informed choices among the various options. Despite this, many households still have assigned contracts, and many consumers who do change providers or contracts do so only rarely. This suggests that switching costs may still exist in the electricity market.

3. SWITCHING COSTS

3.1 Key causes and effects of switching costs

Switching costs are incurred when a consumer switches between functionally identical products or services. The consumer perceives these unobserved costs as being additional to the price of the new product/service to which they are switching. This switching-cost effect can be observed in many markets and could explain consumers' lock-in behavior, namely continuously purchasing the same product despite competing, functionally identical, products being available for less elsewhere. This gives firms with higher market shares increased market power, allowing them to set a price above their marginal cost (Klemperer 1995; Shy 2002). In Sweden, therefore, the dominant share of the market held by the three biggest electricity providers creates the opportunity to exercise market power in the context of switching costs.

Klemperer (1995) categorizes some of the causes of switching costs as follows: (a) the need for compatibility with existing equipment; (b) the transaction costs associated with switching suppliers; (c) the cost of learning to use new products; (d) uncertainty about the quality of untested products; (e) discount coupons and similar devices; and (f) the psychological costs of switching, or non-economic 'brand loyalty'.

For many goods and services for which switching costs have been studied, several of these explanations are potentially applicable, making it difficult to determine the exact reason(s) why consumers continue to use their current brand. However, in the case of choosing a retail electricity provider, most of these causes do not apply. For example, existing equipment will be compatible, very little cost is involved in learning to use electricity from a new provider, and the quality of the electricity itself should be the same regardless of the provider or differences among providers' support services. Instead, the chief drivers of switching costs in this retail market are likely to be discounts, transaction costs (monetary or non-monetary) and psychological costs associated with reluctance to examine the household's electricity options.

Switching costs differentiate otherwise homogeneous products from each other (Martin 2002, 239–44). Switching costs also allow for profitable price discrimination between incumbent and new customers. This is common practice in many markets, including energy markets (Gehrig *et al.* 2011). This type of history-based price discrimination demonstrates how incumbent firms with knowledge of consumers' previous purchasing behavior are protected from competitors because of switching costs. Hence, the consumer surplus is lower on a market with history-based price discrimination than on one characterized by uniform pricing (Gehrig *et al.* 2011).

Klemperer (1987) points out that a market characterized by switching costs is segmented into firm-specific submarkets as a result, with each submarket dominated by those consumers who already buy the specified firm's product. This market segmentation implies that switching costs lead to monopoly rents for producers.

3.2 Switching costs and lock-in behavior in electricity markets

A number of previous studies, from Sweden and elsewhere, have explored consumer lock-in behavior in electricity markets. Sturluson (2002), studying Swedish electricity consumers relatively soon after the deregulation, noted that the Swedish electricity market was characterized by homogeneous contracts and high price dispersion but, nonetheless, a low rate of supplier switching. Using data from a survey of electricity consumers, Sturluson (2002) found that their average expected switching cost was about ten times higher than the average expected benefit.

Ek and Söderholm (2008) studied factors affecting Swedish households' decision as to whether or not to switch electricity suppliers or renegotiate contracts with their current suppliers. Over 60 per cent of Ek and Söderholm's (2008) survey respondents had neither actively renegotiated nor changed electricity supplier since the deregulation in 1996. The authors found that households with greater economic benefits from switching or renegotiating were more likely to do so than households deriving smaller benefits from such options. Another finding was that the higher perceived costs of searching for and gathering information and the higher opportunity cost in respect of time spent were associated with a reduced probability of switching suppliers or renegotiating existing contracts.

Annala *et al.* (2013), surveying Finnish electricity consumers, found that many consumers could have reduced their electricity costs through switching suppliers or renegotiating contracts. Nonetheless, over half of the Finnish consumers surveyed had never done so. Although the authors did not study switching costs per se, they suggested that such costs were an explanation for the observed behavior.

Sirin and Gonul (2016) investigated consumer behavior on the Turkish electricity market, which is also deregulated and also permits customers to switch suppliers. Survey responses indicated that, despite the low monetary cost of switching suppliers, many consumers chose not to switch; the authors explain this as being caused by loss aversion and status quo bias.

Thus, there are numerous studies indicating that switching costs deter electricity consumers from switching suppliers. At the same time, using survey data (as these studies did)

can be problematic when switching costs are caused by psychological costs (such as a reluctance to examine the household's electricity options) or by perceived opportunity costs of time associated with gathering information. If consumers perceive psychological costs associated with renegotiating or changing their electricity contracts, and if they consequently refrain from exploring other options, it seems likely that similar psychological costs may deter them from responding to a survey on electricity use. Moreover, if consumers refrain from switching to cheaper supplier or contract options because they are ill-informed about their electricity use in general, their survey responses about electricity use are likely to be ill-informed as well – if they even respond in the first place. Therefore, while these survey-based studies provide important insights into consumer choices, it is nonetheless worthwhile to study observed behavior in electricity markets as well.

One of the few studies to do this was by Hellmer and Wårell (2009), who used observed market data to study whether the large Swedish state-owned company Vattenfall had a dominant position in either the Swedish or Nordic electricity spot markets. Hellmer and Wårell (2009) found that, while Vattenfall might have a dominant position during brief periods, it did not have a dominant position in general. However, the more general question of whether high switching costs led to above-normal rents in the market, not merely for the largest producer but for large providers in general, remains unexplored.

3.3 Shy's and Salies' methods

Two common methods for estimating switching costs using observed consumer behavior are Shy's (2002) and its extension, the latter developed by Salies (2012). In the estimations that follow, I denotes the number of firms on the market, with $I \geq 2$. The firms are ordered by size of market share N_i, with 1 denoting the largest firm (with market share N_1) and I denoting the smallest (with market share N_I). Each firm sets its own price, denoted by p_i, and has customers with switching cost S_i. Shy (2002) shows that, under a set of plausible assumptions – most importantly, that firms are Bertrand competitors[1] and set the highest price they can without losing customers to other firms – the switching cost for each firm's customers can be inferred from observed market data. Firm i's current customers pay the price p_i if they buy their current firm's product, but they experience the cost $p_j + S_i$ if buying firm j's product, where S_i is their switching cost. Hence, these customers will only switch to firm j's product if the cost $p_j + S_i$ is lower than the price p_i they currently pay.

Assuming that no firm can undercut a competitor in price in order to increase its profits, and simultaneously that no firm can increase its prices without being undercut, the undercut-proof property (Shy 2002) is said to be satisfied. If this property holds, then the largest firms (i.e., those with the most customers) have the highest profits, and the smallest firms the lowest. The smallest firm therefore has the strongest incentive to undercut its more profitable competitors. Each other firm $i \neq I$ therefore fears being undercut by firm I, and hence sets its price p_i, given the price set by firm I. Firm I in turn fears being undercut by firm 1, and hence sets its price p_I given the price set by firm 1. Given these assumptions, each firm $i \neq I$ takes p_I as given and sets the highest price p_i, for which firm I's profit π_I satisfies –

$$\pi_I = p_I N_I \geq (p_i - S_i)(N_i + N_I), \quad (1)$$

such that firm I prefers to maintain its current price rather than undercut firm i's price. Similarly, firm I takes p_1 as given and sets the highest price p_I, for which firm 1's profit π_1 satisfies –

$$\pi_1 = p_1 N_1 \geq (p_I - S_I)(N_1 + N_I) \quad (2)$$

[1] All electricity suppliers in the Nordic market trade freely on the spot market, so Bertrand competition is a reasonable model for their supply to consumers. For their own production, these suppliers are, of course, capacity-constrained; and without the spot market trade, Cournot competition might be a more plausible assumption.

Since prices and relative market shares are observable, (1) and (2) are solvable for *S*, as follows:

$$S_i = p_i - \frac{N_I p_I}{N_i + N_I} \quad i \in \{1, \dots, I-1\} \tag{3}$$

$$S_I = p_I - \frac{N_1 p_1}{N_1 + N_I} \tag{4}$$

Shy's method has been widely used, but the assumption that a customer's switching cost is the same, regardless of what other firm they switch to, is an unrealistic one in many markets. Salies (2012) extends Shy's method with more realistic, and empirically supported, conditions, notably by allowing consumers to have asymmetric switching costs, but also by permitting switching costs to take negative values. In this extended model, firm *i*'s customers experience the cost $p_j + S_{ij}$ if buying firm *j*'s product, where S_{ij} is their switching cost for switching to firm *j*'s product, specifically. With similar assumptions as in Shy's (2002) model about how firms compete, the cost of switching between firms *i* and *j* can be inferred as follows:

$$S_{ij} = p_i - \frac{N_j p_j}{N_i + N_j}, S_{ji} = p_j - \frac{N_i p_i}{N_i + N_j}, i \neq j \tag{5}$$

4. DATA

The industry magazine *VA Insights* (Stattin 2020) recently compiled statistics on the market shares (measured as number of customers, in line with Shy's model) of the 30 electricity providers in Sweden with the highest national number of customers. Of these, 19 had market shares of over 1 per cent and were included in this study. Unfortunately, while market shares for the individual firms are available, market shares for individual contract types are not. In what follows, it is therefore assumed that the distribution across contracts is similar for all firms. Individual contract types are studied separately, using this assumption.

Prices were calculated as the cost in SEK for one year of consumption for a household consuming 2,000 kWh (the average for households living in a small apartment, the most common housing arrangement). The price data were primarily gathered from the Swedish Energy Markets Inspectorate's price comparison website. Although electricity providers are obligated to report their prices to the Inspectorate, a few firms' prices were nonetheless not available on its website. These prices were therefore retrieved from the individual firms' websites instead.

Electricity per se is a homogeneous good. However, fixed-price contract lengths lead to product differentiation. Since electricity providers offer multiple types of contracts at different prices, it is necessary to separate these in the calculations. The types of contracts that were compared were variable price contracts (evaluated using the assumption that the price at the time of measurement would persist for a year), one-year fixed price contracts, and three-year fixed price contracts. These three contract types accounted for 86 per cent of all contracts in 2019 (Ei 2020c). Of these three contract types, variable price contracts are the most interesting to compare in the current context because consumers can switch contract and/or provider at any time. Switching costs in these cases should, therefore, be lower than those for other contract types. Thus, the study focuses on variable price contracts. (Results related to fixed price contracts are reported in the Appendix and are similar.)

5. RESULTS

Table I presents the results of the estimated switching costs in SE3 – the largest of the four trading regions in terms of household electricity consumption – for variable price contracts. The results were obtained using Shy's (2002) method. (Results for other regions and for other contract types are reported in the Appendix and are largely similar.)

Table I: Switching costs in 2019, calculated using Shy's method for trading area SE3 and variable price contracts

Electricity provider	Market share (%)	Price (SEK)	Switching cost	% of price
Fortum[a]	18.14	2,006	1,906	95%
Vattenfall	17.61	2,114	2,011	95%
Eon	14.11	2,111	1,984	94%
Jämtkraft	5.74	2,015	1,730	86%
Göteborg Energi	5.64	1,982	1,693	85%
Bixia	4.33	2,058	1,698	82%
Skellefteå Kraft[a]	3.65	2,078	1,665	80%
Telge Energi[b]	3.61			
GodEl[b]	2.62	1,836	1,306	71%
Mälarenergi	2.56	1,994	1,456	73%
Kraftringen	2.42	2,114	1,552	73%
Öresundskraft	2.02	1,954	1,317	67%
Mölndal Energi[b]				
Varberg Energi/Viva	1.45	1,944	1,161	60%
Nordic Green Energy	1.35	1,809	993	55%
Energi Försäljning Sverige[b]	1.27			
Stockholms Elbolag[b]	1.21			
Borås Elhandel	1.11	2,076	1,167	56%
Jönköping Energi	1.01	1,909	9	0%

Source: Authors' calculations based on the data sources reported in the paper.
[a] These firms did not provide information about their customer numbers. Thus, the numbers are based on estimations and calculations made by *VA Insights* (Stattin 2020).
[b] These firms do not provide comparable contracts and are therefore excluded from the analysis.

For the largest firms, the estimated switching costs constitute well over 90 per cent of the cost of one year's electricity use. Even for the smaller firms, with small market shares and more mobile customers, switching costs make up over 50 per cent of the cost of one year's electricity use. The sole exception is Jönköping Energi, the smallest firm in the sample, which almost by definition (given how the model is set up) would have low estimated switching costs.

Results using Salies' method are presented in Table II. As discussed earlier, this more realistic method permits asymmetric switching costs and negative costs. The largest estimated switching cost from a firm (from that firm to the smallest one in the sample) corresponds to the estimates using Shy's method, while other switching costs are generally smaller – albeit often similar in magnitude. Switching costs are estimated to be substantial compared with the consumers' annual electricity costs in almost all firm pairs. These substantial costs deter switches and encourage customers to stay with their current firms.

Since switching costs are highest when switching *from* a bigger provider, bigger firms can increase their prices more than smaller ones. Klemperer (1995) also pointed this out in his discussion of the effects that switching costs theoretically could have on pricing. Since, in an established market such as that for retail electricity, switching costs can limit competition (Green 2000), it is likely that the overall effect of these switching costs is to raise prices.

Table II: Switching costs in 2019, calculated using Salies' method for trading area SE3 and variable price contracts

	Fortum	Vattenfall	Eon	Jämtkraft	Göteborg Energi	Bixia	Skellefteå Kraft	GodEl	Mälarenergi	Kraftringen	Öresunds-kraft	Varberg Energi/ Viva	Nordic Green Energy	Borås Elhandel	Jönköping Energi
Fortum		965	1,083	1,522	1,536	1,609	1,658	1,774	1,760	1,758	1,811	1,862	1,881	1,887	1,906
Vattenfall	1,096		1,175	1,619	1,633	1,708	1,758	1,876	1,861	1,859	1,914	1,966	1,985	1,991	2,011
Eon	982	937		1,528	1,545	1,627	1,684	1,823	1,804	1,801	1,867	1,930	1,953	1,960	1,984
Jämtkraft	491	420	515		1,032	1,130	1,207	1,439	1,400	1,388	1,507	1,623	1,670	1,679	1,730
Göteborg Energi	452	381	474	966		1,088	1,166	1,400	1,360	1,347	1,468	1,584	1,633	1,641	1,693
Bixia	439	361	443	910	937		1,108	1,366	1,317	1,301	1,438	1,571	1,628	1,635	1,698
Skellefteå Kraft	408	327	401	846	875	961		1,311	1,256	1,236	1,383	1,525	1,590	1,594	1,665
GodEl	83	-4	56	452	482	553	626		850	821	987	1,143	1,221	1,219	1,306
Mälarenergi	237	149	208	601	631	701	773	1,066		968	1,134	1,292	1,370	1,367	1,455
Kraftringen	343	255	312	696	726	793	864	1,159	1,088		1,226	1,385	1,466	1,461	1,552
Öresunds-kraft	148	57	107	462	493	549	615	916	838	801		1,140	1,228	1,217	1,317
Varberg Energi/Viva	86	-9	30	336	367	402	457	762	671	623	808		1,072	1,045	1,161
Nordic Green Energy	-59	-155	-118	177	209	239	292	597	503	452	639	802		873	993
Borås Elhandel	186	87	119	388	420	437	482	786	684	627	816	974	1,083		1,167
Jönköping Energi	9	-91	-61	195	228	239	281	583	478	417	607	762	874	822	

Source: Authors' calculations based on the data sources reported in the paper. The leftmost column indicates what firm the customer is switching from, while the top row indicates the firm that the customer is switching to. Thus, for example, the estimated switching cost in switching from Fortum to Jönköping Energi is 1,906 SEK while the switching cost in switching from Jönköping Energi to Fortum is 9 SEK.

6. DISCUSSION

The results indicate not only that switching costs exist in the Swedish retail market for electricity, but that they are quite substantial in relation to prices. The most expensive variable-price contract in our sample would – over the span of a year and on the assumption that prices do not change in that year – cost almost 20 per cent more than the cheapest contract. Electricity sold under variable price contracts should be a relatively homogeneous good, but customers are nonetheless clearly reluctant to switch providers.

Customer loyalty, leading to psychological costs of switching, is one of the causes of switching costs (Klemperer 1995). If one assumes that customer satisfaction leads to higher customer loyalty, the switching cost should be higher as customer satisfaction increases. However, at present, smaller providers generate higher levels of customer satisfaction than larger ones. In fact, in 2020, the three biggest providers had the lowest satisfaction score on the market (Svenskt Kvalitetsindex 2020). Moreover, as the results have established, the bigger firms' customers incur higher switching costs when switching to smaller providers, while it costs smaller firms' customers less to switch to a bigger firm. This could imply that these 'loyal' customers are instead consumers who are involuntarily locked into their contracts because of the in-built switching costs. Again, this points to the market power that bigger providers have.

Another part of switching costs consists of bonuses and discounts that the consumer is offered for their continued custom. For example, Fortum gives frequent-flier points with SAS (the largest airline in Sweden) to its customers every month, while Eon gives its customers discounts on home security systems and home insurance packages. Such package deals are less common with smaller providers, which are more likely to offer a welcome bonus for new customers. As switching from bigger providers entails higher switching costs than switching from smaller providers does, this could indicate that the bonuses and discounts for continuous business contribute to switching costs.

Currently, where most providers' prices do not differ drastically, the consumer might not find it worthwhile to search for a new provider. Furthermore, as Pomp and Shestalova (2007) argue, the number of choices available to the consumer might increase their search time and, therefore, increase switching costs. If one considers how many providers there are to choose from and the variety of contract types each one offers, it is also reasonable to believe that many consumers feel that the cost of searching for, and then deciding on, a new provider outweighs the benefit of switching. On the other hand, more price-comparison websites are now available. Thus, in a matter of minutes, the consumer can enter their preferences and location and obtain a list of the different contracts offered by various providers, in ascending order of price. Intuitively, this should decrease search time, increase the consumer's incentive to switch providers, and lower the switching cost. That the improved availability of such sites has had less impact than expected suggests that switching costs remain important.

While the results from Shy's (2002) and Salies' (2012) methods are largely similar in magnitude, Salies' method permits asymmetric switching costs, which help explain why market shares are divided the way they are. Generally, switching costs are lower when switching to bigger providers, and higher when switching to smaller providers.

7. CONCLUSIONS

The purpose of this study was to estimate switching costs on the Swedish electricity market for consumers, using observed market data. Our results are in line with those from earlier, survey-based studies. Not only were estimated switching costs found to be substantial in many cases, but customers of providers with higher market shares were also found to have higher switching costs compared to customers of providers with lower market shares. The correlation between

market share and switching costs implies that the bigger firms have a higher degree of market power. Although bigger providers do not necessarily charge the highest prices, their customers show lower levels of satisfaction compared with smaller providers' customers, which may reflect the bigger providers' larger market power.

For consumers with contracts with the bigger providers, the cost of switching to a smaller provider amounted to upwards of 90 per cent of the total price. The switching cost decreased to around 45 per cent of that price for consumers switching to bigger providers. These results should be of special interest to competition authorities, considering the market power that bigger firms acquire because of the association between switching costs and consumer lock-in.

Interesting findings may also be yielded if future research estimated the switching costs separately for different types of consumers. In the Swedish electricity market, consumers who continue to use assigned contracts, i.e., who continue to make no active choice of provider, tend to be less educated and earn lower-than-average incomes. It may be the case that, even among the consumers who do make active choices, those with lower education and/or below-average incomes perceive switching costs to be higher than other consumers do. Further investigations could therefore focus on how customers' education, income, age, gender, and other demographic characteristics impact their switching cost estimates. In addition, since studies based on survey data produced comparable results to our study using observed market data, an interesting option might be to combine the two approaches, using survey data on consumer characteristics and on their contract choice but combining these with observed market data on price differences.

However, even if these potential heterogeneities are not taken into account, it is noteworthy that the average switching cost remains so high in the Swedish electricity market more than 20 years after deregulation. Electricity is a homogeneous good, so the only causes of these high switching costs, apart from discounts, are likely to be transaction costs and psychological costs associated with switching providers. Government agencies' efforts to increase price transparency and encourage price comparisons have made switches – in contract and/or provider – more common, but such efforts obviously need to continue. Many consumers clearly still feel reluctant to reconsider their electricity contracts and their choice of provider, even if doing so will benefit them.

8. REFERENCES

Annala, S., Viljainen, S., and Tuunanen, J. (2013) Rationality of Supplier Switching in Retail Electricity Markets. *International Journal of Energy Sector Management* 7, no. 4 (November): 459–77.

Ei/Swedish Energy Markets Inspectorate (2020a) *Sveriges El- och Naturgasmarknad 2019*. *Energimarknadsinspektionen R2020:05*. Eskilstuna: Ei/Swedish Energy Markets Inspectorate.

Ei/Swedish Energy Markets Inspectorate (2020b) *Historiska Jämförpriser på Elhandelsavtal*. [Dataset]. Accessed January 15, 2023. https://ei.se/om-oss/statistik-och-oppna-data/historiska-jamforpriser-pa-avtal---elhandel.

Ei/Swedish Energy Markets Inspectorate (2020c) *Kunder per Avtalstyp – Elhandel*. [Dataset]. Accessed January 15, 2023. https://ei.se/om-oss/statistik-och-oppna-data/kunder-per-avtalstyp---elhandel.

Ek, K., and Söderholm, P. (2008) Households' Switching Behavior between Electricity Suppliers in Sweden. *Utilities Policy* 16, no. 4 (December): 254–61.

Gehrig, T., Shy, O., and Stenbacka, R. (2011) History-based Price Discrimination and Entry in Markets with Switching Costs: A Welfare Analysis. *European Economic Review* 55, no. 5 (June): 732–9.

Green, R. (2000) Can Competition Replace Regulation for Small Utility Customers? *CEPR Discussion Paper 2406*. London: Centre for Economic Policy Research. https://repec.cepr.org/repec/cpr/ceprdp/Dp2406.pdf.

Hellmer, S., and Wårell, L. (2009) On the Evaluation of Market Power and Market Dominance – The Nordic Electricity Market. *Energy Policy* 37, no. 8 (August): 3235–41.

Klemperer, P. (1987) Markets with Consumers Switching Costs. *Quarterly Journal of Economics* 102, no. 2 (May): 375–94.

Klemperer, P. (1995) Competition when Consumers have Switching Costs: An Overview with Applications to Industrial Organization, Macroeconomics, and International Trade. *Review of Economic Studies* 62, no. 4 (October): 515–39.

Martin, S. (2002) *Advanced Industrial Economics*. 2nd ed. Oxford: Blackwell.

Pomp, M., and Shestalova, V. (2007) Switching Costs in Netherlands Energy Markets: Can Liberalization Bring Benefits to Small Customers? *De Economist* 155 (August): 305–21.

Salies, E. (2012) Asymmetric Switching Costs can Improve the Predictive Power of Shy's Model. *OFCE Document de Travail No. 2012-14*. Paris: Observatoire Français des Conjonctures Économiques. https://hal-sciencespo.archives-ouvertes.fr/hal-01070341.

Shy, O. (2002) A Quick-and-Easy Method for Estimating Switching Costs. *International Journal of Industrial Organization* 20, no. 1 (January): 71–87.

Sirin, S.M., and Gonul, M.S. (2016) Behavioral Aspects of Regulation: A Discussion on Switching and Demand Response in Turkish Electricity Market. *Energy Policy* 97 (October): 591–602.

Stattin, M. (2020) Fortum fortfarande i topp – men Vattenfall knappar in. *VA Insights*, November 3, 2020. https://www.vainsights.se/articles/715465/2020-11-03-10-4547-fortum-fortfarande-i-topp-men-vattenfall-knappar-in.

Sturluson, J.T. (2002) *Topics in the Industrial Organization of Electricity Markets*. PhD diss., Stockholm University. https://ex.hhs.se/dissertations/221397-FULLTEXT01.pdf.

Svenskt Kvalitetsindex (2020) *Helheten Viktigast när Kunderna Betygsätter Energibranschen*. Accessed January 15, 2023. https://www.kvalitetsindex.se/wp-content/uploads/2020/11/SKI-Energi-2020-Helheten-viktigast-nar-kunderna-betygsatter-energibranschen.pdf.

Swedish Central Bureau of Statistics (2021) *Fördelning av Avtal på Olika Avtalstyper*. Accessed January 15, 2023. https://www.scb.se/hitta-statistik/statistik-efter-amne/energi/prisutvecklingen-inom-energiomradet/elpriser-och-elavtal/pong/tabell-och-diagram/tabeller-over-manadsvarden/fordelning-av-avtal-pa-olika-avtalstyper/.