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CONSUMER INERTIA AND INCUMBENCY IN THE ITALIAN RETAIL ELECTRICITY MARKET

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Abstract

The aim of this work is to address the critical issues regarding the retail electricity market in Italy. Since 2007, residential consumers have been able to freely choose their energy provider. However, as the national energy regulator pointed out, retail market is still suffering from paucity of competitive dynamics and insufficient consumer participation in the free market. One of the reasons that may have contributed to consumer inertia is the coexistence of the free market with the regulated branch. Although competitive prices appear to be on average lower than regulated ones, consumers seem reluctant to switch to the free market. A few studies examine the determinants influencing consumer engagement in the energy sector and they show that consumer inertia is due to both monetary and behavioural reasons. In this work, using ARERA's public databases, we empirically analyse how the market structure, in terms of number of distinct local incumbents, and the presence of a national incumbent, might have affected switching rates across the Italian territory.

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Introduction

Residential consumers have been able to freely choose their energy provider since 2007. However, Decree Law № 162/2019[1] has further delayed[2] the completion of the retail electricity market liberalisation in Italy. To date, it represents the latest legislative intervention regarding the creation and fulfilment of a competitive internal market for electricity, which has been advocated by the European Union since 1996.[3] The deferment turned out to be inevitable when ARERA[4] – the Italian Regulatory Authority for Energy, Networks and the Environment – highlighted critical issues regarding the paucity of competitive dynamics and the inadequacy of residential consumers' participation in the free market – accounting, on average, for 46.5% of total Points of Delivery (PODs) in year 2019.[5] Accordingly, the authority pointed out to both the Parliament and the Government the need to extend the coexistence of the regulated retail market,[6] known as *Servizio di Maggior Tutela* (henceforth, SMT), i.e., greater protection service. Until 1st January, 2022, residential customers will be granted two options:

- maintaining their contracts with the incumbent entitled to provide the retail service in their area, under a regulated framework where prices are quarterly defined by ARERA; or

[1] Converted into Law № 8/2020 on 28th February, 2020.

[2] Originally, Competition Law № 124/2017 established the end of regulated prices on 1st July, 2019. Decree Law № 91/2018 at first postponed it to 1st July, 2020; then, Decree Law № 162/2019 again postponed it to 1st January, 2022 for domestic customers & small businesses and to 1st January, 2021 for eligible SMEs, distinguished from small businesses on the basis of revenues, number of employees and power supplied.

[3] See: Directive 96/92/EC of the European Parliament and of the Council of 19th December, 1996 concerning common rules for the internal market in electricity, which established 'common rules for the generation, transmission and distribution of electricity [...] whereas, in the internal market, electricity undertakings must be able to operate with a view to achieving a competitive market in electricity.'

[4] *Autorità di Regolazione per Energia, Reti e Ambiente.*

[5] Source: ARERA, Notice № 515/2019/I/com.

[6] Source: ARERA, Notice № 23/2020/I/com.

- switching to the free market, where they are given the possibility to choose their contracts among those offered by a multiplicity of competitive firms.

Given the low differentiable nature of the services provided and considering that retailers operate in a minutely regulated sector,[7] where the observance of quality standards is thoroughly supervised, it is reasonable to consider the services supplied as homogeneous (Joskow & Tirole, 2006). As a consequence, consumer choice should be oriented to the cheapest tariff.

Regardless of the wide range of tariffs made available by a multiplicity of firms and in spite of the fact that cheaper prices can be found in the free market (Magnani, Manenti & Valbonesi, 2020), consumers still seem reluctant to abandon regulated prices. Even considering the free market branch only, competitive dynamics appear inhibited, resulting in high market concentration.[8]

Several studies analyse the determinants influencing consumer engagement in energy markets and it has been shown that consumer inertia is due to both monetary and behavioural reasons. Low perceived economic benefits, brand loyalty, mistrust versus new entrants, search and learning costs are few of them.

To some extent, the structure of the Italian retail market, whose regulated service is provided in most of the territory by one big firm, may have contributed to the exacerbation of this phenomenon in the first place. In such an environment, consumers may lose incentive to search for other trustworthy competitors and end up 'sticking' to the incumbent. This is especially evident if we consider that, while consumers decide to exit the regulated market, the vast majority subscribes a contract with free market suppliers belonging to the same group as the SMT.[9]

[7] See: ARERA, Resolution № 413/2016/R/com, *Testo integrato della regolazione della qualità dei servizi di vendita di energia elettrica e di gas naturale* (TIQV), i.e., Uniform Code Governing the Quality of Electricity and Gas Sales Services.

[8] In year 2008, Herfindahl-Hirschman Index (HHI) with respect to the free market branch only was reported to be above 2500, which is associated with highly concentrated industries. Source: ARERA, 2019b.

[9] About 60% of SMT exits is directed towards firms owned by the same group as the SMT firm supplier. Source: ARERA, 2019b.

The aim of this thesis is to address these critical issues. The work is organised as follows: in the first chapter, we briefly describe the history of the Italian electricity sector and provide an overview of the current framework, focusing on the structure of the supply; in the second chapter, we introduce the problem of consumer inertia, reviewing the literature that we believe to be pertinent to our analysis and we discuss the level of consumer engagement and market concentration in the Italian retail electricity market; eventually, in the third chapter, by means of ARERA public databases, we empirically analyse how the market structure, in terms of number of distinct local incumbents, and the presence of a national incumbent, might have affected switching rates and the participation in the free market across the Italian territory.

Chapter 1

The Italian Retail Electricity Market

EU Member States have been progressively reshaping the utility sector for the last thirty years. Such a liberalisation process, coherently with the objective of reducing barriers to intra-EU service provision in favour of a European Single Market, also involved the energy industry. The European Parliament and the Council have been promoting an Internal Electricity Market since 1996. Directive 96/92/EC aimed at enhancing the provision of electricity by allowing competition and by defining common harmonised rules across the EU countries. Italy transposed the 1996 EU Directive into the 'Bersani Decree',[1] which established the *unbundling* of generation, transmission, distribution and retail sale. Those activities, which were once the prerogative of a monopolistic, vertically-integrated, company, underwent a deep rearrangement leading to competitive fragmentation. Initially, the liberalisation of retail markets encompassed large consumers only, consistently with the provisions of the EU Directive. In 2007, with Decree Law № 73/2007[2], the liberalisation of the electricity retail became effective for domestic customers and small/medium-sized enterprises, too. Since then, residential customers have been able to freely choose their energy supplier subscribe a contract in the free market. Nevertheless, the liberalisation process was designed to be gradual: alongside the free market, a regulated branch (*Servizio di Maggior Tutela*) has been serving customers. The rationale of a progressive phase-out lied in the necessity to guide consumers through a more conscious and aware transition to the free market, in compliance with the EU

[1] Legislative Decree № 79/1999.
[2] Converted into Law № 125/2007.

Directives and Competition Law № 124/2017.[3]

In the first part of this chapter, we briefly look at the history of the Italian electricity sector, focusing in particular on the transition from a fragmented regional system to an integrated public monopoly and on the recent transformations implemented by the liberalisation process. Finally, with the aid of thematic maps, we depict the presence of free and regulated market retailers in Italy, highlighting how the historical positioning of Distribution System Operators (DSOs) across the Italian territory affected the current allocation of local incumbents entitled to provide *Servizio di Maggior Tutela*.

1.1 Historical Framework

1.1.1 From the Regional System to the State-Owned Monopoly

In Italy, prior to the nationalisation of the sector, electricity was produced and distributed by small and medium firms, scattered throughout the territory, connected and controlled by a few larger companies and consortia.[4] After World War II, on the wave of economic expansion, the debate regarding the nationalisation of the electricity sector –aimed at encouraging massive interventions for industrialisation– became fervent. The main objective was to produce greater conditions for the coordination of regional networks at the national level. However, the fragmentation of the sector hindered the progress of the project. On one hand, public firms merged in Finelettrica –subsidiary of IRI, i.e. *Istituto per la Ricostruzione Industriale*, a public holding company– and strived to strengthen energy production and transport at the national level; on the other hand, most of the private firms had no incentive to alter their regional model (Castronovo, 1994).

In 1962, in order to overcome the national coordination obstacles and to favour the optimal exploitation of resources, ENEL (*Ente Nazionale per l'energia Elettrica*, i.e. National Entity for Electricity) was finally established. Law № 1643/1962[5] led to the unification of the national electricity system: under this arrangement, the whole

[3] Source: ARERA Document № 397/2019/R/EEL.
[4] E.g.: Edison, SADE, SIP, Centrale, SME, UNES, CEdiS.
[5] Proposed by Fanfani Cabinet IV and approved on 26th June, 1962.

production chain was responsibility of one single institution. ENEL was entrusted with the activities of production, import/export, transport, transformation, distribution and sale of electricity. Thus began the ENEL monopoly, lasted thirty years, during which the public electricity service was provided by a single, large, vertically integrated, State-owned company. In the last decade of the century, however, an extensive process of privatisation and liberalisation of the sector was undertaken.

1.1.2 The liberalisation Process

EU's Internal Electricity Market Pillars

As far as 1988, European Commission emphasised the need to achieve a higher degree of integration in the energy sector, whereas barriers to trade within the Community were jeopardising the creation of a common market.[6] The new European Community standards, which included the privatisation of utility services and the transition from public ownership to public regulation, propelled the liberalisation process. With the 1992 Maastricht Treaty, the European Community defined the implementation of energy measures as one of its objectives. In the following years, the EU launched three Directives in order to promote the regulation and liberalisation of the internal market.

Directive № 96/92/EC defines harmonised rules for the internal electricity market. More specifically, it deals with the phases of electricity production chain, from generation to distribution, with the main aim of encouraging the gradual abandonment of the monopolistic regime and promoting, to some degree, an adequate level of competition. Concerning the production phase, Member States are allowed to choose between an authorization procedure or a tendering procedure for the construction of new generating capacities. Regarding the phase of electricity transmission and distribution, Transmission System Operators (TSOs) and Distribution System Operators (DSOs) must behave 'in an objective, transparent and non-discriminatory manner' and, to this aim, the structural separation regime for vertically integrated firms is introduced: the management of transmission or distribution activities must be independent from other activities and

[6] Commission of the European Communities. Directorate-General for Energy. (1988). *Energy in Europe: The Internal Energy Market*. Office for Official Publications of the European Communities.

operators must not discriminate between system users, particularly if this happens to be in favour of their subsidiaries. Finally, in order to ensure the attainment of these measures, integrated electricity undertakings must adopt the principle of accounting separation.

Directive № 2003/54/EC, repealing the previous one, establishes new criteria for the designation of TSOs and DSOs and it allows new suppliers to access the market. All consumers are given the opportunity to choose (from mid-2007) their own supplier on the free market. Nonetheless, it is stated that the completion of the liberalised market must follow a phased approach to enable industry adjustments and to protect the interests of customers and the effectiveness of their choices.

Directive № 2009/72/EC, repealing the previous one, reduces disparities with the aim of reaching a level playing field. It establishes transparency standards for the protection of consumers and corrective measures in order to prevent vertically integrated firms from adopting strategies that hinder competitiveness. Moreover, together with Regulation № 713/2009, promotes the birth of an Agency for the Cooperation of Energy Regulators (ACER).

The Implementation of EU Directives

In 1992, thirty-seven years after its creation, ENEL was transformed into a joint-stock company: it was the end of the State-owned monopoly.[7] Few years later, 'Bersani Decree'[8], in compliance with the 1996 EU Directive, formally paved the way to the liberalisation process in Italy.

However, only in 2007, with Decree Law № 73[9], residential consumers and SMEs were involved in this process. Starting from 1st July, 2007, all residential customers can freely choose their electricity supplier or, alternatively, as a default setting, they are supplied within the regulated regime, the SMT, whose tariffs are set by ARERA[10]. After

[7]In compliance with the 'unbundling and transparency of accounts' provisions, included in the EU Directives, it will be subsequently subject to a corporate reorganization which transformed it to a holding company controlling over three subsidiaries: *Enel Produzione*, *Terna* and *Enel Distribuzione*, respectively entrusted with production, transmission, distribution & selling activities.

[8]Legislative Decree № 79/1999.

[9]Converted by Law № 125/07.

[10]Formerly called AEEG, *Autorità per l'energia elettrica il gas* (until 22th December, 2011) and AEEGSI, *Autorità per l'energia elettrica il gas ed il sistema idrico* (until 27th December, 2017).

being at the attention of the political debate for few years, the deadline for the SMT was set by Competition Law № 124/2017 on 1st July, 2019. Nonetheless, on 25th July, 2018, the Government, considering that at that time less than 45% of total residential consumers were participating in the free market, decided to extend the SMT's functioning by one year. For similar reasons, at the end of 2019, Decree Law № 162/2019 established a further prorogation of the SMT until 1st January, 2022 for domestic customers. Eligible SMEs can avail themselves of SMT only until 1st January, 2021, in compliance with the latest EU Directive.[11]

1.2 Current Retail Market Structure

As mentioned in the previous paragraphs, since 2007, liberalisation has encompassed residential consumers, too. However, the choice of a provider in the free market was not compulsory. According to the progressiveness upon which the liberalisation process was based, a hybrid market was created. Customers who have not yet exercised a choice, can still keep the conditions of the regulated market, the SMT. Nonetheless, while, in the case of a free price contract, supplier selection can be exercised amongst a multiplicity of firms; in the case of regulated price, the contract must be stipulated with a designated company, to which, in the discussion, we will refer to as *incumbent*. The incumbent is a firm holding the authorisation to offer the SMT in a specific area. Prior to 2007 rearrangements, electricity distribution companies could deal with retailing as well. Since 2007, as established by Law № 125/07, electricity distribution must be carried out under the unbundling regime with respect to sales activity. Hence, vertically integrated companies were unbundled in order to create sister companies entrusted with either the management of distribution or the retail sale activities.[12] Consistently with the level of data disaggregation adopted for the empirical analysis presented in the third chapter, we are providing in the next pages an overview of the retail market structure in terms of active suppliers among the Italian provinces. To support this, choropleth maps will be employed.

[11] Directive (EU) № 2019/944 of the European Parliament and of the Council of 5th June 2019 on common rules for the internal market for electricity.

[12] Few years later, Legislative Decree № 93/2011 & Resolution № 296/2015/R/COM established that big vertically integrated companies must not create ambiguity in their policy communication and trademark, regarding the distinct identity of distribution, SMT and free market branches and enforced a separation amongst trademarks, too.

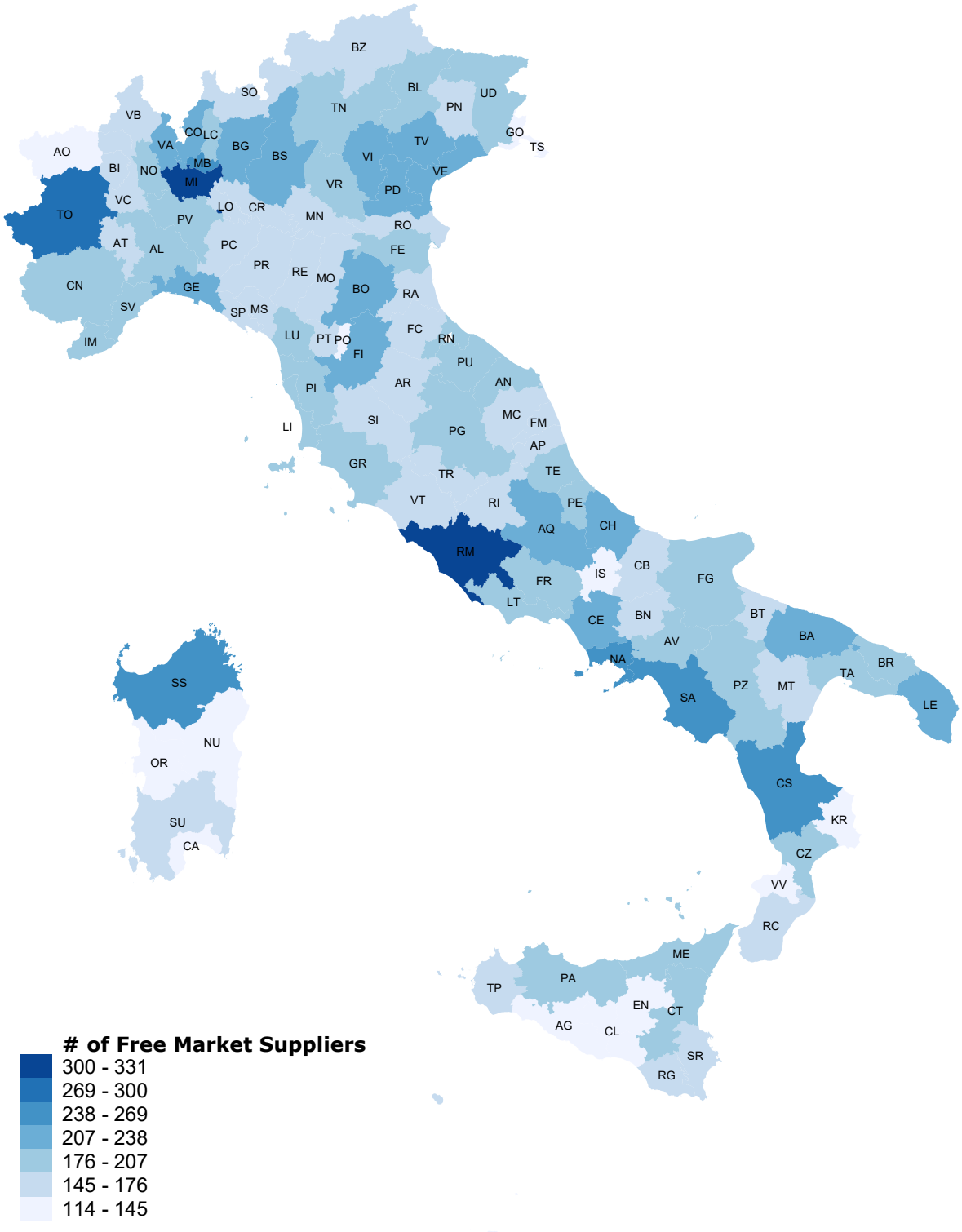
1.2.1 Free Market Suppliers

In contrast to what happens in the regulated market, residential consumers who decide to join the free market can select their counterparty from a multiplicity of providers. A wide range of contracts, differentiated both in terms of how the energy usage is charged and billed and for the presence of any ancillary services, is available in the free market. In general, depending on their preferences, consumers can choose from a variety of options, such as fixed or variable prices, single-rate or multi-rate tariffs (applying different tariff rates for different days and for various times during the day), free market conditions or PLACET[13] (conditions equivalent to those of the SMT) and so on.

The number of active free market providers constantly fluctuates due to market entry/exit by firms. Nonetheless, over the last few years, the trend in the number of retail suppliers to residential consumers in the free market has been increasing relentlessly. In particular, in 2012 the total number of companies was 146.[14] According to ARERA's public registry,[15] as of April 2020, the total number of suppliers is 593. However, only 47 of them are active across the whole Italian territory and 65 of them operate in more than 100 provinces. On average, 184 firms in each province supply electricity to the free market consumers. As shown in Fig 1.1, the most populous provinces are those where there is the greatest number of active providers. As a matter of fact, Milan, Rome, Turin and Naples, the four most populous areas, lead the ranking with 331, 307, 278 and 266 providers respectively. As a whole, correlation between total inhabitants and the number of distinct providers is equal to 0.79. While the populousness of the provinces seems to be relevant, it does not seem possible to detect a clear pattern as far as macro-region are concerned. Provinces in Northern Italy count 188 different active operators, which is slightly above average. On the other hand, if we consider Central Italy and Southern Italy, for both macro-regions the average number of retail sellers by province is 180. Despite these numbers, as we will more extensively discuss in the next chapter, the vast majority of residential consumers is served by the three biggest groups.[16]

[13] PLACET is the Italian acronym of *Prezzo Libero A Condizioni Equiparate Di Tutela*.
[14] Source: ARERA. (2019). *Monitoraggio retail. Rapporto per l'anno 2018*. Graph № 4.5, p. 53.
[15] Source: http://www.arera.it/ModuliDinamiciPortale/reportistica/searchOperatori.
[16] C3 index reported by ARERA relative to consumers in the free market during 2018 was equal to 67,0%.

Figure 1.1. Number of dinstict free market providers in each Italian province.



Source: Authors' elaboration from ARERA public databases using STATA 'spmap' command.

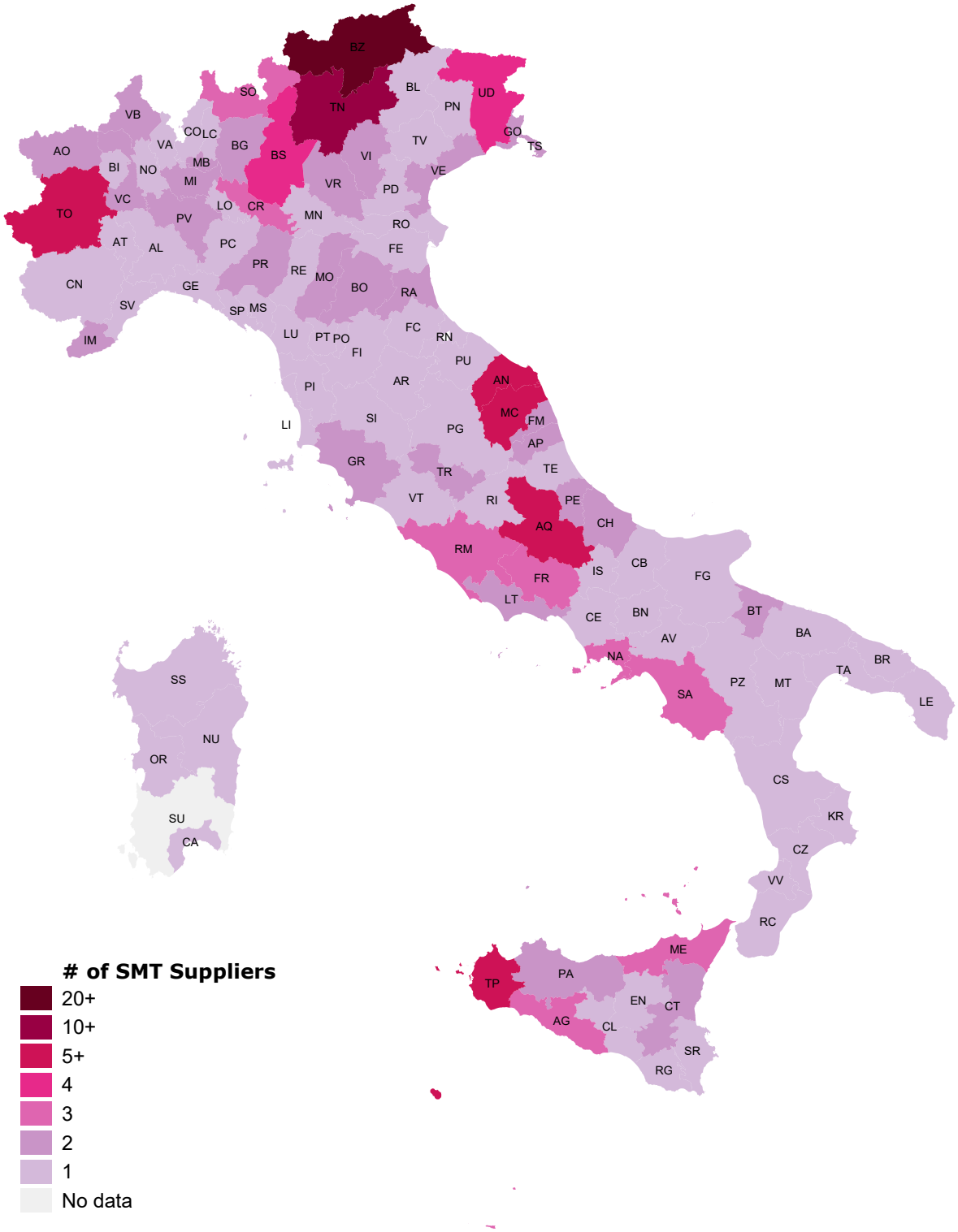
1.2.2 SMT Suppliers

Residential consumers who have not yet chosen a supplier in the free market are entitled to be served under the SMT regime. In this case, the relation between the customer and the commercial counterparty is strictly regulated both in terms of contractual conditions and in terms of price, which is set by the national authority. At the beginning of each new quarter, ARERA does indeed fix the prices that will be in force during the ensuing three months. Residential consumers are allowed to choose between a two-rate tariff or a single-rate tariff. In case the former applies, the price is differentiated between two daily bands: the F1 band, which is generally linked to a higher cost per kilowatt hour, runs from 8am to 7pm from Monday to Friday, excluding national holidays; the F23 band, which generally costs less, tracks consumption running from 7pm to 8am from Monday to Friday and at all hours on Saturdays, Sundays and national holidays. In each case, the energy supplier managing customer care, billing and payments processes cannot be freely chosen by the SMT user: it must be the one associated in a univocal manner to the ZIP code area where the Point-of-Delivery is located, instead.

There are 131 SMT suppliers in Italy. However, the biggest one, Servizio Elettrico Nazionale (SEN), part of the Enel Group, covers the 91.78% of total municipalities. Acea, A2A and Iren, local suppliers of Rome, Milan and Turin[17] respectively, follow SEN in terms of coverage. The remaining SMT providers comprehend local firms, generally supplying at most a few, usually close, cities. The average number of suppliers by province for North of Italy is 3, for Central Italy is 1.77, for South of Italy is 1.59. There is no correlation[18] between the number of SMT suppliers and inhabitants in the area and it is no possible to detect a clear pattern regarding regions, apart from the high number of providers in Trentino-Alto Adige (Fig. 1.2 p.13). This is because, net of minor changes, the current partition is the inheritance stemming from the unbundling of vertical firms which were managing distribution, too. Thus, even today, SMT suppliers usually belongs to the same group providing distribution services.

[17] Iren is the authorised SMT supplier for the city of Parma, too.
[18] Correlation found between number of SMT suppliers and inhabitants is 0.07.

Figure 1.2. Number of dinstict SMT suppliers in each Italian province.



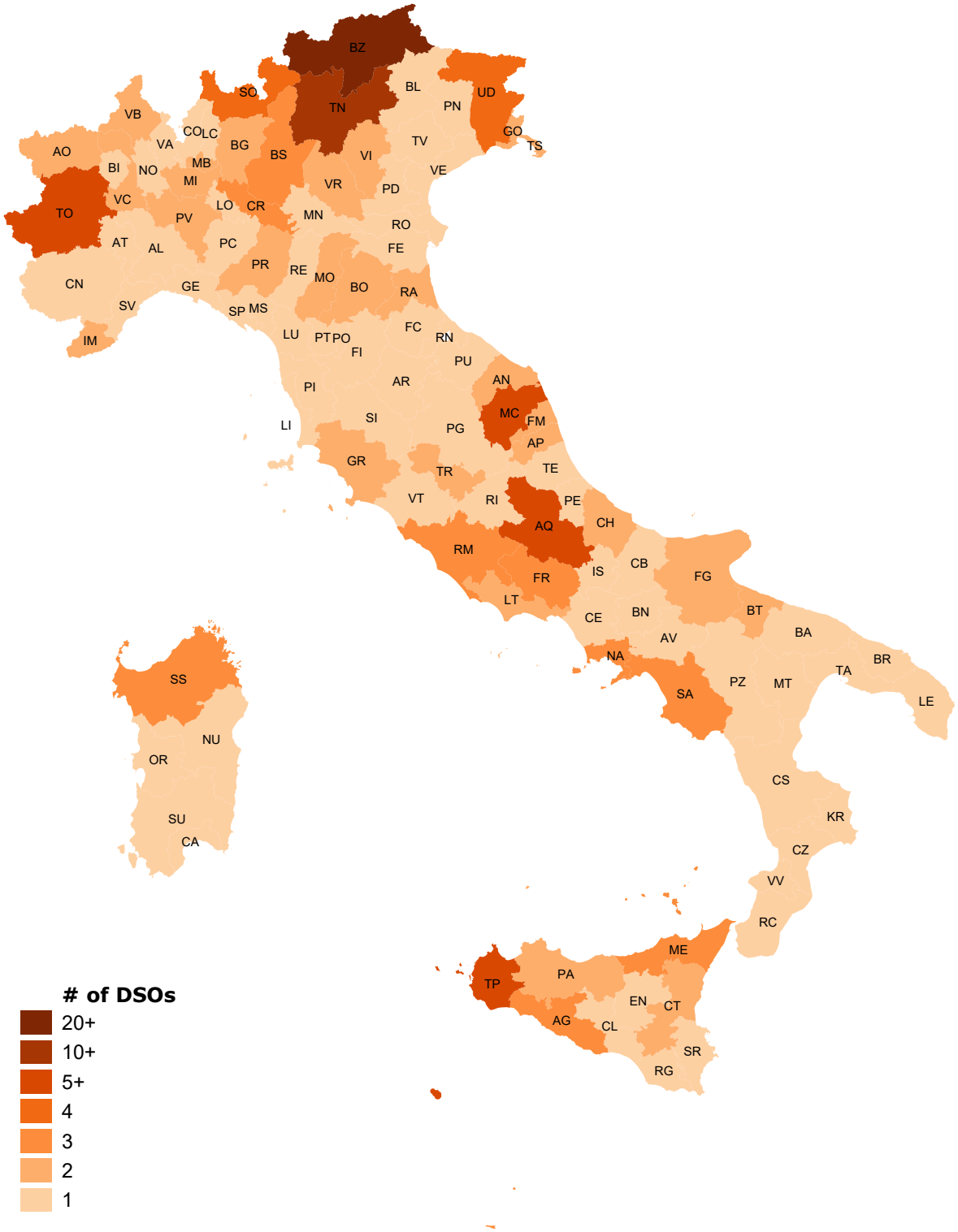
Source: Authors' elaboration from ARERA public databases using STATA 'spmap' command.

1.2.3 Distribution System Operators

In order to sustain the aforementioned match between the firms providing the SMT and those which manage the distribution service, we attach a choropleth map showing the number of DSOs active in each Italian province (Fig. 1.3). A part from few cases,[19] maps can be overlapped, as the provinces largely fall within the same classes as in Fig. 1.2. Further evidence stems from a comparison between maps showing the SMT provider and the DSO operating in each Italian municipality, attached in Fig. A.1 p.51. Firms belonging to the same parent company share the same colour in different hues. It seems clear that in the vast majority of municipalities a single corporate group's subsidiaries are entitled to exercise both electricity distribution activities and the retail under the SMT. Since Law № 125/07 came into effect, establishing the unbundling of distribution and retail, only minor rearrangements occurred. On closer inspection, we may notice the vastness of the Enel Group coverage over the territory. Thus, as far as distribution and regulated retail branch are concerned, Enel still emerges as a huge national incumbent. However, some areas are characterised by the presence of multiple local incumbents. For this reason, in the next chapters, we will exploit such variability in order to try and identify any relationship between incumbency and the competition level, measured in terms of free market participation and switch rate.

[19] The only differences regard: Sondrio, Brescia, Venice, Ancona, Pescara, Foggia, Sassari and the missing data in the province of Sud Sardegna.

Figure 1.3. Number of dinstict DSOs in each Italian province.



Source: Authors' elaboration from ARERA public databases using STATA 'spmap' command.

Chapter 2

Consumer Inertia and Switching

Within the context of a liberalised market, an increase in competition is to be expected. Overall, the main objectives of competition are to foster the quality of the services, while encouraging the emergence of innovation, and to lower prices. The switching rate of consumers is a crucial indicator for assessing the competitiveness in the service sector. As far as the electricity markets –and energy markets as a whole– are concerned, official reports and empirical research shed light on the phenomenon of relatively low switching rates and a lack of consumer engagement. The Italian retail electricity market is no exception (Agency for the Cooperation of Energy Regulators, 2020). Residential consumers, in particular, exhibit poor interest and knowledge with regard to the chance to switch energy provider. Many factors can be identified as responsible for this. Both monetary and behavioural reasons, such as search costs and perceived low savings or loyalty to the incumbent and mistrust towards new entrants, are often imputed to consumer inertia. In the specific Italian context, the persistence of a hybrid regime and the repeated deadline postponement for the phase-out of regulated prices may have induced consumers to avoid and procrastinate the choice, thus contributing to amplify consumer inertia. In this chapter, we will review the literature on the topic. Finally, we will frame the current conditions, in terms of switching rates and free market engagement, in the Italian retail electricity sector.

2.1 Literature Review

As long as service providers are concerned, several variables affect consumer switching. Bansal, Taylor and St. James (2005) propose three broad categories within which they may be subsumed:

- *push variables*, that involve consumer perception about the incumbent's features, such as service quality, price and reliability;
- *mooring variables*, i.e. characteristics facilitating the switching process, that can be consumer-specific (such as her or his natural propensity to switch) or related to the context where the switch takes place (such as norms, explicit or implicit barriers, switching costs);
- *pull variables*, i.e. positive factors driving consumers to alternative firms, such as competitor attractiveness, in terms of innovative way of making business, higher quality, lower prices and so on.

Research seems to agree that electricity services can be treated as relatively homogeneous goods (Bye & Hope, 2005; Joskow & Tirole, 2006) and that in the, renewed, liberalised environment consumers are expected to be seeking low prices (Watson, Viney & Schomaker, 2002; Defeuilley, 2009). Given the homogeneity of the product, the extent to which the quality of the electricity service can be improved is very limited (Littlechild, 2002), especially if we consider that the observance of quality standards is thoroughly monitored and supervised by the national authority. Thus, consumer choice is implausibly determined by the quality of the electricity service. In some cases, homogeneous goods passively undergo differentiation after they are purchased, in the sense that consumers do not find convenient to change supplier, because a cost is attached to the switching process (lock-in effect). In other words, homogeneous goods are susceptible to switching costs (Klemperer, 1987). To some extent, firms do try to actively differentiate their proposals by bundling electricity in dual-fuel[1] offers or together with additional services (such as internet subscription, mobile plans, sale of devices on finance, insurance and

[1] Bundles which supply both electricity and gas.

so on). However, observed switching rates data suggest that the competitive dynamics are inhibited. Residential consumers are reported to be quite idle, in the sense they do not behave in a responsive manner when cheaper alternatives are available in the retail electricity market. For this reason, additional aspects determining consumer choice must be taken into account.

Variables affecting consumer decision in the field of energy markets are commonly divided into two macro-categories: traditional economic factors, associated with the pursuit of value for money (maximising satisfaction and minimising associated costs), and behavioural (or psychological) factors, linked to consumer attitudes to utility products (Klemperer, 1995; He & Reiner, 2017).

Several empirical studies have investigated those determinants. We will show below results among those we think are relevant for the present analysis. In general, switching costs are identified whenever customers give up benefits stemming from changing supplier. In the case of homogeneous products, consumers renounce to exploit cheaper alternatives and stick to their current supplier (Farrell & Klemperer, 2007).

Analysis performed on a sample of Swedish households revealed that price affects the switching decision when the consumer is a bargain hunter, while it turned to be not significant for passive agents (Sturluson, 2002).

Similarly, Rowlands, Parker and Scott (2004), conducting a survey on a sample of consumers in Ontario (Canada), find that consumers prone to switch consider price as the factor with the highest impact on their decision, while consumers averse to switch judge reliability of competitors as the most important feature. This result may suggest that brand-loyalty plays a crucial role in determining the decision to stay with the incumbent. The latter indeed let them spare the effort needed to find trustworthy new entrants.

Analysing consumer switching behaviour in Netherlands residential energy markets, Pomp and Shestalova (2007) show that switching costs in terms of search costs and learning costs[2] are factors affecting consumer probability to switch provider. By computing implicit switching costs perceived by customers, it appears that incumbents can raise prices 75 euros per year above competitors and still preserve profitability, thus absorbing free

[2]Time spent to gather information and compare offers.

market gains that are supposed to benefit households.

Deller et al. (2017) examine a sample of households willing to take part in a collective switch scheme[3] and find that they could not fully exploit economic opportunities. When analysing the reasons why households seemingly leave 'money on the table', non-monetary preferences are identified. The detection of consumers deliberately keeping more expensive contracts may bring into question the fact that energy is unanimously considered as a homogeneous product. However, time pressure and concerns about the switching process are reported to be some of the causes for non-switchers preventing them to change supplier, thus, the hypothesis that the status quo preference may be instilled by the implied switching costs cannot be ruled out.

Wilson and Price (2010) question the presumption of the positive role generally ascribed to consumers in improving market competition. By analysing the UK retail electricity market, notwithstanding controls for possible deceiving sales activities and bias for particular tariff structures, a limited underlying capacity of consumers to select providers is found: not only do they lose a part of gains available, by not choosing the cheapest offers, but also they reduce their surplus as a result of switching, by oddly selecting more expensive contracts. This phenomenon seems to be exacerbated when many alternative competitors are available, confirming the impact of search costs and learning costs.

Studying the Danish market, Yang (2014) finds that consumers attribute low predictive power to perceived economic benefits with respect to switching intention and stresses the importance of the implementation of measures simplifying the switching process and making sceptical consumers more aware of the positive consequences of switching.

Shin and Managi (2017) find that for Japanese households economic benefits and customer satisfaction matter, along with fixed price contracts. Moreover, household and individual characteristic may affect switching. Higher number of family members, unemployment status, house ownership, living in large cities[4] are associated with a higher switching rate.

[3]The results on such a self-selected sample are reported to typify an upper-bound in evaluating engagement in the UK market.

[4]On the contrary, Fontana, Iori and Nava (2017), studying the Italian case, attribute a negative power to living in a large city in determining the probability to switch.

Table 2.1. Summary of switching rates determinants according to literature

Author(s)	Year	Country	Explanatory Variables	Relation
Sturluson	2002	Sweden	Economic benefits	(+) for switch inclined (n.s.) for switch averse
Rowlands et al.	2004	Canada	Economic benefits Reliability Incumbency	(+) for switch inclined (n.s.) for switch averse (-)
Deller et al.	2017	UK	Time pressure Mistrust vs. process	(-) for switch inclined (-) for switch inclined
Wilson & Price	2010	UK	High # of competitors	(-)
Yang	2014	Denmark	Mistrust vs. process Low perceived benefit Brand Loyalty	(-) (-) (-)
Shin & Managi	2017	Japan	Fixed price Large family Unemployment House ownership Large city	(+) (+) (+) (+) (+)
Hortaçsu, Madanizadeh & Puller	2017	US	Incumbency Brand Loyalty	(-) (-)

Finally, Hortaçsu et al. (2017) examine data about Texas residential electricity market, where, historically, vertically integrated utilities managed the service with regulated prices. The average price of the incumbent was systematically higher than entrants. However, consumers kept purchasing electricity from the incumbent, displaying inertia. This attitude, attributable to brand loyalty versus the incumbent or search frictions, prevented them from saving until 12.47$ per month.[5] Thus, the presence of former vertically integrated incumbents seems to generate inertia in the sense that consumers, by maintaining the contract with a trustworthy incumbent, lose incentive to frequently consider offerings of alternative providers and, even when they do, they leave to incumbents a significant advantage.

Tab. 2.1 reports the main results revealed by the economic literature and herein discussed.

[5]Median: 7.63$ per month.

2.2 Inertia in the Italian Market

In 2019 recorded switching rate in the Italian retail electricity market was higher than previous years (Fig. 2.2 p.25). It should be noted, however, that consumers may have been pushed to switch to the free market by the deadline for the phase-out of the regulated regime, which was expected for 1st July, 2020 (ACER, 2020).

In the aggregate, the Italian market is not exempt from consumer inertia. Thirteen years after the process of liberalisation started, consumers still exhibit low engagement, resulting in high market concentration.

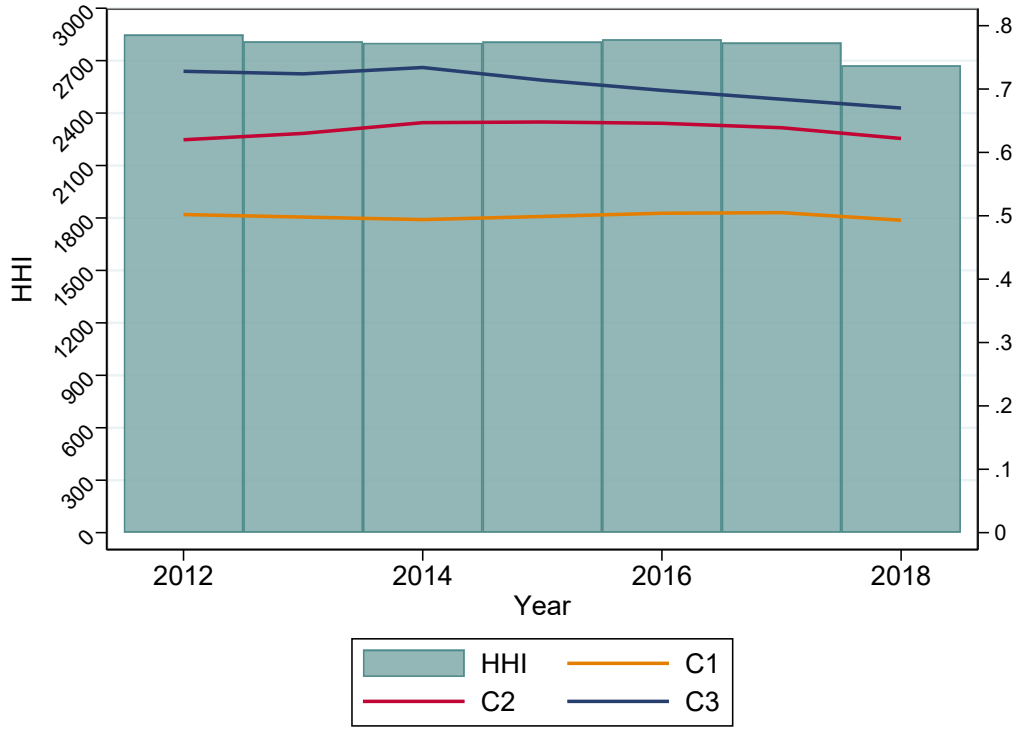
2.2.1 Market Concentration

The Italian electricity retail market is still very concentrated, especially if we consider the residential branch. The simultaneous presence of a regulated market may have exacerbated the inertia of residential consumers. In fact, if we consider the low-voltage non-residential market, for which the possibility of maintaining the contract in the SMT is also conceived, the market shares are distributed more uniformly. According to 2019 Retail Market Monitoring Report by ARERA, the Enel group bills 69.8% of the energy consumed in the residential sector as a whole (Tab. B.1 p.54). This percentage drops considerably if we consider the low-voltage non-residential branch (38.6%).[6] However, at present, the relevance of SMT enables us only to speculate about the degree of competitiveness that will be determined in the sector when the liberalisation process will have fully unfolded its effects. For the sake of congruence, we can examine the market shares relatively to the free market only, so that there is no bias due to the considerable weight that the SMT still holds. Still, in spite of SMT shares being ruled out, the top 5 corporate groups operating in the SMT hold 62.1% of total residential free market. This value drops to 39.7% for the low-voltage non-residential branch (ARERA, 2019b). Through a quick comparison between Fig. 2.1a and Fig 2.1b (p.23), it is possible to detect the discrepancy in the free market concentration between the residential and the low-voltage non-residential branch.

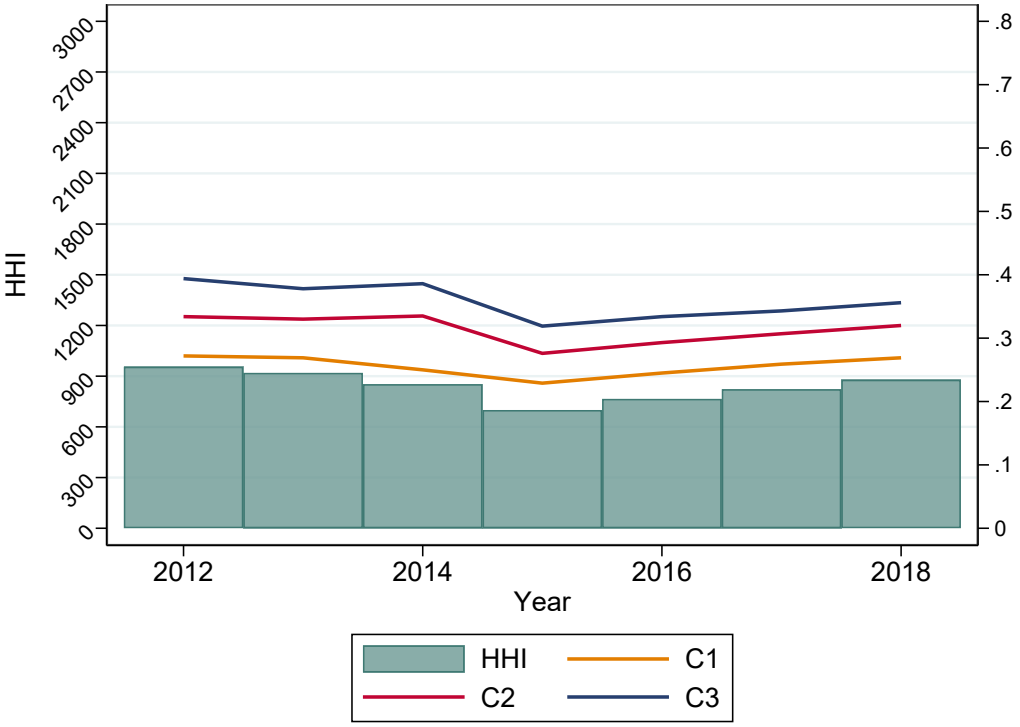
[6] It drops even more in the medium-voltage non-residential branch (20.4%). However, it must be noted that since these shares concern the energy consumed, there could be a self-selection problem, in the sense that customers with lower average consumption choose Enel while those with higher consumption choose other suppliers.

Figure 2.1. Free market concentration. The green bars represent the HHI. The yellow line, red line and blue line represent C1, C2 and C3 indices, respectively.

(a) *Residential* free market.



(b) *Non-residential* free market (low-voltage).



Source: own elaboration (based on ARERA databases).

Table 2.2. Concentration in *residential* and *non-residential* market.

Year	C1_res	C1_nr	C2_res	C2_nr	C3_res	C3_nr	HHI_res	HHI_nr
2012	50.2%	27.2%	62.0%	33.4%	72.8%	39.4%	2 849	956
2013	49.8%	26.9%	63.0%	33.0%	72.4%	37.8%	2 810	920
2014	49.4%	25.0%	64.7%	33.5%	73.4%	38.6%	2 802	853
2015	49.9%	22.9%	64.8%	27.6%	71.4%	31.9%	2 809	700
2016	50.4%	24.5%	64.6%	29.3%	69.8%	33.4%	2 822	766
2017	50.5%	25.9%	63.9%	30.7%	68.4%	34.3%	2 803	823
2018	49.3%	26.9%	62.2%	32.0%	67.0%	35.6%	2 673	879

Source: ARERA databases.

In Fig. 2.1, C1, C2 and C3 indices represent the market share held respectively by the first corporate group, the first two corporate groups and the first three corporate groups in the free market in terms of energy (kWh) billed. The first group holds about the half of the market as regards the residential branch. When considering the market share of the first three groups,[7] it is possible to notice that over the last years it has been usually decreasing (a part from year 2014). At the end of 2018, the first three group held two third of the residential free market. The values are nearly halved when the low-voltage non-residential market is taken into consideration.

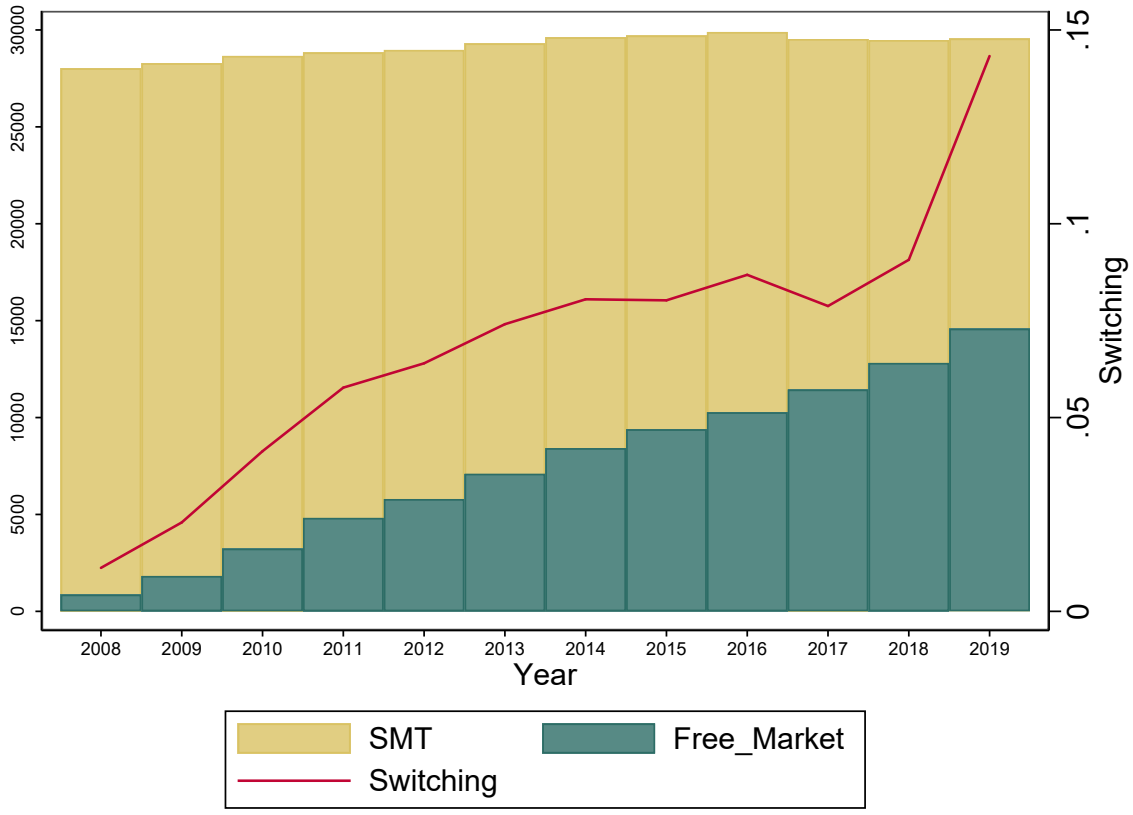
The green bars (Fig 2.1) represent the HHI (Herfindahl-Hirschman Index), computed as the sum of squared values of market shares and ranging from 0 (perfect competition) to 10000 (monopoly). As a rule of thumb, values over 2500 are associated with critical competitive dynamics and high concentration. Values between 1500 and 2500 are on the threshold and require an in-depth analysis. Values under 1500 symbolise an unconcentrated industry (US Department of Justice, 2010). The HHI for the residential market decreased in 2018. However, it is still very large and depicts a highly concentrated industry. The HHI for the low-voltage non-residential market is below 1000, which suggests an unconcentrated industry. Tab. 2.2 reports the discussed indices in detail.

[7] Namely, Enel, ENI and Edison.

2.2.2 Switching

The number of consumers who do not switch is still high. The reasons associated with this phenomenon are various, ranging from regulatory barriers to behavioural factors. The presence itself of a hybrid regime can represent a form of regulatory barrier, especially if regulated prices are set below competitive prices (ACER, 2020). Actually, in the competitive branch of the Italian electricity retail market, during period 2013-2018, it was always possible to find cheaper prices than those fixed by the regulatory authority Magnani, Manenti and Valbonesi (2020). Despite that, in 2018, 56.51% of total PODs (Tab. B.2 p.55) was still served by the SMT, while only 43.49% by the free market; that is, the majority of consumers had never once switched provider. Of course, the competitive market has been gaining ground during the last years, but, as shown in Fig. 2.2 the transition to a competitive market is far from being completed, as half of the market share is still supplied by the SMT.

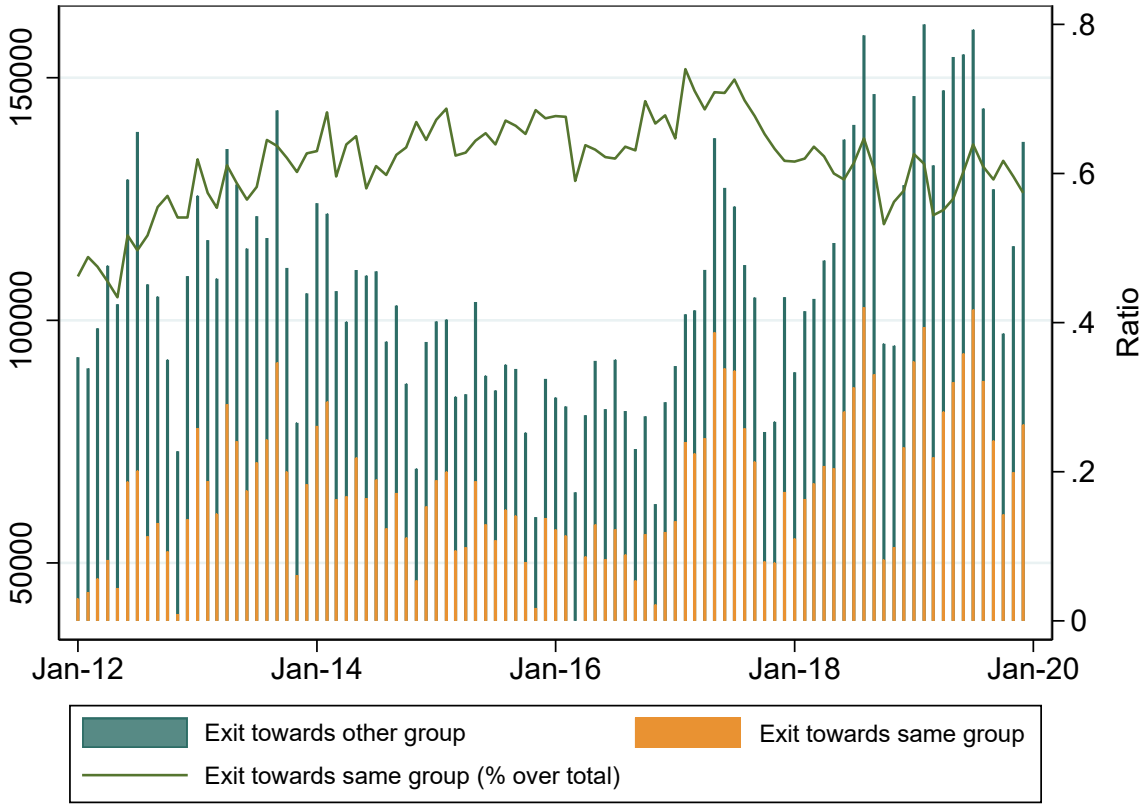
Figure 2.2. SMT vs free market share & switching rate (2008-2019). Values on the left are expressed as thousand of active PODs.



Source: own elaboration (based on ARERA databases).

This is especially evident if we consider that, while consumers decide to exit the regulated market, the vast majority subscribes a contract with free market suppliers belonging to the same group as the SMT. Fig. 2.3 illustrates this phenomenon. About 60% of the SMT exits[8] is directed towards firms of the same group. Since the authorisation to provide the SMT service is held in most of the Italian territory by one incumbent (see Fig. A.1 p.51), the high ratio of exits towards the same group may result in a high level of concentration even once the liberalisation process will be over. This phenomenon, which may be associated with consumer tendency to stick to the incumbent rather than sifting through company offers, guarantees a significant advantage to the incumbent. In this sense, residential consumers perceive higher switching costs when it comes to leave the incumbent.

Figure 2.3. Exit from SMT towards a free market supplier belonging to the same group.



Source: own elaboration (based on ARERA databases).

[8]Total of exit from SMT distinguished between those referring to customers who have chosen to exit SMT by signing a contract with a supplier connected to the electricity distributor or with another supplier on the free market.

Possible explanations for the higher 'perceived' switching costs in the residential electricity market are:

- low perceived economic benefits;
- search and learning costs, exacerbated by the high number of competitors,[9] which makes the comparison even more demanding and time-consuming (Fontana et al., 2017);
- reliability of the incumbent and brand loyalty;
- mistrust versus new entrants.

Magnani, Manenti and Valbonesi (2020) do estimate switching costs stemming from exiting the three biggest firms in the competitive branch of the Italian retail electricity market. Exiting the biggest one, which is the national incumbent, is perceived to be much more expensive. As a result, for the last five years, the incumbent has been gradually increasing its share in the free market, to the detriment of competitors.

[9] As of April 2020, 593 suppliers were active in the free market.

Chapter 3

Inertia and Incumbency: an empirical analysis

This last chapter focuses on our empirical analysis. We investigate the relation between incumbency and the observed consumer inertia in the Italian retail electricity market. As suggested by Agency for the Cooperation of Energy Regulators (2020) and several research results,[1] residential consumers may grant the incumbent an advantage. In the Italian case, the regulated regime, still coexisting with the free market, is provided by a national incumbent and few other local firms, generally supplying at most a small number of close cities. This structure allows us to examine how the numerousness of incumbents may produce discrepancy in the switching rate across the Italian territory. In the first section, we will present the data employed, justifying the choices made and displaying the descriptive statistics for the main variables. In the second section, we will show the results obtained and provide possible explanations as well as policy suggestions.

[1] See Tab. 2.1, p.21.

3.1 Data and Sources

Low switching rate is commonly associated to consumer disengagement. Since the core of our analysis is to assess whether the latter depends on the differences in the structure of the regulated market across Italy, we will employ the variable *switching rate* as the dependent variable. Data regarding observed switching rates for year 2019 have been recovered from ARERA's website,[2] which published them for the first time in July 2020 at the provincial level.[3] The switching rate is expressed as the ratio of switching Points-of-Delivery with respect to the total number of active PODs, that is the share of consumers who changed their supplier during year 2019, net of SMT exits towards the same group.[4] The average switching rate by province is 14.5% (Tab. 3.1). However, the min/max band suggests that some provinces are more involved into switching dynamics than others. In map B.1 (p.53), we provide a broader view of the discrepancy in the switching rate across Italy.

Table 3.1. Descriptive statistics for the variables employed.

Variable	Obs	Mean	Std. Dev.	Min	Max
Switching	107	0.1451	0.0222	0.0580	0.2023
DSOs	107	5.6031	9.3351	0.6153	90.366
SMT_suppliers	106	5.7103	9.7045	0.6153	94.130
E.dist_share	107	0.9097	0.2144	0.0000	1.0000
Free_market	107	0.5153	0.0676	0.3467	0.6837
Unemployment	107	0.1042	0.0577	0.0290	0.2884
Schooling	107	0.4554	0.0422	0.3482	0.5932
Over65	107	0.2377	0.0239	0.1750	0.2910
Net_income	107	31084	4408.3	22745	37892

[2]Source: https://www.arera.it/allegati/dati/monitoraggioretail//swprovincia.xlsx.
[3]Previous to 2020, data were published at the regional level only.
[4]Switching rate thus includes both changes from one free market supplier to another and changes from the incumbent SMT supplier to a free market supplier. Nonetheless, SMT exits towards a free market supplier belonging to the same group are counted out.
Source: https://www.arera.it/it/dati/mr/switchbar.htm.

In the second stage of our analysis, we introduce one additional dependent variable, which is the rate of participation in the *free market*, available on ARERA's website.[5] It represents the portion of consumers who have left the SMT since 2007 and are served by a firm operating in the free market as of December 2019.

The number of incumbents operating in each province is the main explanatory variable on which we will focus. Incumbency data, retrieved from ARERA's registry,[6] are expressed in terms of number of *SMT suppliers* operating in each municipality. However, the variable included few missing data, resulting in the absence of a whole province. Therefore, we opted for the number of *DSOs* (per million inhabitants) by province as a measure of incumbency. DSOs distribution across Italy mirrors the SMT suppliers' one, as we have previously shown.[7] Given the magnitude of the Enel Group in providing the SMT – through the subsidiary Servizio Elettrico Nazionale S.p.A. – and the distribution service – through the subsidiary E-distribuzione S.p.A. –, we included *E.dist_share*, which represents the coverage of the distribution service under the Enel Group in each province (measured as share of inhabitants covered).

Coherently with the literature reviewed in Chapter 2, we input in our model the following socio-demographic variables for year 2019 published by ISTAT:[8]

- *unemployment* rate, measured as portion of population which is currently not working but in search of a job;
- *schooling*, which represents the percentage of 18+ inhabitants who got at least a high-school diploma;
- *over65*, that is the share of 65+ inhabitants;
- *net_income* is the average disposable income per capita in each Italian province;

Finally, we will include the dummy variables at the regional level,[9] in order to capture the residual effects due to socio-demographic inter-regional differences.

Descriptive statistics for the aforementioned variables are reported in Tab. 3.1

[5] Source: https://www.arera.it/allegati/dati/monitoraggioretail/mlprov.xlsx.
[6] Source: https://www.arera.it/ModuliDinamiciPortale/reportistica/compilaRicerca.
[7] See: Fig. A.1 p.51.
[8] ISTAT is the Italian National Institute of Statistics.
[9] The dummy variables identify 20 categories, namely the number of regions in Italy.

3.2 Analysis

In order to measure the effect of incumbency on the switching rate, the Ordinary Least Squares (OLS) method is used to construct our regression in the first place. To better identify the effects of our main explanatory variable, we gradually increase the number of variables considered. Cluster-robust standard errors at the regional level are computed.[10] In specifying the model, log-transformations of the dependent variables and of the socio-demographic controls are taken:

$$\begin{aligned} Switching = \alpha + \beta_1 DSOs \\ + \beta_2 Unemployment + \beta_3 Schooling \\ + \beta_4 E.dist\_share + \beta_5 DSOs * E.dist\_share \\ + \phi_{k-1} Region + u_1, \end{aligned} \tag{3.1}$$

where $k = (2, \ldots, 20)$, indexing Italian regions.

Subsequently, we will extend our analysis by implementing a Seemingly Unrelated Regression (SUREG) model, which allows us to run two regression equations predicting both *switching* rate and *free_market*, whose error terms could be correlated. We use a slightly different set of explanatory variables, as required by SUREG model.[11] Therefore, along with Eq. 3.1, we define:

$$\begin{aligned} Free\_Market = \gamma_0 + \gamma_1 DSOs \\ + \gamma_2 Over65 + \gamma_3 Net\_income \\ + \gamma_4 E.dist\_share + \gamma_5 DSOs * E.dist\_share \\ + \psi_{k-1} Region + u_2, \end{aligned} \tag{3.2}$$

where $k = (2, \ldots, 20)$, indexing Italian regions.

[10] Heteroscedasticity tests are displayed in Appendix C, Tab. C.6 p.61. In Tab. C.7 p.61, multi-collinearity tests are available.

[11] When a same set of explanatory variables is used, SUREG results are the same as fitting the models separately.

3.2.1 Results

In this subsection, we show the main results of our analysis. In Tab. 3.2 outputs of OLS regression treating *Switching* as dependent variable are reported. The number of DSOs is found to have a negative impact on the switching rate in OLS (1) and OLS (2). Suspecting that this effect could be tied to the share of PODs covered by the national incumbent in each province, we add the continuous interaction term *DSOs∗E.dist_share*, which allows us to assess the average effect of one additional incumbent with respect to different levels of presence of the Enel Group. Once we control for the regional effects in OLS (4) (Tab. 3.2),[12] we observe that the interaction term coefficient is negative (-0.012) and statistically significant (p-value 0.042). The average negative effect of one additional incumbent seems to be exacerbated when the coverage by the national incumbent is higher.

Table 3.2. Switching OLS regression.

	OLS (1)	OLS (2)	OLS (3)	OLS (4)
VARIABLES	**Switching**	**Switching**	**Switching**	**Switching**
DSOs	-0.009***	-0.009***	-0.007**	0.003***
	(0.001)	(0.001)	(0.002)	(0.000)
Unemployment		-0.048	-0.069*	-0.001
		(0.039)	(0.035)	(0.052)
Schooling		-0.140	0.077	-0.092
		(0.226)	(0.178)	(0.195)
E.dist_share			0.306	0.127
			(0.184)	(0.092)
*DSOs*E.dist_share*			0.008	-0.012**
			(0.005)	(0.005)
Regional dummies				*YES*
Observations	107	107	107	107
R-squared	0.234	0.252	0.388	0.754
Robust standard errors in parentheses				
**** p<0.01, ** p<0.05, * p<0.1*				

Note:
Full output reported in Appendix C (Tab. C.3 p.58).
Interaction's marginal effects w.r.t. OLS (4) in Appendix C (Tab. C.1, p.57).

[12] In OLS (3), which does not include regional effects, the interaction term coefficient is close but above the significance level (p-value: 0.107).

Table 3.3. SUREG regression and correlation matrix of residuals.

	SUREG (1)	SUREG (2)
VARIABLES	**Switching**	**Free_market**
DSOs	0.003*	-0.029***
	(0.002)	(0.010)
E.dist_share	0.136**	-0.002***
	(0.067)	(0.001)
*DSOs*E.dist_share*	-0.011***	0.026**
	(0.004)	(0.011)
Unemployment	-0.009	
	(0.038)	
Schooling	-0.021	
	(0.132)	
Over65		-0.003**
		(0.001)
Net_income		2.301***
		(0.749)
Regional dummies		*YES*
Observations	107	107
R-squared	0.753	0.692
Standard errors in parentheses		
**** p<0.01, ** p<0.05, * p<0.1*		
Correlation matrix of residual		
Switching	1.0000	
Free_market	0.4536	1.0000
Breutsch-Pagan test of independence: chi2(1) = 22.012, Pr = 0.0000		

Note:
Full output reported in Appendix C (Tab. C.4 p.59).
Interaction's marginal effects in Tab. 3.4 & Tab. 3.5, p.36.

Indeed, the significant coefficient of the continuous variables' interaction term in OLS (4) (Tab. 3.2, p.33) suggests that the presence of the Enel Group determines the extent to which the numerousness of DSOs impacts on the switching rate. In order to verify whether this is the case, we decide to investigate how the number of local incumbents and the magnitude of the national incumbent in each province affect the other variable of interest, i.e. the rate of participation in the free market.

We expect the decision to switch provider and the participation in the free market to be determined by similar factors. In fact, even though, when joining the free market, the majority of consumers does not change supplier, but rather stay within the same corporate group – as we have shown in Fig. 2.3 (p.26); still, both switching and participating in the free market are forms of consumer engagement. In this sense, we believe that unobservable characteristics may affect both; in other words, *Switching*'s and *Free_market*'s error terms may be correlated. For this reason, we estimate both variables as dependent variables using a SUREG model,[13] which – by estimating parameters of the two equations simultaneously – exploits information of one equation to improve the other and vice versa and produce higher efficiency gains the higher is the correlation among error terms of the two equations (Zellner, 1962; Baltagi et al., 1998).

Tab. 3.3 displays the results found. The interaction term captures the effects on *Switching* and *Free_market*. On the one hand, a higher presence of the national incumbent is associated with a reduction in the marginal effect of DSOs on *Switching*; on the other hand, the effect of one additional incumbent, whilst still producing a negative effect on the rate of participation in the free market, lessens as the presence of the national incumbent intensifies. Besides, according to the Breutsch-Pagan test of independence of residuals – shown at the bottom of Tab 3.3 –, the null hypothesis of independence of errors across the two equations can be rejected with a chi-squared statistic equal to 22.012 and a very low p-value, confirming the conjecture that error

[13] As a complement, we also provide the output of the OLS regression with regard to the variable *Free_market* as the dependent in Tab. C.5 p.60. In that case, interaction term's p-value is 0.107, thus close but beyond statistical significance.

Table 3.4. Marginal effects of # of DSOs on *Switching* in SUREG.

E.dist_share	DSOs dy/dx	Std. Err.	t	P>t	[95% Conf.	Interval]
0	0.003035	0.001799	1.69	0.092	-0.00049	0.006561
0.5	-0.00259	0.001712	-1.52	0.13	-0.00595	0.000761
0.6	-0.00372	0.001913	-1.94	0.052	-0.00747	0.000030
0.7	-0.00485	0.002157	-2.25	0.025	-0.00907	-0.00062
0.8	-0.00597	0.002431	-2.46	0.014	-0.01074	-0.00121
0.9	-0.0071	0.002726	-2.6	0.009	-0.01244	-0.00175
0.95	-0.00766	0.002879	-2.66	0.008	-0.0133	-0.00202

Note:
Body-text regression reported in Tab. 3.3, p.34.
Full output reported in Appendix C (Tab. C.4 p.59).

Table 3.5. Marginal effects of # of DSOs on *Free_Market* in SUREG.

E.dist_share	DSOs dy/dx	Std. Err.	t	P>t	[95% Conf.	Interval]
0	-0.02894	0.009871	-2.93	0.003	-0.04829	-0.0096
0.5	-0.01607	0.004518	-3.56	0.000	-0.02493	-0.00722
0.6	-0.0135	0.003575	-3.78	0.000	-0.02051	-0.00649
0.7	-0.01092	0.002781	-3.93	0.000	-0.01638	-0.00547
0.8	-0.00835	0.002297	-3.64	0.000	-0.01285	-0.00385
0.9	-0.00578	0.002326	-2.48	0.013	-0.01034	-0.00122
0.95	-0.00449	0.002539	-1.77	0.077	-0.00947	0.000486

Note:
Body-text regression reported in Tab. 3.3, p.34.
Full output reported in Appendix C (Tab. C.4 p.59).

terms in the two equations correlate and thus validating the implementation of a SUREG model. More detailed insights with regard to the interaction term can be found in Tab. 3.4 & Tab. 3.5 (p.36). Therein, we report the average marginal effects of the number of DSOs on the dependent variables for those we consider to be pertinent[14] levels of *E.dist_share*. Note that in the absence of the national incumbent, one additional competitor may even increase switching rates; instead, as the national incumbent's share increases, the effect becomes more and more negative.[15] By comparison, as concerns the participation in the free market, a higher number of DSOs is generally associated with lower rates, but such an effect is tempered when the presence of Enel Group increases.

The discrepancy in the marginal effect generated by the numerousness of incumbents may be due to the fact that, when sharing the provision of SMT and distribution services with the biggest incumbent, local firms are more likely to retain consumers within the SMT, which would explain the lower free market participation rate associated with lower presence of the Enel Group. Accordingly, the higher the presence of the national incumbent, the more conservative the strategy adopted by small local incumbents. Retaining consumers within the SMT would indeed ensure local incumbents moderate, but 'safer' earnings. Alternatively, the Enel Group, by exploiting economies of scale and its historical brand, may be more capable of leading consumers to the free market branch.

On the other hand, these very same consumers, once moved to the free market, may have no incentive to further switch to other providers, which would explain the pejorative effect that a larger coverage by Enel has on the inherently inhibited

[14]The selection is based both on the frequency of data distribution and on statistical significance.

[15]While, in general, provinces with the highest number of DSOs, such as Bolzano, Aosta and Trento have low switching rates and provinces with only one incumbent, such as Pescara, Isernia, Biella have higher switching rates, the above-mentioned relation is particularly evident with regard to provinces located in the same region and exhibiting different switching rates. For instance, Vercelli, Verona, Brescia, Trieste, Frosinone, Salerno and Agrigento exhibit higher switching rates than Verbano-Cusio-Ossola, Vicenza, Monza-Brianza, Udine, Rieti, Avellino and Enna respectively. Despite sharing the same number of DSOs, the latter are in fact more largely covered by the Enel Group than the former.

competitive dynamics. In this sense, results seem to evidence the presence of a 'lock-in' effect in the free market. In other words, consumers tend to stick to the national incumbent, as it can be inferred by the high percentage of consumers that, exiting the SMT, subscribe a contract in the free market with the supplier of the same corporate group (Fig. 2.3, p.26). This phenomenon, in turn, generates high market concentration with regard to the shares held by suppliers operating in the free market (Fig. 2.1a, p. 23 and Tab. B.1, p. 54).

3.2.2 Limits and Shortcomings

It must be noted that our analysis presents several limits, which we illustrate hereinafter.

- Although data employed were the only publicly available about the topic, the province-level switching rates published in 2020 provide us only 107 observations, which may be not sufficiently fit to validate the results. A time-series of the switching rates by province would be useful to better validate the relationship existing between variables. Moreover, the implementation of a panel-data analysis would allow us to grasp the time dimension of the phenomenon.
- Additional variables, which we believe to be pertinent in explaining the propensity to switch energy providers, may be integrated into the analysis. For instance, in view of the number of offers made available by suppliers on their websites only and the presence of on-line tools that facilitate the comparison between offers,[16] a measure of internet penetration could be taken into consideration.[17] Furthermore, in the literature, house ownership is also found to have an impact on consumer engagement in the energy markets. House owners are generally more prone to actively search for alternatives. Thus, it could represent an additional explanatory factor to be included in our analysis.

[16] E.g.: *Portale Offerte*, made available by ARERA, includes offers of all major firms and computes estimated yearly spending, ranking offers from the cheapest to the most expensive.

[17] Admittedly, the variable *Over65*, which represents the percentage of inhabitants above 65 years and is found to have a negative effect on the participation in the free market, may somehow capture also the low propensity to use the internet.

- The comparison between the two dependent variables involves a 'flow' variable, *Switching*, and a 'stock' variable, *Free_market*. On the one hand, this gave us the opportunity to assess the effect of incumbency on correlated, but different phenomena. As previously mentioned, switching rates count every change of provider, including transitions from one free market provider to another, but net of SMT exits towards firms of the same group; while the free market rate merely counts the number of PODs in the free market over the total, thus giving a stock dimension of the transitions from the regulated to the competitive regime occurred since 2007 and, unlike switching, also including exits from the SMT towards free market firms of the same group. On the other hand, if the same format was available for both variables, results would be more homogeneously comparable.
- Besides, the increase in switching shown in Fig. 2.2 (p.25), determined to some degree by the expected end of the SMT, makes year 2019 atypical (ACER, 2020). Nonetheless, it should be mentioned that the removal of the regulated prices has been delayed several times prior to 2019. The existence of previous occurrences may have led both energy companies and residential consumers to perceive the end of regulated prices as an unreliable announcement. For this reason, they may have expected a further delay and acted accordingly. In other words, the push towards the free market generated by the announcement could have been attenuated by the previous non-fulfilments.
- This work does not take into consideration contractual renegotiations, which are generally considered as a measure of 'internal' switching. While it is true that contractual renegotiations do not affect the rate of participation in the free market, they do have an impact on 'external' switching. Favourable contractual renegotiations may indeed deter consumers to switch provider for better conditions. Internal switching is thus relevant for assessing consumer engagement, because it represents a form of interest in the free market dynamics exhibited by the consumer.

3.2.3 Policy implications

In our work, we found that incumbency affects switching rates. In particular, the presence of a national incumbent exacerbates consumer inertia. In such an environment, residential consumers tend to stick to the well-known brand of the incumbent and they are even willing to accept paying higher prices (incumbency premium). The incumbent, in turn, preserves an advantage over competitors. This suggests that policy-makers need to better enlighten consumers about the opportunities that can be exploited by switching providers.

In this sense, tools like *Portale Offerte*,[18] and the *expense comparability sheet*[19] represent valuable resources. *Portale Offerte* is an institutional website hosted by ARERA allowing consumers to easily compare different proposals. The *expense comparability sheet*[20] is a prospectus, compulsorily disclosed by electricity retailers, summarising the economic conditions for each of the available offers. It also features the comparison of the estimated annual expenditure[21] that the customer would incur by accepting the new proposal with respect to the expenditure generated by the SMT. By simplifying the comparison between competitive with regulated prices, the document represents a powerful tool to foster customers' consciousness with respect to the transition to the free market.

This kind of resources evidently permits to lower the costs associated with the time spent by consumers sifting through the various offers (i.e., search and learning costs). Enhancing the visibility of *Portale Offerte* and *expense comparibility sheet* would be helpful in enlarging their user base and consequently their beneficial effects.

One of the reasons consumers decide to stick to the incumbent is the perception of low economic benefits stemming from switching supplier. This perception may be ascribable to the fact that a large portion of energy bills is composed by fixed costs and

[18] Source: https://www.ilportaleofferte.it/portaleOfferte/.

[19] In italian: 'Scheda di confrontabilità della spesa'.

[20] The specific details regarding the structure of this document are established by Resolution №366/2018/R/com (ARERA).

[21] Estimates are based on standard consumption profiles identified by the Authority. More precisely, for each level of consumption, savings or higher expenditure in terms of euros and as a percentage with respect to the standard conditions of the SMT are specified.

taxes (Yang, 2014). As a result, energy operators are entrusted with less discretionary room than it may seem in determining the total amount of energy bills. On the consumers' perspective, the greater the portion of fixed costs, the lower the relative savings brought by lower tariffs.

Furthermore, some consumers may even fail to disentangle costs charged by the retailer from the remainder, resulting in biased expectations about the possible savings generated by cheaper prices. Actually, electricity bills compulsorily label and specify the various items of expenditure by type, also by means of explanatory graphs. However, a number of consumers, perhaps deceived by the pre-liberalisation experience of a vertical integrated single provider or simply affected by cognitive bias, may still fail to recognise that only few of the bill's entries they pay go to their electricity retail seller. Stressing the effective recipients of each item of expenditure may help consumers adjust their saving expectations with regard to the offers proposed by retailers. By so doing, the perception of the economic benefits deriving from switching could become more straightforward.

As we have discussed in the previous chapters, the high number of active free market providers – 593, as of April 2020 – exacerbates perceived switching costs for residential consumers, making the comparison among different proposals more demanding and time-consuming (Fontana et al., 2017). Besides, the majority of consumers concentrate in a few well-known big firms. Oppositely, the bulk of active free market operators holds a very small share. This type of firms might appear on consumers' perspective less reliable if compared to the most famous brands. However, being the electricity sector highly regulated and supervised, authorised suppliers are reportedly trustworthy enough to guarantee the maintenance of quality standards. Therefore, the regulatory authority could improve its intervention aimed at reassuring residential consumers about the quality of smaller competitors and their performances. More aware consumers would presumably manoeuvre the free market in a more confident manner.

Conclusions

As a whole, the liberalisation of the Italian electricity sector is on the right track. It must be noted, however, that residential consumers still exhibit scarce engagement, which translates into inadequate levels of participation in the free market and relatively low switching rates. On the one hand, the hybrid regime involving the coexistence of regulated prices with competitive ones is still helpful in protecting those who are not yet ready to navigate the free market. On the other hand, being the service at regulated prices vastly provided by one big firm, incumbency advantage arises. As a matter of fact, in presence of a well-known, formerly public, company, consumers may lack incentive to switch. After all, switching produces costs. When perceived economic benefits are low,[22] spending time for finding a trustworthy supplier among many may just not be worth the effort. Sticking to the incumbent undoubtedly requires less commitment.

In this work, we empirically analysed the influence that the market structure has on the Italian residential electricity sector competitive dynamics. We found that incumbency, in terms of provision of the SMT and distribution service, may concretely produce an effect on switching rates. In particular, the larger the presence of the national incumbent, the more inhibited are the competitive dynamics in terms of switching. Nevertheless, we also found that a larger coverage of SMT and distribution service under the national incumbent is associated with an attenuation of consumers' idleness as long as participation in the free market is concerned. This result is coherent with

[22] A significant portion of energy bills consists of taxes and transmission costs, which make harder the price comparison among different suppliers.

the evidence of consumers that, when joining the free market, change commercial counterparty but, in most of the cases, stay within the same corporate group. It also suggests that the national incumbent, thanks to the economies of scale, may essentially be better performing than smaller competitors in transferring its user base from the regulated branch to its own free market branch. However, once they join the free market with the incumbent, these very same consumers are less likely to further switch.

In view of these results, we believe that the largest operator effectively benefits an incumbency advantage, due to concomitant factors such as the wide provision of SMT, its well-known brand and consumers reluctance to subscribe contracts with smaller, little-known, firms. In addition to the already implemented tools allowing their users to easily browse through different commercial proposals, further quality controls and reassurance by the regulatory authority about licensed suppliers' reliability may be useful to instil trust in residential consumers, who, in turn, would more confidently navigate the free market.

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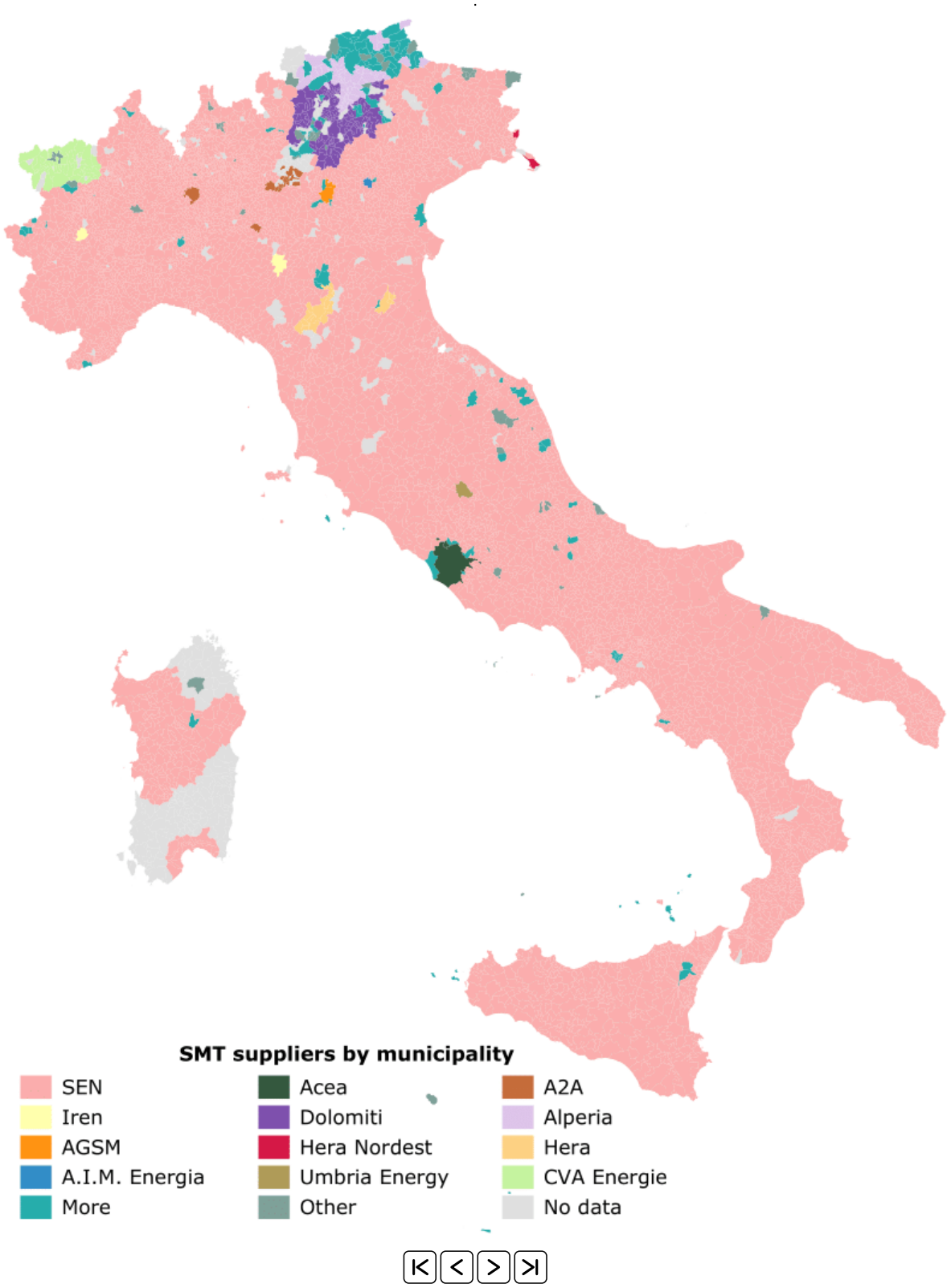
Appendix A

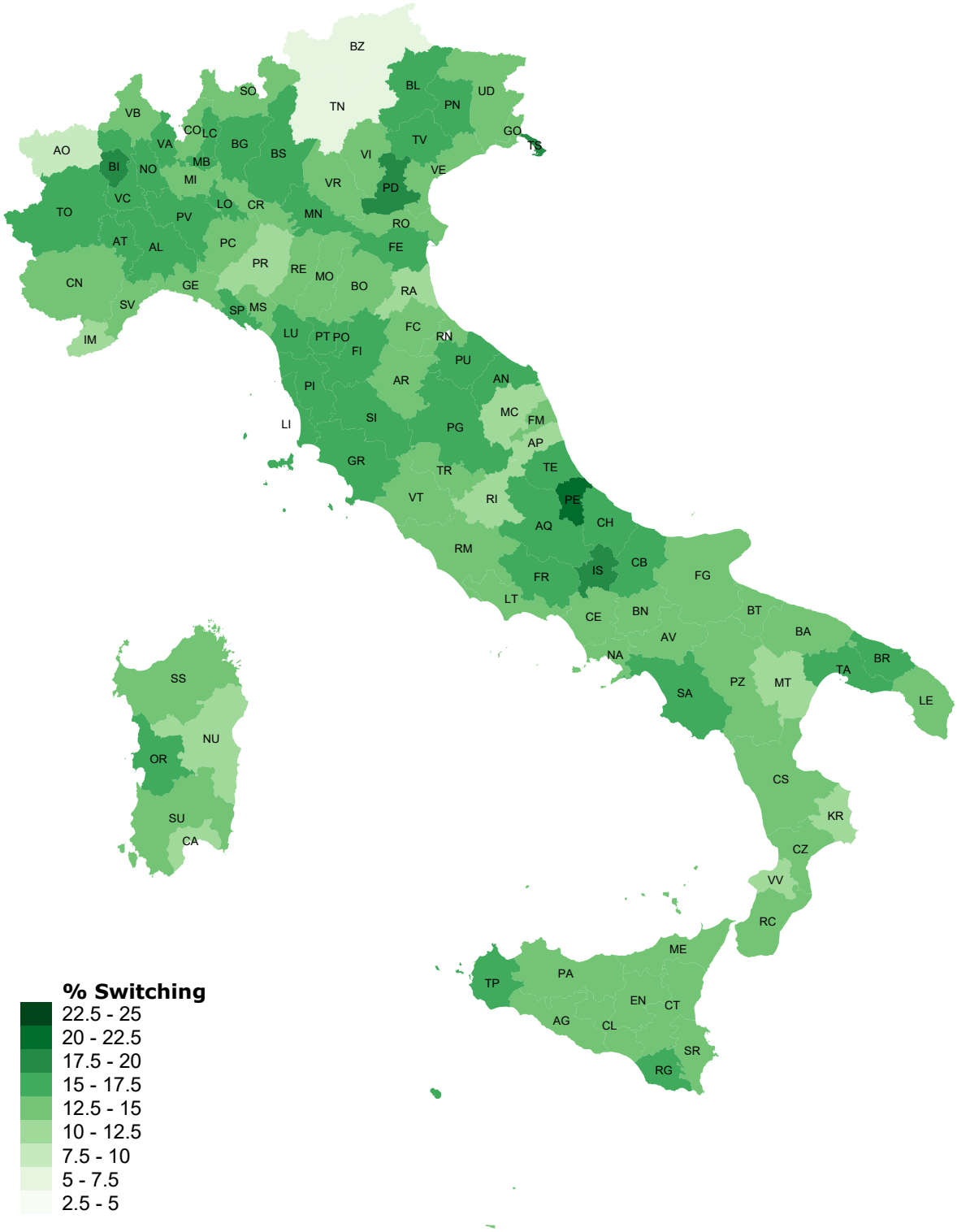
Figure A.1. Comparing SMT suppliers vs DSOs by municipality (**click** on the image to switch map). Same colour has been assigned to firms belonging to the same Corporate Group (vivid hue for SMT providers, pallid hue for DSOs). Legend order reflects coverage ranking (computed in terms of number of users served).



Source: Authors' elaboration from ARERA's registry using STATA 'spmap' command.

Appendix B

Figure B.1. Switching rate in 2019.



Source: Authors' elaboration from ARERA public databases using STATA 'spmap' command.

Table B.1. Market shares of the Top 10 corporate groups (in terms of amount of billed kWh).

Corporate Group	Type of Service	Residential	Low Voltage (Non-residential)	Medium Voltage (Non-Residential)
ENEL	SMT	47.2%	17.2%	N.A.
	Free Market	22.6%	20.8%	19.2%
	Safeguard	N.A.	0.5%	1.3%
	Total	69.8%	38.6%	20.4%
ENI	SMT	0.0%	0.0%	N.A.
	Free Market	5.9%	1.8%	4.7%
	Total	5.9%	1.8%	4.7%
ACEA	SMT	2.5%	1.4%	N.A.
	Free Market	0.9%	0.7%	1.3%
	Total	3.4%	2.0%	1.3%
A2A	SMT	1.6%	0.7%	N.A.
	Free Market	1.3%	2.5%	4.0%
	Total	3.0%	3.2%	4.0%
HERA	SMT	0.2%	0.1%	N.A.
	Free Market	2.2%	3.9%	5.1%
	Safeguard	N.A.	1.4%	1.5%
	Total	2.4%	5.4%	6.6%
IREN	SMT	0.5%	0.3%	N.A.
	Free Market	1.7%	2.8%	3.0%
	Total	2.3%	3.1%	3.0%
EDISON	Free Market	2.0%	2.6%	6.0%
	Total	2.0%	2.6%	6.0%
DOLOMITI ENERGIA	SMT	0.4%	0.1%	N.A.
	Free Market	0.7%	2.0%	1.5%
	Total	1.1%	2.1%	1.5%
E.ON	Free Market	0.6%	2.3%	3.4%
	Total	0.6%	2.3%	3.4%
ALPERIA	SMT	0.2%	0.2%	3.0%
	Free Market	0.3%	1.5%	N.A.
	Total	0.6%	1.7%	3.0%
Other Groups	SMT	1.40%	0.60%	0.00%
	Free Market	7.60%	36.30%	45.90%
	Safeguard	0.0%	0.0%	0.0%
	Total	9.10%	37.20%	46.00%

Source: 2018 Retail Market Monitoring Report (Autorità di Regolazione per Energia, Reti e Ambiente, 2019b).

Table B.2. SMT vs free market share & switching rate (2008-2019). SMT and free market values are expressed as thousand of active PODs. Switching rate is computed with respect to active PODs, net of transitions to suppliers belonging the same corporate group.

Year	SMT	Free Market	YoY growth	% Free Market	Δ Free Market %	Switching
2008	27 155	870	n.a.	3.10%	3.10%	1.12%
2009	26 458	1 829	110%	6.47%	3.36%	2.29%
2010	25 424	3 240	77%	11.30%	4.84%	4.13%
2011	24 016	4 826	49%	16.73%	5.43%	5.77%
2012	23 173	5 798	20%	20.01%	3.28%	6.40%
2013	22 204	7 105	23%	24.24%	4.23%	7.41%
2014	21 203	8 425	19%	28.44%	4.19%	8.05%
2015	20 313	9 401	12%	31.64%	3.20%	8.02%
2016	19 619	10 278	9%	34.38%	2.74%	8.68%
2017	18 083	11 449	11%	38.77%	4.39%	7.88%
2018	16 660	12 821	12%	43.49%	4.72%	9.07%
2019	14 969	14 590	14%	49.36%	5.87%	14.33%

Source: ARERA databases.

Appendix C

Table C.1. Marginal effects of # of DSOs on *Switching* in OLS (4). Body-text regression in Col.(4), Tab. 3.2 p.33.

E.dist_share	DSOs dy/dx	Std. Err.	t	P>t	[95% Conf.	Interval]
0	0.003047	0.000431	7.08	0	0.002146	0.003948
0.5	-0.0028	0.002556	-1.1	0.287	-0.00815	0.002549
0.6	-0.00397	0.003086	-1.29	0.214	-0.01043	0.00249
0.7	-0.00514	0.003618	-1.42	0.172	-0.01271	0.002434
0.8	-0.00631	0.004151	-1.52	0.145	-0.015	0.00238
0.9	-0.00748	0.004684	-1.6	0.127	-0.01728	0.002327
0.95	-0.00806	0.004951	-1.63	0.12	-0.01842	0.002301

Table C.2. Marginal effects of # of DSOs on *Free_Market* in OLS. Body-text regression in Tab. C.5 p.60.

E.dist_share	DSOs dy/dx	Std. Err.	t	P>t	[95% Conf.	Interval]
0	-0.03003	0.014617	-2.05	0.054	-0.06062	0.000568
0.5	-0.01688	0.007149	-2.36	0.029	-0.03185	-0.00192
0.6	-0.01425	0.005755	-2.48	0.023	-0.0263	-0.00221
0.7	-0.01163	0.004468	-2.6	0.018	-0.02098	-0.00227
0.8	-0.009	0.003412	-2.64	0.016	-0.01614	-0.00186
0.9	-0.00637	0.002858	-2.23	0.038	-0.01235	-0.00039
0.95	-0.00505	0.002871	-1.76	0.094	-0.01106	0.000956

Table C.3. Switching OLS regression (uncut version). Body-text regression in Tab. 3.2, p.33. Interaction's marginal effects in Tab. C.1, p.57.

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
VARIABLES	**Switching**	**Switching**	**Switching**	**Switching**
DSOs	-0.009***	-0.009***	-0.007**	0.003***
	(0.001)	(0.001)	(0.002)	(0.000)
Unemployment		-0.048	-0.069*	-0.001
		(0.039)	(0.035)	(0.052)
Schooling		-0.140	0.077	-0.092
		(0.226)	(0.178)	(0.195)
E.dist_share			0.306	0.127
			(0.184)	(0.092)
*DSOs*E.dist_share*			0.008	-0.012**
			(0.005)	(0.005)
Aosta Valley				-0.590***
				(0.092)
Lombardy				-0.034
				(0.022)
Trentino-South Tyrol				-0.974***
				(0.094)
Veneto				-0.067**
				(0.026)
Friuli-Venezia Giulia				0.039
				(0.031)
Liguria				-0.107***
				(0.023)
Emilia-Romagna				-0.166***
				(0.030)
Tuscany				-0.033*
				(0.018)
Umbria				-0.020
				(0.026)
Marche				-0.115***
				(0.026)
Lazio				-0.128***
				(0.025)
Abruzzo				0.114***
				(0.037)
Molise				0.182***
				(0.039)
Campania				-0.137***
				(0.042)
Apulia				-0.105**
				(0.045)
Basilicata				-0.264***
				(0.024)
Calabria				-0.272***
				(0.055)
Sicily				-0.116*
				(0.057)
Sardinia				-0.210***
				(0.050)
Constant	-1.893***	-2.118***	-2.322***	-2.000***
	(0.021)	(0.228)	(0.238)	(0.132)
Observations	107	107	107	107
R-squared	0.234	0.252	0.388	0.754
Robust standard errors in parentheses				
**** p<0.01, ** p<0.05, * p<0.1*				

Table C.4. SUREG regression (uncut version). Body-text regression in Tab. 3.3, p.34.

	SUREG (1)	SUREG (2)
VARIABLES	**Switching**	**Free_Market**
DSOs	0.003*	-0.029***
	(0.002)	(0.010)
E.dist_share	0.136**	-0.002***
	(0.067)	(0.001)
*DSOs*E.dist_share*	-0.011***	0.026**
	(0.004)	(0.011)
Unemployment	-0.009	
	(0.038)	
Schooling	-0.021	
	(0.132)	
Over65		-0.003**
		(0.001)
Net_income		2.301***
		(0.749)
Aosta Valley	-0.583***	0.003*
	(0.112)	(0.002)
Lombardy	-0.040	-0.035***
	(0.041)	(0.011)
Trentino-South Tyrol	-0.984***	-0.022***
	(0.130)	(0.007)
Veneto	-0.073	-0.032***
	(0.047)	(0.010)
Friuli-Venezia Giulia	0.028	-0.022***
	(0.058)	(0.007)
Liguria	-0.113**	-0.006***
	(0.056)	(0.002)
Emilia-Romagna	-0.175***	-0.030***
	(0.046)	(0.010)
Tuscany	-0.038	-0.020***
	(0.042)	(0.006)
Umbria	-0.028	-0.014***
	(0.073)	(0.005)
Marche	-0.122**	-0.016***
	(0.052)	(0.005)
Lazio	-0.133**	-0.011***
	(0.055)	(0.003)
Abruzzo	0.106*	0.024***
	(0.060)	(0.008)
Molise	0.177**	0.027***
	(0.074)	(0.009)
Campania	-0.134**	0.049***
	(0.060)	(0.017)
Apulia	-0.095*	0.025***
	(0.056)	(0.009)
Basilicata	-0.266***	0.042***
	(0.071)	(0.015)
Calabria	-0.267***	0.042***
	(0.065)	(0.015)
Sicily	-0.106*	0.070***
	(0.058)	(0.023)
Sardinia	-0.196***	0.022***
	(0.058)	(0.008)
Constant	-1.972***	-2.387***
	(0.153)	(0.774)
Observations	107	107
R-squared	0.753	0.692
Standard errors in parentheses		
**** p<0.01, ** p<0.05, * p<0.1*		

Table C.5. Free Market OLS regression. Interaction's marginal effects in Tab. C.2, p.57.

	OLS	OLS	OLS
VARIABLES	Free_Market **coef**	Free_Market **stderr**	Free_Market **pval**
Free_Market			
DSOs	-0.0300*	0.0146	0.0540
E.dist_share	-0.00214*	0.00112	0.0711
*DSOs*E.dist_share*	0.0263	0.0156	0.107
Over65	-0.00148	0.00148	0.329
Net_income	2.398**	1.105	0.0429
Aosta Valley	0.00296	0.00215	0.184
Lombardy	-0.0366**	0.0165	0.0385
Trentino-South Tyrol	-0.0230**	0.00933	0.0232
Veneto	-0.0336**	0.0147	0.0342
Friuli-Venezia Giulia	-0.0232**	0.0103	0.0356
Liguria	-0.00660**	0.00234	0.0108
Emilia-Romagna	-0.0316**	0.0145	0.0422
Tuscany	-0.0210**	0.00942	0.0379
Umbria	-0.0147*	0.00730	0.0576
Marche	-0.0168**	0.00715	0.0301
Lazio	-0.0110**	0.00432	0.0196
Abruzzo	0.0255**	0.0119	0.0464
Molise	0.0286*	0.0138	0.0526
Campania	0.0516*	0.0253	0.0557
Apulia	0.0265*	0.0134	0.0617
Basilicata	0.0440*	0.0214	0.0542
Calabria	0.0439*	0.0217	0.0574
Sicily	0.0729**	0.0345	0.0482
Sardinia	0.0232*	0.0125	0.0792
Constant	-2.485**	1.141	0.0422
Observations	107		
R-squared	0.694		

Table C.6. Heteroscedasticity test.

Type of test		**Switching**	**Free_market**
Breutsch-Pagan	F(24, 82) =	1.08	1.45
	Prob >F =	0.3858	0.1109
White	chi2(100) =	104.87	94.33
	Prob >chi2 =	0.3498	0.2291

Table C.7. Collinearity test.

Collinearity Diagnostics						
Variable	SQRTVIF	VIF	Tolerance	R-Squared	Eigenval	Condition Index
Switching	1.58	1.26	0.6326	0.3674	2.2824	1
DSOs	1.6	1.26	0.6249	0.3751	1.2111	1.3728
E.dist_share	1.97	1.4	0.5068	0.4932	0.6935	1.8141
Unemployment	1.28	1.13	0.7828	0.2172	0.4498	2.2527
Schooling	1.25	1.12	0.8002	0.1998	0.3633	2.5063
MEAN VIF	1.54			CONDITION #		2.5063

Variable	SQRTVIF	VIF	Tolerance	R-Squared	Eigenval	Condition Index
Free_market	1.35	1.16	0.7404	0.2596	1.9553	1
DSOs	1.46	1.21	0.684	0.316	1.4068	1.1789
E.dist_share	1.59	1.26	0.6289	0.3711	0.8017	1.5618
Over65	1.23	1.11	0.8129	0.1871	0.4272	2.1393
Net_income	1.62	1.27	0.6164	0.3836	0.409	2.1866
MEAN VIF	1.45			CONDITION #		2.1866