

Assessment of Competition in EU Liberalised Energy Markets in 2016

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SUMMARY

The liberalisation of gas and electricity markets had been achieved in almost all EU Member States by the end of the last century. It basically aimed at bringing competition into energy markets and benefiting from its favourable impacts. However, initial experiences showed that markets suffered from limited competition. The objective of this article is to give a brief assessment of the current market competition with special attention to two fundamental issues related to undistorted competition: unbundling of activities and developments in market concentration. The analysis shows that significant progress has been achieved in the unbundling of activities over the past few years. However, the market concentration in the retail segment in most Member States is still high (based on the HHI, C3, the number of undertakings with a market share over 5 percent, and the ARCI indicators).

Keywords: energy liberalisation, market concentration, network-based public utilities, demonopolisation, natural monopoly

Journal of Economic Literature (JEL) codes: Q40, Q48, Q49

DOI: <http://dx.doi.org/10.18096/TMP.2017.02.04>

INTRODUCTION

Gas and electricity markets have undergone significant changes over the last decades. We have witnessed the beginning of market liberalisation processes. By the late 2000s (earlier in some countries, later in others) energy markets in both sectors had been opened up to competition in almost all EU Member States. Liberalisation basically aimed at bringing competition into energy markets and thereby benefiting from its favourable impacts. However, the conducted analyses proved that structural reforms resulted in only limited competition according to the earlier experiences. The emergence of vertically integrated transnational market players encompassing cross-border or even cross-sectoral value chains of the whole sector led to significant impediments to the development of effective competition. Apart from high market concentrations, insufficient unbundling of network activities was another factor that restricted competition. Both implicit cross-financing opportunities and the hidden barriers to network access hindered the evolution of undistorted competition and enhanced the possibility to generate extra profit for energy market players already dominant in energy markets (Kádárné Horváth 2012).

THE AIM AND STRUCTURE OF THE STUDY AND THE METHODOLOGICAL BACKGROUND

This article aims at providing a brief assessment of the current competition with special attention to two fundamental issues related to undistorted competition: the unbundling of activities and the development of market concentration. The article consists of two major content parts.

The first part deals with issues related to unbundling of activities. To this end, the EU regulatory background related to unbundling is presented. In addition, the unbundling models applied in corporate practices in the EU member states are also introduced. Furthermore, the compliance of TSO and DSO systems with unbundling requirements is evaluated. The issues are presented within the framework of a secondary research study. This article provides a summary of the chapters of EU directives related to the topic, the main findings of the surveys conducted by CEER (2016a,b) and the data on certification procedures until February 2016 released by European Commission.

Table 1
Unbundling requirements in the EU legislation

Energy Package	Sector	Directive*	Unbundling transmission system operators	Unbundling distribution system operators
1 st energy package	electricity	96/92/EC	accounting	accounting
	natural gas	98/30/ EC	accounting	accounting
2 nd energy package	electricity	2003/54/ EC	legal, functional, decision-making	legal, functional, decision-making
	natural gas	2003/55/ EC	legal, functional, decision-making	legal, functional, decision-making
3 rd energy package	electricity	2009/72/ EC	ownership or ISO or ITO	legal, functional, decision-making
	natural gas	2009/73/ EC	ownership or ISO or ITO	legal, functional, decision-making

*The exact and complete name of the directive is indicated in the references

Source: the author's own construction based on the directives

The second major content part of the article evaluates market concentration on retail electricity and gas markets. Several indicators were used for the evaluation. Apart from the Herfindahl-Hirshmann index (HHI), the concentration rate (C3), the number of companies with over 5% of market share and the ACER Retail Competition Index (ARCI) were used for investigating the market concentration and competitive situation in the UE member states.

UNBUNDLING OF ACTIVITIES - REGULATORY BACKGROUND

For undistorted competition, network access – which was in a natural monopolistic state (transmission and distribution networks) – needed to become non-discriminatory and fairly priced for competitors. Thus, an appropriate regulatory environment had to be developed. The core legislative agenda included such items as fulfilling the obligation of granting network access, setting access charges by competent authorities and unbundling the activities of vertically integrated undertakings. The European Union created three legislative packages (directives) where the objectives and phases of energy liberalisation were formulated. These directives stipulated the requirements related to separation of production and supply activities from network operations.

Table 1 shows that in the first legislative package the unbundling rules stipulated the accounting unbundling in case of both transmission and distribution networks (96/92/ EC, 98/30/ EC Directives). The second energy package regulated a full legal, organisational and decision-making unbundling (legal and functional unbundling) of networks while keeping accounting unbundling requirements. However, these formulated requirements were insufficient because they failed to grant non-discriminatory network access and to promote network investments and allowed cross-financing. According to

Illés (2000) the problem that cross-financing faces is that 'An undertaking or an interpreter conducting activities outsourced to several undertakings has great interest in manipulating cost information and within this in considerably increasing costs that are related to fees for network use and in using various tricks to pass costs associated with activities performed in the private sector to others. The point is that the costs shifted to networks are financed by others, whereas the activities of actors – a part of whose costs have been passed on to others – become less expensive and, in this way, these actors gain an unfair competitive advantage over other actors.' (Illés 2000, pp. 33-34, my translation). Thus, the conditions for the evolution of non-distorted competition were not created.

In order to safeguard fair competition, the European Union then called for ownership unbundling at transmission level, which means that network owners either in their own capacity or through their interests shall not exercise any other activities in the energy market. Literally speaking, they must operate independently from all market players. This requirement gave rise to heated debates because of the underlying extensive ownership concentration. As a result of these debates, these requirements were fine-tuned and the third energy package provided three theoretical models for unbundling (2009/72/EC and 2009/73/EC directives) depending on the preferences of individual EU countries. The three models (based on Directives 2009/72/EC and 2009/73/EC, Hungarian Energy Office (MEH) 2011, Vince in Valentiny et al. 2011) are as follows:

- ownership unbundling: the system operator is at the same time the network owner without any generation, supply or commercial interests in the energy sector;
- Independent System Operator (ISO): a system operator without any generation, supply or commercial interests is only a network operator, not its owner. The grid owner is a vertically integrated undertaking operating in the energy market.

- Independent Transmission Operator (ITO): a member of a vertically integrated group of undertakings that operates in the energy market. This group of undertakings is the network owner.

In order to secure undistorted competition, both the appointment of system operator and the operation of the system are regulated in detail and strictly verified. After transmission operators have been certified by national regulatory authorities, they are approved and designated as transmission system operators by Member States. The designation of transmission system operators must be notified to the Commission and published in the Official Journal of the European Union. Transmission system operators notify to the regulatory authority any planned transaction that may require a reassessment of their compliance with the requirements. The regulatory authorities, on the other hand, monitor the continuing compliance of transmission system operators with the requirements. Transmission system operators have to comply with organizational and conflicts of interest rules as well as accounting and information unbundling rules. In the case of ISO and ITO models, vertically integrated undertakings can maintain their ownership of network assets while ensuring effective separation of interests on condition that independent system or transmission operators perform all the activities related to system operation (pursuant to Article 16 of Directive 2009/72/EC). As regards these models, compliance with further provisions is required. The strictest provisions are related to the ITO model (including communication, brand-building and information systems, requesting consultancy services, independent accounting, human resources and management). Rules are addressed in detail in 2009/72/EC and 2009/73/EC directives.

Member States are given the choice provided the undertaking owning a transmission system was part of a vertically integrated undertaking on 3 September 2009, on the date when this directive came into force. Systems set up or owned after that date must comply with ownership unbundling provisions. Member States can opt for full ownership unbundling. In this case an undertaking has no right to set up an independent system operator or an independent transmission operator. Mention should be made that the ITO+ model is applicable in special cases. The directives stipulate the derogations and exemptions from relevant provisions such as isolated markets,

emerging markets, etc. (See 2009/72/EC and 2009/73/EC directives).

Apart from transmission networks, mention should be made of Distribution System Operators (DSO), which play an essential role in the energy sector and act as an interface with retail markets. Legal and functioning unbundling of distribution system operators was required, pursuant to Directives 2003/54/EC and 2003/55/EC, from 1 July 2007. The third energy package did not stipulate ownership unbundling, so legal, organizational and decision-making unbundling requirements (legal and functional unbundling) remained. Accounting unbundling is an essential requirement and must comply with numerous conflicts of interest and other rules in order to secure undistorted competition. However, this article does not aim at addressing these rules. Member States may have decided not to apply unbundling requirements to integrated electricity undertakings serving less than 100,000 connected customers, or serving small isolated systems. Member States had to comply with unbundling requirements stipulated in the third energy package by 3 March 2011.

UNBUNDLING MODELS IN THE EU MEMBER STATES IN 2016

The Council of European Energy Regulators (CEER) evaluated the compliance of both transmission system operators (TSO) and distribution system operators (DSO) with unbundling requirements in the European Union in 2016 based on the February data (CEER 2016a and CEER 2016b). The data were obtained via a survey of national energy regulatory authorities of 26 EU countries (excepting Bulgaria and Ireland).

Compliance of Transmission System Operators (TSOs) with Unbundling Requirements

European Commission data (European Commission 2016) show that 109 certification procedures (51 in the electricity sector and 58 in the gas sector) were conducted in the EU until February 2016. As a result, transmission system operators (TSO) complied with unbundling requirements stipulated in the third energy package.

Table 2
Unbundling model of transmission system operators in the EU in 2016

	Electricity					Natural gas				
	Number of TSO-s	Ownership unbundling	ITO	ISO	Others	Number of TSO-s	Ownership unbundling	ITO	ISO	Others
Austria	3	1	1	1	0	6	0	4	1	1
Belgium	1	1	0	0	0	2	2	0	0	0
Bulgaria	No data					1	0	1	0	0
Cyprus	Derogation					Derogation: isolated market, emerging market				
Check Republic	1	1	0	0	0	1	0	1	0	0
Denmark	1	1	0	0	0	1	1	0	0	0
United Kingdom	21	17	0	0	4	5	4	0	0	1
Estonia	1	1	0	0	0	Derogation (temporary) : isolated market				
Finland	1	1	0	0	0	Derogation (temporary) : isolated market				
France	1	0	1	0	0	3	1	2	0	0
Greece	1	0	1	0	0	1	0	1	0	0
the Netherlands	1	1	0	0	0	2	1	0	0	1
Croatia	No data					No data				
Ireland	1	0	0	0	1	1	0	1	0	0
Poland	2	1	0	0	1	3	1	0	2	0
Latvia	1	0	0	1	0	Derogation (temporary) : isolated market				
Lithuania	1	1	0	0	0	1	1	0	0	0
Luxemburg	Derogation					Derogation				
Hungary	1	0	1	0	0	2	1	1	0	0
Malta	Derogation					Derogation				
Germany	6	3	2	0	1	15	4	11	0	0
Italy	1	1	0	0	0	4	2	2	0	0
Portugal	1	1	0	0	0	1	1	0	0	0
Romania	1	0	0	1	0	1	0	0	1	0
Spain	1	1	0	0	0	5	3	0	2	0
Sweden	1	1	0	0	0	1	1	0	0	0
Slovakia	1	1	0	0	0	1	0	1	0	0
Slovenia	1	1	0	0	0	1	0	1	0	0
Total	51	35	6	3	7	58	23	26	6	3
Proportion (%)	100	68.6	11.8	5.9	13.7	100	39.7	44.8	10.3	5.2

Source: the author's own construction based on the certificates issued on 14 February (European Commission 2016 cited in CEER 2016a)

<https://ec.europa.eu/energy/sites/ener/files/documents/Received%20notifications%20corr.xlsx>

Table 2 clearly illustrates that in the electricity sector 68.6% of certified transmission system operators referred to full ownership unbundling (In 2009 this ratio amounted only to 40.5% according to EC data 2011, pp. 36-39). About 11.8% of transmission systems were certified under the Independent Transmission Operator (ITO) model, 5.9% were granted certifications under the Independent System Operator (ISO) model and 13.7% were certified under other models. As for the natural gas sector, full

ownership unbundling was implemented in about 39.7% of certified transmission system operators (in 2009 this ratio amounted to only 16.9% according to EC data 2011, pp. 36-39). About 44.8% of transmission systems were certified under the Independent Transmission Operator (ITO) model, 10.3% were granted certifications under the Independent System Operator (ISO) model and 5.2% were certified under other models.

Table 3
Ownership structure of transmission systems

	Electricity	Natural gas
100% public ownership	Croatia, Cyprus, Czech Republic, Denmark, Estonia, Greece, Hungary, Latvia, Poland, Slovakia, Slovenia, Sweden, the Netherlands	Croatia, Denmark, Hungary, Poland, Slovenia
> 51% public ownership	Austria, Finland, France, Lithuania, Romania	Belgium, Estonia, Finland, Greece, Italy, Lithuania, Slovakia
> 51% private ownership	Belgium, Italy, Luxembourg, Spain	Austria, France, Luxembourg, Spain, Sweden
100% private ownership	United Kingdom, Portugal	Czech Republic, United Kingdom, Portugal, Latvia

* In Germany there are undertakings with mixed public and private ownership in both sectors. No information is available about other member states.

Source: the author's own construction based on CEER (2016a)

Table 3 clearly shows that the TSO public ownership is stronger in the electricity sector than in the gas sector. In more than half of the Member States the TSO ownership structure is public and amounts to 100%. Only two Member States have a full private ownership structure for their TSOs and in other Member States there is mixed public and private ownership for electricity TSOs. Only in four EU countries do gas TSOs have a public ownership of 100%. In other countries most of the TSO ownership structure is private. According to CEER 2016a, the ownership structure of the TSO has changed in two thirds of the Member States since the third energy package entered into force.

The CEER 2016a study investigated monitoring tools used by National Regulatory Authorities (NRAs) to ensure compliance of TSOs with unbundling requirements and monitored issues and measures taken by NRAs in cases where non-compliance with unbundling rules were experienced. The study found that the three unbundling models proposed in the Third Energy Package (including the 'most relaxed' ITO model) and the related unbundling requirements are sufficient to ensure effective unbundling of network operation from production and supply activities.

Compliance with Unbundling Requirements of Distribution System Operators (DSOs)

The basic functional model of distribution system operators is similar in all Member States. However, the number of distribution system operators, their size, technical parameters and the profile of their activities differ greatly in these Member States. In 2015 there were 714 distribution system operators in the German gas market, out of which 689 supplied less than 100,000 connected customers. As many as 803 out of 880 German electricity DSOs serviced less than 100,000 connected customers. In several countries the number of DSOs was

below 10. As for distribution systems, the Energy Package imposed the obligation of accounting unbundling as well as legal and functional unbundling requirements. Unbundling of accounts is mandatory for all distribution system operators. However, exemptions from legal and functional unbundling rules may be granted. For example, DSOs servicing less than 100,000 connected customers are entitled to exemptions. Member States transposed the rules into their national legislation in different ways. For example, in the Netherlands the implementation of full DSO ownership unbundling is required. In other countries all DSOs including those with less than 100,000 connected customers are obliged to implement legal and functional unbundling. More than half of the Member States grant small DSOs exemptions from unbundling rules. Several Member States have adjusted the threshold of 100,000 connected customers to their own circumstances. There are states where different requirements are imposed on gas and on electricity. In Malta and Cyprus only accounting unbundling is required due to their special situation (isolated and emerging market). In the majority of Member States distribution systems belong to vertically integrated undertakings.

The CEER 2016b study reported that, in general, the legal form chosen for distribution system operators guarantees a sufficient level of independence. Distribution system operators have sufficient financial resources at their disposal to ensure full independence and decision-making power. The study highlights some weaknesses in branding and communication policies, namely, that corporate identity is not fully separated from the integrated company group. The role of regulatory authorities in monitoring and control is an important factor in ensuring compliance programmes (CEER 2016b).

MARKET CONCENTRATION IN RETAIL MARKETS – METHODOLOGICAL BACKGROUND

One of the major barriers to creating a real competitive business environment is vertical integration encompassing the whole value chain of the sector, that is, the emergence of dominant market players. In this sub-chapter the degree of market concentration and the competition level in the retail market is investigated.

Several indicators were taken into consideration when the market concentration was measured. First, the values of the frequently used Herfindahl-Hirschman index (HHI) were analysed. The Herfindahl-Hirschman index (HHI) is calculated by adding the squares of the percentage market share of each market player. Its value ranges between 0 and 10,000. The higher the value of the indicator is, the more concentrated the market is. The index can be as high as 10,000 if there is only one market player in a monopoly position on the supplier side. When the index value is over 5,000, the market concentration is very high. Even a 1,800 index value is said to be high. This value can be considered to be a threshold, as market concentration above this value may lead to the possibility of abusing a dominant market position. A Herfindahl-Hirschman index value between 1,000 and 1,800 indicates a moderately concentrated market. If this index is below 1,000, the market is deconcentrated (Kovács, 2011).

In order to gain a more complete picture of market concentration, further indicators for assessing market competition are also worth considering. This assessment focuses on conventional market concentration indicators with an emphasis on three largest corporate market shares (C3 indicator) and on a number of undertakings with a market share over 5%. In addition, this study presents a compounded indicator produced to assess the relative level of competition (the ACER Retail Competition Index). Before analysing the data, mention should be made of ARCI methodology. For more details, see the description of the ARCI methodology and its values in detail in IPA (2015) and ACER/CEER (2016).

The ACER Retail Competition Index and its 9 sub-indicators assess the relative level of competition in retail energy markets at a national level in the household segment in EU Member States. This composite index consists of the following indicators (based on IPA 2015 and ACER/CEER 2016):

1. Market structure indicators: analyse market concentration ratio
 - a. market share of the three largest undertakings (C3) expressed as percentages (2015): these data are normalised into a range of 0 to 10. A score of 10 corresponds to 30% or below and indicates a competitive market. If the value ranges between 30% and 100%, the potential value of the normalised value decreases linearly to zero. A score

of 0 shows that the value of the C3 indicator is 100%.

- b. the number of undertakings with a market share over 5% (2015): This indicator is computed on a scale ranging from 0 to 10 (0 indicates monopoly of an undertaking, 10 means 10 or more suppliers)
 - c. difficulties of price comparison (2015): The price comparison is based on customer surveys. A ten-point scale is used for estimating the ease or difficulty of comparing service and product prices set by different retailers. (0 indicates the greatest ease, 10 means that comparing is difficult). Normalisation is not required. This component is subjective.
2. Market behaviour indicators:
 - a. average rate of customers switching suppliers (external) and switching tariffs activities (internal) (2011-2015): This indicator shows what percentage of customers have switched energy suppliers or switched to different tariffs with historically incumbent suppliers. Higher switching rates and activities indicate greater competition. However, lower rates do not necessarily mean limited competition. (The rates were converted to linearly increasing scores on a scale from 0 to 10. Zero indicates that the switching rate is 0%, 10 means that the switching rate is 20% or above. It is assumed that such a switching rate has no further impact on competition. (I think this indicator can be applied to characterise competition, with certain reservations, in Member States applying regulated prices.)
 - b. consumer inactivity: This indicator expresses the proportion of consumers who do not switch suppliers, but remain with an incumbent supplier (2015). These data are estimated based on the supplier's market share. Normalisation is a conversion to a scale ranging between 0 and 10. 10 indicates that 1/3 of the consumers switched to non-incumbent suppliers, while 0 shows that 100% of consumers remained with incumbent suppliers. (I think this indicator can be applied for characterising competition with certain reservations in Member States applying regulated prices.)
 - c. average net market entry (2013-2015): This indicator shows a change in the number of domestic suppliers, namely, market entries minus market exits. This indicator is problematic. (For example, the average net market entry is 0 if there are no market entries or market exits, or if the same number of undertakings have entered or exited the market). (Normalisation on a scale ranging between 0 and 10: 0 means that the net market entry is zero, 10 indicates that the net market entry is 5 or more. The normalised score between two values increases linearly.)
 - d. Number of offers per supplier (2015) (examined in the European capital cities): This indicator shows the number of offers divided by the number of

service providers. On a scale ranging between 0 and 10, 0 means one offer per supplier, 10 indicate five or more offers per supplier).

3. Competition performance indicators:
 - a. customer satisfaction indicator: This indicator measures how markets meet customer expectations (2015) in terms of service and product prices and quality offered by suppliers. This indicator is based on a consumer survey and is a very subjective element. Normalisation is not required. A scale of 0 to 10 is used for evaluation (0 – low, 10 – extremely high satisfaction).
 - b. average price margin: This indicator shows the difference between wholesale and retail prices. Average price margin = (retail price - wholesale price)/retail price. In the case of retail prices, average retail prices are used as the basis for calculations. In the case of wholesale prices, the energy component of the retail price is considered. It should be noted that a low average price margin may result from regulated end-user prices and not necessarily from market competition. This fact is taken into consideration when the data are normalised. Normalisation uses the proportion of consumers on non-regulated prices. (Based on IPA (2015) and ACER/CEER (2016))

Certain indicators were normalised and computed on a scale from 0 to 10. Then each indicator was assigned equal weight and a single weighted composite index was produced. The ARCI value ranges on a scale from 0 to 10. A zero score indicates that the level of competition is low. The higher the score is, the stronger the competition

experienced in the market. The index has all the general critical features of composite indices, which should be taken into account in the evaluation of the obtained results. ARCI indicates that the competition level in the energy retail market in Member States varies. Energy markets can be ranked based on this index. By examining each component of the nine sub-indicators, it becomes evident which areas need to be improved in individual Member States. To this end, the present assessment does not intend to present further details related to this issue (see IPA (2015) and ACER/CEER (2016)).

EVALUATION OF THE MARKET CONCENTRATION IN ENERGY RETAIL MARKETS

HHI clearly shows that (See: Table 4) there is market deconcentration in both sectors only in Germany. There is moderate market concentration in several Member States. In the majority of Member States the HHI in retail is high or very high in both sectors.

Table 5 presents the ARCI, ranking based on ARCI, reliability of data for ARCI, the market share of the three largest suppliers (C3) and the number of undertakings with a market share over 5% in the electricity and gas sectors in the EU Member States in 2015. Since Malta and Cyprus do not have retail gas markets and in Finland and Sweden the gas retail market is small, the data on this market are incomplete.

Table 4
HHI value in electricity and gas retail markets based on the data of 2012

2012*	Electricity	Gas
Very high market concentration (HHI>5000)	Cyprus (10000), Estonia, Greece, Latvia, Luxembourg, Malta (10000), Portugal	Estonia, Latvia (10000), Lithuania, Luxembourg, Poland
High market concentration (HHI 1800-5000)	Belgium, Croatia, France, Ireland, Italy, Lithuania, Poland, Spain, Netherlands	Austria, Belgium, Denmark, France, Ireland, Portugal, Slovenia, Spain, Netherlands, United Kingdom
Moderate market concentration (HHI 1000-1800)	Austria, Hungary, Romania, Slovenia, United Kingdom	Croatia, Czech Republic, Hungary, Italy
Market deconcentration (HHI<1000)	Germany	Germany

* In case of missing Member States data were not available.

Source: the author's own construction based on European Commission (2014)

Table 5
Indicators measuring market competition in the electricity and gas sectors
in the EU Member States in 2015

Country	Electricity					Natural gas				
	ARCI	Ranking based on ARCI	Reliability of data for ARCI	C3	Number of undertakings with a market share over 5%	ARCI	Ranking based on ARCI	Reliability of data for ARCI	C3	Number of undertakings with a market share over 5%
Austria	6	7	High	60	5	4.5	11	Moderate	> 70	3
Belgium	5.7	8	High	>70	5	6.8	1	High	>70	5
Bulgaria	2.2	27	Moderate	100	3	2.1	22	High	100	2
Cyprus	2.4	26	Moderate	100	1	-	-	-	-	-
Czech Republic	6.1	4	High	>70	5	5.5	5	High	>70	5
Denmark	5.6	9	Moderate	>40	6	3.5	13	High	>90	3
United Kingdom	6.8	3	High	>50	6	6	2	Moderate	>60	6
Estonia	5.3	11	High	>80	2	4.1	12	Moderate	>90	1
Finland	7.7	1	Moderate	40	4	-	-	-	>90	1
France	3.3	20	High	>90	2	3.5	14	High	>90	2
Greece	2	28	High	100	1	2	24	High	100	1
the Netherlands	6.1	5	High	>70	3	5.8	4	High	>70	3
Croatia	2.5	25	High	>90	1	2.5	19	High	>60	3
Ireland	5.1	13	High	90	4	5.1	9	High	>80	5
Poland	5.1	14	High	>70	5	2.2	20	High	100	1
Latvia	4	18	High	>90	1	2	23	High	100	1
Lithuania	2.9	24	High	100	1	2.1	21	High	100	1
Luxembourg	4	19	High	>90	2	3.1	16	High	100	2
Hungary	3.1	21	High	>70	2	3	17	High	100	4
Malta	3.1	22	Low	100	1	-	-	-	-	-
Germany	6.1	6	High	40	4	6	3	High	>20	3
Italy	5.2	12	High	>80	1	5.3	6	High	>50	4
Portugal	5.5	10	High	>90	2	5.2	7	High	100	3
Romania	4.2	17	High	>80	4	2.8	18	High	>90	2
Spain	4.5	16	High	90	3	5.2	8	High	>80	4
Sweden	7.2	2	Moderate	>40	4	-	-	-	>80	4
Slovakia	3.1	23	High	>80	3	3.2	15	High	>90	3
Slovenia	5	15	High	>60	7	5	10	High	>60	5

Source: the author's own construction based on IPA 2015 és ACER/CEER 2016

Conventional market concentration indices show that retail markets are still relatively highly concentrated. The market share of the three largest suppliers (C3) in the majority of EU Member States amounts to about 70-100% in both sectors. The grey areas in Table 5 show values below 70%. The number of undertakings with a market share over 5% is also small in almost all Member States.

According to the ARCI created to compare relative levels of competition in energy retail markets, the competition in the electricity market is the highest in Finland, Sweden, the United Kingdom, the Czech Republic and the Netherlands. In the gas retail market the competition is the most advanced in Belgium, the United Kingdom, Germany, the Netherlands and the Czech Republic. The level of competition in the electricity market is the lowest in Greece, Bulgaria, Cyprus, Croatia and Latvia. As for the gas market, it is the weakest in Greece, Lithuania, Bulgaria, Latvia and Poland.

CONCLUSION

The findings of the present assessment show that a significant improvement has been made in the unbundling of activities over the past few years. Full ownership unbundling has been implemented in a large proportion of transmission systems. However, this proportion varies in the gas and electric sectors. As for the other two models, ISO and ITO, the introduced stringent regulations and the tight control exercised by authorities create conditions for the evolution of undistorted competition. The studies referred to show that legal and functional unbundling stipulated for distribution system operators and supplemented by strict regulation regimes is considered to be appropriate.

A significant scope for improvement remains in market concentration. As for the retail energy markets, the market concentration indices still show a high level of concentration both in the electricity and gas markets, despite the fact that the market competition increased in 2015 compared to the initial period (beginning from years 2007-2008).

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