UNDERSTANDING REGIONALISM THROUGH ELECTRICITY REGULATORS’ COMPETENCIES: A SURVEY ANALYSIS ON REGULATORS FROM THE EU AND THE NEIGHBOURHOOD

Abstract
In the political science literature assessing regulatory authorities in the EU, the topic of independence has taken the lion’s share of scholars’ attention. Scant, if any, investigation has been done of the competencies regulators have in the sectors they regulate. This paper opens the door onto the topic of the extent of regulatory competence in one regulated sector: electricity. It does so by analysing a dataset resulting from energy regulators’ replies to a section of a comprehensive survey carried out in 2011, which investigated their competencies in the electricity sector. The Third Package, in fact, clearly states that regulatory authorities must be endowed with both independence and sufficient competencies to regulate the electricity sector, yet the latter topic is completely missing from scholarly literature. Exploratory Data Analysis on regulators’ replies to the survey provides interesting insights into similarities/differences among them, as far as the extent of their reach into the electricity sector is concerned. The sample of regulators examined includes not only the population of national regulatory authorities of the EU but also a sample of regulators from the so-called EU Neighbourhood.

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Introduction & Motivations

In the political science literature assessing national regulatory authorities in EU Member States, the topic of independence has taken the lion’s share of scholars’ attention. Independence has been investigated, in particular, by analysing how regulators enter and exit the regulatory authority board, i.e. the twinned themes of appointment and of the so-called “revolving door”.

Scant, if any, investigation has been done of the competencies regulators have in the sectors they regulate. Competencies of regulators involve both their ex-ante decision-making powers and their ex-post enforcement powers, besides monitoring activity and, where this applies, dispute settlement duties. Regulators are endowed with competencies by the same act of law that establishes the regulatory authority. The range of competencies of regulators could grow with time, in particular if markets expand and where it is realized that regulatory competence is required in a broader set of issues that originally envisaged, for reasons of policy and/or economic development.

In the case of regulatory authorities in the EU energy market, a series of Directives, the last of which released in 2009, have gradually expanded not only the scope of market opening, both upstream and downstream, in the electricity and gas sectors, but also the range of competencies energy regulatory authorities should be endowed with in order to ensure market parties’ compliance with the overall objectives set out in the Directives.

This paper opens a door onto the topic of the extent of regulatory competence in one regulated sector (electricity) for one specific aspect of it (transmission, i.e. the high voltage grid). It does so by analysing a dataset resulting from energy regulators’ responses to a survey carried out in 2011, which investigated their competencies in the electricity sector. The analysis is descriptive and includes not only the quasi totality of the population of national regulatory authorities of the EU but also a sample of regulators from the so-called EU Neighbourhood. The survey was submitted in 2011 to regulatory authorities regulating electricity markets from all over the world, by the IERN (International Energy Regulation Network - now subsumed under the ICER (International Confederation of Energy Regulators)). The electricity survey contains five sections, one of the each of the four segments of the electricity market (generation/production, transmission, distribution and retail), plus a fifth section on regulators’ competence in four additional subfields that, while being outside the realm of infrastructure regulation strictly intended, have nonetheless become the realm of energy regulation in the past few years. These are consumer protection, renewable energy sources, security of supply, energy efficiency.

The IERN/ICER website lists 319 energy Regulatory Authorities (RAs). At a closer look, it emerges that, of these, 180 are state-level RAs (i.e. those energy Regulatory Authorities that exist in each state of a federation of states, for example, the various US Public Utilities Commissions); 8 are Federal Regulatory Authorities (these are Regulatory Authorities established at federal level, such as the ones of the USA, Canada, Australia, Russia, India, Brazil), and the remaining 130 are NRAs (i.e. those that exist within a state which is not part of a federation of states, therefore, any regulator created by an autonomous state (e.g. Italy, Norway, Algeria, etc).

The sample of regulators that replied to the electricity survey in 2011 consists of:

- 82 energy RAs, of which:
  - 53 are National Regulatory Authorities (40% of the total population of NRAs)
• 5 are Federal Regulatory Authorities (Canada, Russia, USA, Australia, India – 62.5% of the total population of FRAs)

• 24 are state level regulatory Authorities (5 from Canada, 15 from the USA, 4 from Australia – 13% of the total population of state-level RAs)

However, this contribution will focus on a subset of respondents only, namely National Regulatory Authorities; in particular, on those that are members of CEER (Council of European Energy Regulators) and/or of MEDREG (Association of Mediterranean Energy Regulators), for a total of 32 NRAs.

Established in the year 2000, the CEER is a voluntary regional association of energy regulators from EU Member States plus Norway and Iceland (members of the European Economic Area). Recently, regulators from FYROM, Montenegro and Switzerland have become CEER observers. While these regulators were not CEER observers at the time of the survey, it is reasonable to assume that talks were already going on about these authorities gradually joining the CEER, given that, in the case of FYROM and Montenegro, they are members of the Energy Community1; in the case of Switzerland, the geographical position of the country makes it an important actor for the EU internal energy market. Croatia has also been included into the CEER members, although it was not at the time of the survey, for the same reasons FYROM, Montenegro and Switzerland have. Moreover, the electricity regulatory authority of Croatia is also a member of MEDREG.

Established in 2007, MEDREG is the association of Mediterranean energy regulators, where Mediterranean indicates that member regulatory authorities should be from countries facing the Mediterranean Sea. It thus comprises a selection of regulators from EU Member States, several regulators from Balkan countries that are members of the Energy Community, several regulators (or ministerial departments) from North Africa (the only respondent in the sample is the regulator of Algeria), and Turkey, which is another crucial partner in the EU energy policy. MEDREG was created at the initiative of several EU energy regulators (Italy, France and Spain in particular) and funded through the European Neighbourhood and Partnership Instrument (the funding branch of the EU funds for the Neighbourhood). Its main goal is to achieve a Mediterranean energy community2 that includes Northern African, besides Eastern European, countries; MEDREG represents the attempt to harmonize the energy regulatory frameworks of member countries (with that of the EU) enough to make the creation of a wide energy market possible.

Respondents from the CEER are 25 in total. Hence, they dominate the sample. The survey itself has been evidently constructed on the basis of EU legislation regarding regulatory practice in energy markets and, specifically, the type of responsibilities EU regulators are expected to be endowed with according to Article 36 and Article 37 of the Directive 2009/72/EC of the Third Energy Package. The Third Energy Package was released in 2009. Member States were required to transpose the Directive into national

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1 The Energy Community is a Treaty signed in 2005 (it entered into force in 2006) between the EU and several Balkan countries, with the objective of integrating the respective electricity and gas markets. Signatories committed to implement the relevant EU energy law dispositions, including not only important changes such as the abandonment of regulated tariffs for customers and liberalization, but also institutional novelties, such as setting up a national regulatory authority and providing it with the resources and powers necessary to perform its regulatory duties. With time, the Treaty has been extended to Moldova (in 2011) and Ukraine (in 2010). Turkey is an observer since 2006. Other observers are Georgia, Armenia and Norway.

law by the 3 March 2011. The electricity survey under consideration was launched at the end of June 2011 for all energy regulatory authorities to complete. Both the numerousness of respondents from the EU and the structure of the questionnaire indicate that EU regulators were the main promoters of this survey effort within the network. Moreover, the timeliness of the launch of the survey seems to suggest a stock-taking exercise.

This analysis will focus on one subsection of the survey only, namely Transmission. The choice of focusing on Transmission only is motivated by a set of considerations:

- the infrastructure network (i.e. the natural monopoly) is the core of the regulatory activity, where regulation is inescapable given the impossibility of competition taking place;
- interconnection between countries is the aspect of transmission networks that is of crucial importance in achieving the EU goal of establishing an Internal Energy Market;
- the survey under consideration has been drafted on the template of Directive 2009/72/EC (i.e. the electricity directive in the Third Package), which introduced ownership unbundling (explained below);
- in a perspective of regional market integration, transmission is the key sector of interest; regional regulatory networks such as the CEER and MEDREG have market integration as their core objective, hence the extent of their member regulators’ powers into the transmission segment is of utmost importance to take stock of what each NRA can be expected to have decision-making powers upon;
- the survey itself focuses on transmission, as it will be seen in the reminder;
- the dataset of regulators’ replies to the transmission section of the survey is much richer and more complete than all others.

Hence, the main goal of this analysis will be to observe whether, in the dataset consisting of regulators’ replies to the Transmission section of the IERN/ICER electricity survey 2011, a pattern of similarity/difference of regulatory competencies emerges between regulators from the CEER (including observers) and MEDREG. Specifically, I will investigate whether CEER and MEDREG members’ regulatory responsibilities, as they appear from the electricity survey, correspond to those indicated in the Directive 2009/72/EC, Article 37 and where not, to what extent they differ.

As concerns federal and state-level regulators, their replies will not be included in this analysis: comparisons between NRAs (EU or non-EU) with state-level or federal regulators would require an additional, substantive layer of explanation regarding the differences between these institutional arrangements, which moreover differ considerably by federal state. While a systematic comparison of these systems would certainly be interesting and useful, it would be difficult to carry out on the basis of the data retrievable from the survey under consideration. In fact, state-level regulators in the sample are from Canada, the USA and Australia. However, not only are they in insufficient number to convey a sufficiently good picture of regulatory practice in their respective jurisdictions, but also their mandate in these different jurisdictions varies.

Besides the importance of transmission per se, at least another two key reasons motivate this work and are both linked to filling important gaps in the literature. First of all, the extent of competition reached upstream and downstream has been the focus of much academic and EU attention. Other much debated topics are third-party access (TPA) and the related issue of unbundling, which mandated the breaking up of vertically integrated undertakings by requiring the operator of the transmission network
to be split from other parts of the chain (i.e. generation, distribution and retail). The European Commission’s preferred model, the Directive on electricity stated, was Ownership Unbundling, which foresees that the Transmission network is owned and managed by a separate company. Two other models were however declared admissible: the Independent System Operator (ISO) model, whereby the transmission network is owned by the vertically-integrated undertaking and leased to a company that is charged with managing it; the Independent Transmission Operator (ITO) model, whereby the transmission network is owned by the vertically-integrated undertaking and managed by a department within it, walled by strict independence requirements in its operations. The independence of the TSO is necessary to ensure it will not discriminate against new entrants into the market by raising barriers to entry, thus favouring the incumbent (which, in the case of vertically-integrated undertakings, is the parent company).

Quite predictably, vertically integrated undertakings are usually state-owned, given the extent of the sunk cost and investment needs of the electricity sector. It is important to note that the requirement is for the TSO to be ownership unbundled, not to be of private ownership. Hence, the fact that in several Member and neighbouring States the sole shareholder of the electricity Transmission network is the state does not represent an infringement of the Directive.

This brief overview of the types of TSO arrangements foresaw by the Directive was made necessary by the fact that the nature of the TSO impacts on the extent of regulatory oversight. Specifically, the ISO and ITO model are premised on stricter regulatory oversight than the OU (ownership unbundled) model. This is because in the latter case the TSO is a (usually private) company. This is supposed to ensure that an OU TSO possesses adequate incentives to ensure TPA and adequately plan investment needs for network maintenance and expansion. Given the focus on regulators’ power in the transmission segment for EU and neighbouring regulators, knowledge of the type of TSOs each country had when the survey was carried out is useful additional information. In fact, while putting forward a new architecture of the internal energy market, the Directive concomitantly explained the role regulators should play in this new setting and the competencies they should be endowed with. Here comes the second remarkable gap in the literature that this work aims to start filling: assessing regulatory powers/competencies.

The Directive clearly states (lemma 33): “Experience shows that the effectiveness of regulation is frequently hampered through a lack of independence of regulators from government, and insufficient powers and discretion. For that reason, at its meeting on 8 and 9 March 2007, the European Council invited the Commission to develop legislative proposals providing for further harmonisation of the powers and strengthening of the independence of national energy regulators”. Lemma 34 states: “Energy regulators need to be able to take decisions in relation to all relevant regulatory issues if the internal market in electricity is to function properly, and to be fully independent from any other public or private interest.”

Hence, the Directive sees independence and powers as complements and underlines how both need to form the backbone of the energy regulatory authorities institutional endowment. As underlined by Hanretty and Koop (2012), extensive regulatory powers do not imply more independence, as well as more limited regulatory powers cannot be taken to imply lack of independence. The two characteristics run parallel to each other, and none can be taken to imply the other.

In order to characterize a regulatory authority, one needs to look at many aspects. Some will concern the background over which the NRA is established: legal and institutional system, market size and
structure, resource endowment. Others will concern the NRA itself: its degree of autonomous decision-making and the extent of its powers are two fundamental aspects; the resources available to it and the level of expertise it enjoys (and uses in making-decisions) represent the other half of the picture.

**Literature Review**

The literature that needs to be called upon in order to reconstruct the narrative that links national energy regulatory authorities to this contribution is composed of several important topics of scholarly attention. At least three broad issues can be identified: Europeanization & the EU internal and external energy policy, policy networks, cross-country comparisons. Linking up these different, yet interrelated topics, is necessary not only in order to make sense of the contents of this paper but also, and most importantly, in order to see the interrelations between policy developments at different levels and notice how their overlap leads to outcomes perhaps not initially envisaged by any analysis singularly taken.

1. **EU energy policy as instance of the EU as a regional hegemon**

(Kanellakis, Martinopoulos et al. 2013) provide an overview of the EU energy policy since its very beginning, when the Economic Coal and Steel Community (ECSC) was formed in 1951. As they recall, at that time the six Member States involved looked at nuclear power as the driver of future economic growth. For this reason, the European Atomic Energy Community was created in 1957. It can be argued, therefore, that the very origins of the EU lie in energy issues.

Indeed, various documents regarding the investment and import needs of the European Community date from the same years. However, the first Commission Working Paper on an energy policy for the Community dates back as far as 1988\(^3\). This was complemented by studies on the Member States energy policies in the same year. Much later, at their informal meeting held at Hampton Court in October 2005, the European Council asked the European Commission (EC) to formulate a concept of EU energy policy. This was followed by the March 2006 Green Paper entitled “A European Strategy for Sustainable, Competitive and Secure Energy”. In it, the EC argued for the necessity of achieving energy security through a “pan-European energy community” and the creation of a “common regulatory space” around Europe. Following the Green Paper, the EC’s 2007 “An energy policy for Europe” made explicit the three objectives of the EU energy policy: security of supply, sustainability and competitiveness.

The Treaty of Lisbon, entered into force on 1 December 2009, includes a chapter on energy issues, thus embodying EU competence in energy issues in the main legal basis of the EU. The chapter consists of only one article, number 194. The article states the EU energy policy shall aim to ensure a functioning energy market, security of supply, energy efficiency and renewable energy development and to promote the interconnection of energy networks. Article 194 introduces shared competence in energy for Member States and EU institutions. However, these are constrained by the national sovereignty over energy issues.

There is legal research which has focused on the usage the European Commission has made of the tools of competition law in order to speed up energy markets liberalization and integration (Monti 2008) there, where harmonization (as foreseen in Article 114 of the TFEU) failed. One specific facet of this issue regards how the European Commission has made use of Article 9 of Regulation 1/2003 and of the

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\(^3\) http://aei.pitt.edu/view/eusubjects/H016004.html
“commitment decision” to bring big EU energy incumbents in line with the provisions of competition law, thus adopting a typically ex-post policy to realize ex-ante, regulatory objectives (Sadowska, 2011).

Another Article 9 that is potentially crucial in overcoming the difficulties so far encountered in reconciling the market arrangements of the EU with the practices of several North African (Maghreb) countries is Article 9 in Directive 2009/28/EC (the so-called RES Directive), which states that “One or more Member States may cooperate with one or more third countries on all types of joint projects regarding the production of electricity from renewable energy sources” (Ahner and Glachant 2014).

Some of the NRAs studied in this contribution are located in the so-called EU Neighbourhood, i.e. countries lying at the “borders” of the EU to the South and to the East. These countries are protagonist of one of the EU’s flagship policies, namely the European Neighbourhood Policy, which, as it is well know, included energy-dedicated policy initiatives since the start (for instance, the Black Sea Synergy, the Eastern Partnership and the Union of the Mediterranean).

The main objectives of the EU external energy policy regard ensuring security of supply through diversification. (Prange-Gstöhl 2009) explains how the EU external energy policy has been studied accordingly to a notion of “rings of energy cooperation” around the EU consisting of three circles of countries. Circle 1 consists of the Western Balkan countries (i.e. those having membership perspective). With them, the EU established a highly institutionalized framework of market integration following the hierarchical governance (Schimmelfennig 2009) pattern typical of enlargement procedures; Circle 2 includes countries with no membership perspective but with potential to become members of the Energy Community soon (i.e. Ukraine, Moldova, Armenia, Georgia, which in fact are members or observers to the Energy Community at present); Circle 3 includes “the neighbours of the neighbours”, that is, countries with no membership perspective but with potential to become members of the Energy Community in the long run (Central Asian/Caspian Sea region, Mediterranean, Gulf region).

The Energy Community Treaty (ECT) had been planned as a legal tool to initiate the integration of prospective EU members in the Western Balkans into the EU internal market, starting from the energy sector. Through the establishment of the Energy Community, the EU took the initiative to start the process of integration of South Eastern European (SEE) countries’ energy infrastructure both across SEE territories and with the EU energy market. The EU provided for the legal and regulatory framework in the form of a Treaty binding its signatories to implement relevant pieces of the EU energy legislation. In time, however, the concept of the ECT seems to have evolved. As stated on its website, “In Dec 2009 the Energy Community Ministerial Council decided on the accession of Moldova and Ukraine. With the decision, the geographical concept of Western Balkans, with which the process was linked initially, lost its validity. Today, the leitmotiv behind the Energy Community Treaty is rather the import of the EU energy policy into non- EU countries”

Prange-Gstohl (2009) confirms that the ECT has become, in the eyes of the EC, the legal tool to export its internal energy markets norms, rules, and institutions.

The SEE countries were not included in the ENP. In fact, the Energy Community countries’ acknowledged eligibility for membership made them unfit to be inserted into the periphery of the EU. Therefore, including a country into the ENP has been equivalent to declare that it had very slight hopes to be offered EU membership (Cardwell 2011). The May 2011 review of the ENP re-stated the desirability of establishing an “EU-Southern Mediterranean Energy Community” as a complement to the SEE Energy

http://www.energy-community.org/portal/page/portal/ENC_HOME/ENERGY_COMMUNITY (last accessed on 18/09/13)
Community. This important statement seems, however, to have got lost into subsequent reviews of the ENP.

Despite the attractiveness of the idea of establishing an EU-Med energy community, the main and obvious obstacle to such a plan is the modality of its establishment. As mentioned, the Energy Community was a fully-fledged top-down initiative, whereby energy market integration was achieved in an asymmetric, hierarchical governance (Lavenex and Schimmelfennig 2009) form; such a deep change in the energy markets structure of SEE countries was made possible by the membership perspective. Those countries with no membership perspective, then, can be expected to be less eager or ready to harmonize their institutional and regulatory arrangements with those of the EU. Despite the attractive economic possibilities represented by the European Single Market, the pressing energy dependency and the even more pressing need to ensure its security of supply make the EU vulnerable to shortages.

To bridge between EU’s and neighbouring countries’ respective interests in the energy issue, some other form of dialogue than straightforward export of European rules and formats needed to be found.

2. Policy networks

The expressions “policy networks” and “multi-level governance” are frequently associated with the whole governance infrastructure of the EU. Both policy networks and multi-level governance practices often appear within the framework of analyses on delegation of regulatory power to supra-national EU institutions, and Europeanization more generally. In particular, the study of these governance instruments is related to analyses of the impact of EU regulation on domestic national regulatory policy and institutions (see for instance Borzel and Risse, 2000).

Levi-Faur (2013) recognizes in the meeting of the two literatures (the one on regulation and the one on governance) a veritable turning point. The regulatory governance literature is, unsurprisingly, distinctively European: after all, very early on the EU has been depicted as a regulatory state characterized by “multi-level (or multi-tiered) governance” (for a review of the concept, see Piattoni, 2009), given the nature of its policy process that develops at the nexus between local, national, and supra-national levels. In the interstices between these levels, policy networks supplement and complement policy formation, which itself takes place within the complex committee system proper of EU institutions.

While we will dig deeper neither in the issue of EU multi-level governance (although see Marks, Hooghe and Blank, 1996; Scott, 2002; and Kohler-Koch and Rittberger, 2006, for a comprehensive review) nor in the significance of policy networks for the EU as a system of governance in itself (although see Borzel, 1997), we will briefly explore what regulatory governance has come to mean in the energy sector.

Eberlein and Grande (2000) analysed the impact of EU regulatory practices in Germany in the utilities sectors. They argued that national regulatory regimes persist in the context of the forming EU regulatory framework. EU regulation and institutions have not substituted for or overwhelmed corresponding national ones: rather, “European and national regulation interact in a complex and dynamic multi-level set-up, reflecting the specific characteristics of the European integration dynamic and of EU multi-level governance”. They re-affirmed the point in (2005) by recognizing that the European and the national dimensions of regulation in Europe are inseparable and form a multi-level structure. The dilemma for

http://ec.europa.eu/world/eng/pdf/com_11_303_en.pdf (last accessed on 16/09/13)
regulation in Europe rests in the lack of institutional and political capacities at EU level to regulate effectively; hence the need to find alternative routes to ensure Europeanization of regulatory practice across the Member States.

One further step leads directly to the crossroads between policy networks and national regulatory authorities (NRAs). Much has been said on European Regulatory Networks (ERNs) and the role they perform within the EU and the Member States. (Nicolaides 2004) argued that these networks are needed because of the inherent difficulties of policy implementation at national level that the European Commission has to face. NRAs networks respond to the need to eliminate the ambiguity of the rules that are agreed upon at EU political level: the heterogeneity of preferences and objectives of the Member States cause that, in order to achieve agreement, common rules have to be left purposefully broad. This is also why the instrument of the Directive is most commonly used to promulgate EU law. The Directive sets out the overall objectives of the policy; policy implementation measures, thereafter, can be decided at national level. Despite the benefits of having common rules, however, having to deviate from their national optimum is costly for Member States. Therefore, vague common rules create a compliance problem afterwards. To obviate to this risk, ERNs are established.

In a topical article, Coen and Thatcher (2008) looked at ERNs from the perspective of the study of delegation; they recognized the existence of a “double delegation” to ERNs (downwards from the EC and upwards from NRAs) that makes ERNs pivotal to the governance system of the EU. (Maggetti 2013), in his turn, set out to assess ERNs’ concrete achievements, focusing specifically on the CEER. He examined the extent to which the soft rules (guidelines and codes of best practice) NRAs agree upon at network level are then implemented at national level. For an analysis of the evolution of the CEER in the view of its first Chairman, see Vasconcelos (2009).

The diffusion of the regulatory network as a form of soft governance and policy coordination within the EU, it seems, helped envisaging network solutions for dealing with neighbouring countries as well. In this view, the setup of MEDREG (the network of Mediterranean Energy Regulators) finds its rationale in the attempt by the EU to lay down a regulatory minimum common denominator with neighbouring countries, which have no membership perspective, but do have strategic importance in terms of their location and/or their huge resource reservoirs, be it of renewables or fossil fuels. Hence, cooperation on a specific set of issues among the institutional actors that are closer to fieldwork level, i.e. the regulators, appears to have been one of the possible avenues chosen by the EU, complementing traditional policy-making and broad umbrella programmes such as the ENP.

By bringing together countries facing the Mediterranean, MEDREG involves only a subset of EU NRAs, namely, those that are closer and most interested in reaping the fruits of market creation in the electricity sector with the countries in the Neighbourhhood. From this point of view, the creation of MEDREG represents a whole new approach in the governance instruments of the EU, whose results will have to be assessed in time. One point of view is already available, however, in the analysis carried out by Cambini and Franz (2013a, 2013b) who assessed the perceptions of a set of regulators from North Africa of the role of the EU in the transformation of their electricity and gas markets. Their conclusions are that a top-down approach is preferable and most effective for rules diffusion (or export). One of the questions they asked concerned the role of MEDREG in rule adoption, which respondents indicated as

6 It must be underlined that ERNs differ from ERAs in that they are voluntary association of NRAs, not under the direct aegis of the European Commission.
rather low. It must be borne in mind, however, that MEDREG is a very young organization and that, most importantly, it is possibly not meant to trigger rule adoption by third countries. The role of a network initiative is rather to socialize and familiarize its members with a certain market framework and a certain understanding of their own role. Surveys like the one here analysed seem to be part of this logic of familiarization with a set of prerogatives and responsibilities that “good” regulators ought to have. In this way, the network empowers its less experienced and endowed members with the basis to make advocacy claims, where they have no powers, or to use the decision-making powers they possess having in mind certain objectives.

3. Cross-country comparisons of regulators’ characteristics

Looking at how regulatory institutions work has proven a fascinating topic for political scientists, who, rather than looking at how regulated markets work per se, have interest in investigating the features of the regulators. This is especially true in the EU, where utility regulatory authorities are a relatively new phenomenon, and there diffusion to all member states is an even more recent event. Furthermore, the active export of this institutional form beyond EU borders, in its immediate vicinity, is a phenomenon of great interest to assess the EU as a regional hegemon that however exerts this role in a radically new way.

Hence, the political science literature on regulatory authorities has been mainly interested in trying to describe them, in both their visible and in their hidden features. First and foremost, this research has focused on the topic of regulatory independence. While the literature on the EU regulatory authorities lacks, to the best of my knowledge, any attempt at analyzing regulatory competencies and powers in a cross-country perspective, there is no shortage of cross-country analyses as far as independence is concerned, in particular independence from politics. This is unsurprising given the reasons that brought to the establishment of regulatory authorities in the utilities sectors in the EU: breaking up former state-owned monopolies. Due to the political saliency of utilities, the literature has often adopted a principal-agent framework to check whether politicians were exerting pressures on the regulators to try and direct them to make decisions they would not make otherwise, for sake of electoral success or other similar gain. The debate over assessing regulatory independence has evolved from the study of formal independence (as per regulatory authorities’ statutes) to the attempted study of de facto independence, but has not developed further.

Formal independence has been assessed more often, most likely also for reasons of data availability. Formal independence concerns all the procedural and statutory duties and requirements regarding the regulatory authority and determining its internal and organizational functioning in terms of appointment procedures, budget, dismissal, and type of organization (board or single head), terms of tenure and the like. The topic of independence is related, and examined concomitantly, with the topic of delegation of authority from political entities. Thatcher inaugurated a rich strand of cross-country studies of delegation of regulatory powers to independent National Regulatory Authorities (NRAs), explained through a principal-agent dynamic borrowed from US studies (2002a, 2002b, 2002c). He summed up the main characteristics independent NRAs should have to be qualified as (formally) independent (2002a, while highlighting the interplay between national specificities and EU policies in the creation of NRAs. Thatcher (2005), instead, studied the relationship between politicians and regulation after delegation has taken place, to see whether the former try to keep the latter under tighter control or else they allow the latter substantial independence.
In an often cited study, (Gilardi 2002) set out to test the credibility hypothesis put forward by Majone to explain the rise of the regulatory state and delegation of authority to the National Regulatory Authorities (NRAs). As part of the analysis he calculated an index of regulatory independence, ranking regulatory authorities on the basis of their cumulative independence score. His method was revisited by Hanretty and Koop (2012), who applied a robust statistical methodology to analyze the results of the same questionnaire he used, but with replies gathered from 175 NRAs worldwide in the same sectors Gilardi looked at. In another contribution on independence of EU energy NRAs, Larsen and Pedersen (2006) studied the independence of regulatory authorities in European electricity markets as prerequisite for a successful process of market liberalization through an analysis of the results of a questionnaire on formal independence and regulatory objectives to which 15 EU electricity regulators responded.

Once the topic of independence had been examined in its formal, visible aspects, attention shifted to studying actual, or de facto, independence of regulatory authorities. Given the magnitude of the task, Maggetti (2007 and 2009) looked at several proxies that can be taken to indicate de facto independence and checked whether there is correspondence between high levels of formal independence and high levels of de facto independence. His results disprove the latter claim and show that other factors, including regulatory networks, have more to bear on actual independence. However, his analysis did not include energy regulatory authorities. Hanretty and Koop (2013) also walk the de facto vs de iure independence path by analyzing 17 NRAs in EU countries and seven sectors including energy and telecom. They take into consideration several factors (including formal independence, the rule of law, the coordination of the economy, the presence of veto players and the political salience of the regulated sector), and find they do concur in explaining de facto regulatory independence.

Ingold and Varone (2013) introduced innovative analytical methods on this well-trodden research strand by proposing to use Social Network Analysis to indirectly assess de facto independence of NRAs from elected politicians, regulatees and other co-regulators. Using the same approach, Maggetti, Ingold and Varone (2013) investigate the correlation between NRAs' independence and their accountability. The authors focused on three differentially liberalized sectors (telecommunications, electricity and railways) in Switzerland. Their results show that NRAs can be de facto independent and accountable at the same time, but the two features do not necessarily co-evolve in the same direction.

Despite the value of contributions on independence, it is somehow surprising how little attention has been paid by scholars to other, equally crucial facets of regulatory authorities. One of them is, indeed, the extent of their powers and duties in the markets they regulate.

**Sample and structure of the survey**

Below is a list of the NRAs, whose replies will be considered in this work (to avoid confusion, throughout this paper energy RAs will be referred to by the name of the country/state each belongs to) with indication of the RRA(s) they belong to and whether they are parties to the Energy Community Treaty.

It must be noted that Energy Community members, at the time of the survey, had to comply with the provisions of the 2nd energy package only, which foresaw much less competences for regulatory authorities and allowed for “softer” forms of unbundling (legal or functional). A decision by the Ministerial Council of the Energy Community dated 6 October 2011 amended the Treaty by foreseeing implementation of the provisions of the 3rd Package for member regulators by 1 January 2015.
On the other hand, regulators from the EU were required to effectively implement the Directive provisions by 3 March 2011. By 1 June 2011, no Member State had notified full transposition. Moreover, in 2010 the European Commission had to open an infringement procedure against 20 Member States for violations of the provisions of the Second Energy Package.

This delay in implementing EU energy legislation stands in stark contrast with the performance of several Energy Community members in the Balkans, which, as the table below shows, have instead rushed to implement the unbundling provisions of the Third Package ahead of time, given what stated above about their deadlines for implementation. Furthermore, as the analysis of the survey replies will show, several regulators from the area seem to be ahead of the curve with respect to the powers they are endowed with. This may be due to what some authors have called “anticipatory adaptation (Langbein and Wolczuk, 2012), while however referring to the case of Ukraine.

The list of NRAs considered in this work reads as follows:

<table>
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<tr>
<th>NRA1</th>
<th>NRA2</th>
<th>Energy Community</th>
<th>NRA</th>
<th>TSOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEDREG</td>
<td>Energy Community</td>
<td>Albania</td>
<td>state-owned TSO (OU)</td>
<td></td>
</tr>
<tr>
<td>MEDREG</td>
<td>Algeria</td>
<td>Vertically-integrated undertaking (VIU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Austria</td>
<td>ITO &amp; OU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Belgium</td>
<td>OU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEDREG</td>
<td>Energy Community</td>
<td>Bosnia-Herzegovina</td>
<td>state-owned TSO (OU)</td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Bulgaria</td>
<td>state-owned TSO (ITO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>MEDREG</td>
<td>Croatia</td>
<td>ITO</td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Czech Republic</td>
<td>state-owned TSO (OU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Denmark</td>
<td>state-owned TSO (OU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Estonia</td>
<td>state-owned TSO (OU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Finland</td>
<td>OU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>MEDREG</td>
<td>France</td>
<td>ITO</td>
<td></td>
</tr>
<tr>
<td>CEER observer</td>
<td>Energy Community</td>
<td>FYROM</td>
<td>state-owned TSO (OU)</td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Germany</td>
<td>ITO &amp; OU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Hungary</td>
<td>ITO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Ireland</td>
<td>ITO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>MEDREG</td>
<td>Italy</td>
<td>OU</td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Latvia</td>
<td>ISO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Lithuania</td>
<td>state-owned TSO (OU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Luxembourg</td>
<td>exempted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER observer</td>
<td>MEDREG</td>
<td>Energy Community</td>
<td>Montenegro</td>
<td>state-owned TSO (OU)</td>
</tr>
<tr>
<td>CEER</td>
<td>En Comm observer</td>
<td>Norway</td>
<td>state-owned TSO (OU)</td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Poland</td>
<td>state-owned TSO (OU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEER</td>
<td>Romania</td>
<td>ISO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>Serbia</td>
<td>state-owned TSO (OU)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7 Source http://ec.europa.eu/energy/gas_electricity/internal_market_en.htm
As for the regulators of Switzerland, Algeria and Turkey, it must be noted that these have no binding obligation to implement the EU energy law. Hence, the extent of their competence is investigated for the sake of discovering whether it importantly differs from the one of the other respondents considered, who instead have this obligation. Given the fact it is a small isolated system and that the regulator does not have to deal with unbundling, cross-border issues, congestion & balancing, the regulator of Iceland has been excluded from subsequent analysis.

The structure of the IERN/ICER electricity survey, version 2011, can be conveniently described as follows:

Table 1: Electricity Survey structure according to sectors and competences

<table>
<thead>
<tr>
<th>FIELDS OF COMPETENCE</th>
<th>Market Sectors (or Topics)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I. Generation</td>
</tr>
<tr>
<td>1. Regulation</td>
<td>✓</td>
</tr>
<tr>
<td>2. Access rules</td>
<td>✓</td>
</tr>
<tr>
<td>3. Tariffs</td>
<td>✓</td>
</tr>
<tr>
<td>4. Unbundling</td>
<td>✓</td>
</tr>
<tr>
<td>5. Investment planning</td>
<td>✓</td>
</tr>
<tr>
<td>6. Quality Standards</td>
<td>✓</td>
</tr>
<tr>
<td>7. Cross-border activities</td>
<td>✓</td>
</tr>
<tr>
<td>8. Congestion &amp; Balancing</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 1 outlines the macrostructure of the survey. In it, five main topics were explored: Generation; Transmission; Distribution; Retail; Other Issues.

Topic “Transmission”, the most thoroughly explored, contained questions about 8 Fields of Competence: Regulation, Access Rules, Tariffs, Unbundling, Investment Planning, Quality Standards, Cross-Border Activities, Congestion & Balancing. These correspond to the sectors named into Directive 2009/72/EC, in the section which lists the duties and powers EU energy RAs must be endowed with (Article 37). These will be explored further below.

---

8 Containing 4 sub-sections: Consumer Protection; Security of Supply; Environmental Issues; Energy Efficiency, in which the only Field of Competence explored was the one named Regulation.
As for the micro structure of the survey, within each field of competence, the following “tasks” have been explored: A) Regulation; B) Powers; C) Monitoring; D) Enforcement; E) Settlement; F) Bodies/Institutions, as reported in the following Table to account for questions and answer options.

Table 2: Questions about tasks

<table>
<thead>
<tr>
<th>TASKS</th>
<th>QUESTIONS</th>
<th>ANSWERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Regulation</td>
<td>How do you regulate?</td>
<td>1. tendering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. licence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. any other authorization procedure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. other</td>
</tr>
<tr>
<td>B Powers</td>
<td>What powers do you have?</td>
<td>1. rule-making power</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. proposal of rule</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. approval of rule</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. other</td>
</tr>
<tr>
<td>C Monitoring</td>
<td>Do you monitor and/or audit?</td>
<td>1. yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. no</td>
</tr>
<tr>
<td>D Enforcement</td>
<td>What enforcement powers do you have?</td>
<td>1. request of info</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. publication of letters/report</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. issue of penalties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. issue of opinions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. imposition of your decision</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. other</td>
</tr>
<tr>
<td>E Settlement</td>
<td>How do you settle disputes in this field?</td>
<td>1. hearing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. arbitration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. actual settlement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. other</td>
</tr>
<tr>
<td>F Bodies/Institutions</td>
<td>Are there bodies/institutions able to overturn regulatory decisions?</td>
<td>1. yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. no</td>
</tr>
</tbody>
</table>

One question was asked for each task and there always was the possibility to give multiple answers (check-all-that-apply) as well as to leave an open comment.

It should also be noticed that the Tasks selected refer to different time frames of regulatory action. Specifically:

Tasks A and B: Regulation & Powers are “ex—ante” tasks;

Task C: Monitoring in an “on—going” task;

Tasks D and E: Enforcement and Settlement are “ex—post” tasks;

Task F: Other bodies/institutions is a question about whether there exists in the country another body able to overturn regulatory decisions (as per Article 37, pgf 17).
Article 37

An assessment of CEER and MEDREG regulators’ competencies in the sample, as they result from the electricity survey, will be carried out with a view to check whether these correspond to the competencies listed by Directive 2009/72/EC, Article 37 (and reiterated in the Commission Staff Working Paper titled “The Regulatory Authorities”, dated 22 January 2010 and constituting an interpretive note of Directive 2009/72/EC). While Article 36 lists some general, overarching objectives of the regulatory authorities, Article 37 lists the specific core duties that regulatory authorities should be endowed with in relation to electricity markets. Regulatory authorities are then expected to use the powers listed in Article 37 to achieve the overall objectives listed in Article 36, which can be summed up in the opening sentence, referring to the objective of establishing a “competitive, secure and environmentally sustainable internal market in electricity within the Community”.

Hence, it seems useful to provide here an overview of those provisions in Article 37 that allow for such an assessment, being mirrored in the questions of the Electricity Survey:

4. (...) the regulatory authority shall have at least the following powers:

(a) to issue binding decisions on electricity undertakings; [Task D5 in electricity survey – “imposition of your decision”]

(b) to carry out investigations into the functioning of the electricity markets, and to decide upon and impose any necessary and proportionate measures to promote effective competition and ensure the proper functioning of the market. [no specifically relevant question in the survey, apart from Task D1 “request of information”; however, the expression “to decide upon and impose” suggests that the wording “rule-making power” (Task B1) and broad enforcement powers, i.e. including “imposition of your decision” (Task D5) can be considered as proxies of such powers]

(c) to require any information from electricity undertakings relevant for the fulfilment of its tasks, including the justification for any refusal to grant third-party access, and any information on measures necessary to reinforce the network; [Task D1 – “request of information”]

(d) to impose effective, proportionate and dissuasive penalties on electricity undertakings not complying with their obligations under this Directive or any relevant legally binding decisions of the regulatory authority or of the Agency, or to propose that a competent court impose such penalties. [Task D3 – “issue of penalties”]

(e) appropriate rights of investigations and relevant powers of instructions for dispute settlement under paragraphs 11 and 12. [Task E – “dispute settlement”]

As for the rest of the provisions of Article 37, the following prerogatives of regulators are mirrored in the structure of the electricity survey, as regards Transmission and Distribution:

- Fixing or approving at least the methodologies used to calculate or establish terms and conditions for:
  o Access rules and Tariffs (in both Transmission and Distribution)
  o Provision of Balancing services
The combined reading of the articles in the Directive and the interpretive note of the European Commission titled “The Regulatory Authorities”, permits to identify the set of minimum powers a “proper” energy regulator in the EU should be endowed with. These consist of the following:

1. Widespread monitoring and investigation powers across all segments; (Task C and Task D1 in the survey)

2. A significant enforcement role overall and in particular in Transmission and Distribution, including the possibilities to issue penalties and to impose the regulators’ decision\(^9\); (Task D in the survey)

3. A significant ex-ante, rule-making (or approval) role (Task B1 and B3 in the survey) as concerns:
   - Access to the infrastructure, including interconnectors; (Access Rules in the survey)
   - Transmission and Distribution Tariffs; (Tariffs in the survey)
   - Quality Standards; (Quality Standards in the survey)
   - Congestion management and Balancing rules; (Congestion&Balancing in the survey)

4. As concerns Cross-border issues, the duty of energy RA is to cooperate with their counterparts in other EU Member States and implement the Agency for the Cooperation of Energy Regulators (ACER)’s decisions on the matter; (no specific question in the survey regarding cooperation in cross-border issues)

5. As for Unbundling, the Article does not mention the word per se but contains a provision stating the RA should ensure there are no cross-subsidies between transmission, distribution and supply activities; (lets infer that enforcement powers are important in this field, hence Task D)

6. A monitoring role in investment plans of the TSOs; however “the Commission’s services are therefore of the opinion that the power to impose any necessary and proportionate measures to promote effective competition and ensure the proper functioning of the market can also include the power to require that a TSO makes certain investments” (interpretive note, p.18). (Investment Planning in the survey, Task C and possibly Task B)

7. A dispute settlement role in relation to complaints by any party against a transmission or distribution system operator in relation to that operator’s obligations under Directive 2009/72/EC (Task E in the survey).

The interpretive note of the Commission also states that these duties, or powers, need not be exhaustive and that Member States can endow regulators with more powers if deemed necessary ("The

\(^9\) The interpretive note reads: “(…) the NRA has the power to ensure compliance with the entire sector specific regulatory ‘acquis communautaire’ relevant to the energy market, and this vis-à-vis not only the TSOs but any electricity or gas undertaking".

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powers listed in paragraph 4 are not exhaustive. Member States must generally grant the NRAs the powers enabling them to carry out their tasks in an efficient and expeditious manner". (...) These duties constitute a minimum set of competences and Member States may give the NRA additional powers to those specified", interpretive note, p.17).

Transmission

Transformation of the replies

The duties listed in Article 37 of Directive 2009/72/EC can be taken as the benchmark against which to assess the powers that regulators in the sample affirmed to have in the Transmission section of electricity survey. The Article allows identifying a pattern of reply options, which could be taken to indicate adequate regulatory competencies. As a consequence, the various reply options can be ranked according to this criterion. This possibility helps the analysis by reducing the number of variables to be considered and allowing handling the difficulty in interpretation of reply patterns caused by the “check-all-that-apply” reply scheme used in this survey.

In Task B, for instance, reply options are:

1. rule-making power
2. proposal of rule
3. approval of rule
4. other

However, the examination of Article 37 suggests that “Rule-making power” and “Approval” power can be considered as equivalent powers (“fixing or approving”). The Article, in fact, consistently requires that regulators have the power to “fix or approve” access rules, tariffs (or methodologies to calculate them) etc. Hence, “proposal of rule” indicates a somehow lower level of regulatory discretion. Reply “other”, in all survey sections, has been consistently the least checked. Moreover, the comments provided allowed to understand that only sometimes did respondents actually have “other” competence than those proposed. Taking into account replies “other” would introduce into the dataset, and the subsequent exploratory analysis, a strong element of variation. In other words, given that the stated objective is to look for (dis)similarity among the selected subsample of respondents by reducing the dimensionality of the dataset (which has far more variables than observations), taking into consideration replies such as “other” would make a small number of respondents stand out of the sample, thus preventing examination of the characteristics of the others in terms of ex-ante and ex-post competences, as they would all conflate in a single ensemble of very similar regulatory authorities. Briefly, considering replies such as “other” would make the majority of the respondents look a lot more similar than they actually are.

This reasoning allows us to rank replies in three levels. In Task B (Powers):

1 = rule-making/approval power (adequate)
2 = proposal power (mild)
3 = no power (no)

By the same token, the set of reply options of Task D (Enforcement) can be transformed into categories. The reply options for the question as stated in the survey are:

1. request of information
2. publication of letters/report
3. issue of penalties
4. issue of opinions
5. imposition of your decision
6. other

In the light of the provisions of article 37 and of the replies actually observed to the survey, I will consider “imposition of decision” and “issue of penalties” as indicating adequate competence. This is because they are highly correlated in the dataset. There is a subset of respondents (Turkey, Romania, Serbia, Slovakia) that indicated power to issue penalties but not to impose their decision. There is another subset of respondents (Bosnia-Herzegovina, Germany, Croatia, Ireland, Denmark) that consistently indicated the power to impose their decision but not to issue penalties. However, the directive states the regulator can either issue penalties directly or propose that a court of law does so. Given the possibility that differences in reply only correspond to procedural, but not substantial, differences, I am going to consider these two replies as equivalent. By the same token, I will consider “publications of reports” and “issue of opinions” as equivalent instances of rather “mild” enforcement powers. Therefore, a regulator possessing only those powers will be classified as having mild enforcement powers. A regulator indicated they can impose their decision or issue penalties will be classified as having adequate enforcement powers, independently from whether they also indicated mild powers or not.

In substance, this strategy amounts to taking into consideration the “highest” reply given by regulators to each question, thus transforming a “check-all-that-apply” pattern into a single response reply pattern.

Overall, the replies to enforcement questions can be ordered as follows:

1 = imposition of your decision/penalties (adequate)
2 = publications/opinions (mild)
3 = request of information only (basic)
4 = no enforcement power (no)

As for Monitoring, this reply has only two categories:

1 = yes (adequate)
2 = no (no)
As for Task E and dispute settlement, the question in the electricity survey is not entirely clear. Based on the provision of Article 37, however, one can assume the following ranking:

1 = dispute settlement/arbitration (adequate)

2 = hearing (mild)

3 = no dispute settlement power (no)

Sometimes the comments provided by the regulators have helped placing their reply under one of the above categories. For instance, every time respondents mentioned they have none of the mentioned ex-ante powers in Task B, but do give advice (it happened relatively often in the section on Investment Planning) their competence has been classified as mild. In the same section, some respondents mentioned that the tariff methodology includes an item for investment incentives: their reply has been considered to express adequate competence.

Analysis

The dataset formed by the replies regulators gave to the Transmission section of the electricity survey was transformed so that one response variable corresponds to each task in each field of competence. Hence, the dataset contains seven fields of competence (Access Rules, Tariffs, Unbundling, Investment Planning, Quality Standards, Cross-border Activities, Congestion & Balancing) each containing four variables (Pwr = Ex-ante powers; Mono = Monitoring; Enfo = Enforcement powers; Disp = Dispute Settlement powers).

Each of the variables can have several categories, which depend on the replies provided by the respondents:

- **Pwr**
  - Adequate powers
  - Mild powers
  - No powers

- **Mono**
  - Adequate
  - No

- **Enfo**
  - Adequate
  - Mild
  - Basic
  - No

- **Disp**
  - Adequate
  - Mild
  - No

The transformation of the sets of reply options into categories allows performing a type of exploratory analysis called Multiple Correspondence Analysis (MCA), followed by a cluster analysis.
**Multiple Correspondence Analysis & Cluster Analysis**

MCA is a dimension-reduction exploratory data analysis technique, broadly equivalent to Principal Component Analysis (which is a type of analysis that can be carried out on continuous data) for categorical data, that is, data, as the name suggests, organized into nominal categories. It is part of a family of descriptive methods (such as clustering & factor analysis and Principal Components Analysis itself), which reveal patterning in complex data sets. It is distinctive in that it describes these patterns geometrically by locating each variable/ unit of analysis as a point in a low-dimensional space. MCA allows mapping both variables and individuals, so allowing the construction of visual maps, whose structures can be interpreted and help interpretation of the contents of the dataset.

In the context of this dataset, I will perform a MCA for each of the Tasks considered. Thus, I will group regulatory tasks not by field of competence (Access Rules, Tariffs, Unbundling, etc) but by “type” of power, i.e. ex-ante, ex-post, basic, and dispute settlement. In this way, I will perform four rounds of MCA instead of seven (the number of the fields of competence) and I will be able to organize respondents according to the extent of their competences in the Transmission sector along the different time dimensions they belong to (ex-ante vs ex-post).

Cluster analysis is a technique belonging to the same family of descriptive methods, and allowing the researcher to organize observations into groups (clusters, indeed) on the basis of the distance separating them, according to the position in the low-dimensional space of the variables that describe them in a given dataset. It is complementary to techniques such as MCA, in that it helps removing noise in the data and creating robust clusters. Following exploration of the dataset using MCA, I will carry out a cluster analysis on the coordinates of the individual as identified by the MCA. The package I will use to carry out this analysis, called FactoMineR ([available for the R software](http://cran.r-project.org/web/packages/FactoMineR/FactoMineR.pdf)), contains a hierarchical clustering functionality that allows to do exactly that, by clustering individuals on the basis of their coordinates using the Ward’s criteria, i.e. based on the inertia explained by the dataset. This criterion is based on the Huygens theorem, which allows to decompose the total inertia (total variance) in between and within-group variance ([available](http://factominer.free.fr/docs/HCPC_husson_josse.pdf)). The Ward’s method consists in aggregating two clusters such that the growth of within-inertia is minimum (thus minimizing the reduction of the between-inertia) at each step of the algorithm. The within-inertia characterizes the homogeneity of a cluster. The hierarchy is represented by a dendrogram (or cluster tree), which is indexed by the gain of within-inertia.

I will start by analyzing regulators’ replies to all questions in the transmission section of the electricity survey. As explained, I am analyzing a sample of respondents, characterized by relation to the EU internal energy market and relative legislation, and belonging to either or both the EU-backed Regional Regulatory Networks, CEER and MEDREG.

Carrying out an MCA on the whole group for all replies in all fields of competence should provide a first indication of the presence of outliers in the sample, i.e. of regulators having an uncommon reply pattern relative to other respondents.
The graph returned by the analysis clearly shows the presence of several outliers. In particular, Slovenia, Spain and Albania stand out of the sample, with Montenegro and Latvia in the upper part, and Algeria and Ireland in the lower part, appearing also fairly distanced from the rest of the cloud of countries. I have added a “fake” respondent, having adequate powers in all fields of competence, and imputed it into the analysis as supplementary observation; this means the graph shows where it would be located if it were taken into account into the analysis. However, the dimensions and the locations of the respondents are calculated without considering the fake replies of the fake respondent.

The fake respondent has negative coordinates on the first dimension and zero coordinates on the second dimension. As the position of the 0 coordinate of each axis indicates, the upper and lower and right and left sides of the graph are negatively correlated with each other. I kept the analysis restricted to three dimensions only. This means that the position of the respondents with regard the third dimension is unobservable. The dimension description function of the package helps with unveiling what variables represent the most variation in the dataset, i.e. which linear combination of variables and, especially, which categories for each variable, explains and is correlated with the three dimensions.

The graphical output below translates the same information in graphics, and shows several things. The variables accounting for the most variation in the dataset are those representing ex-ante powers in both cross-border and congestion&balancing, followed by ex-ante powers in investment, which also represent significant variation. The second dimension, instead, is dominated by variables related to enforcement powers, specifically in congestion&balancing, cross-border, unbundling.
On the other hand, variables concerning monitoring do not convey much variation, being all close to the origins, i.e. with very low coordinates on both dimensions. This indicates that the vast majority of regulators have given the same reply to the question on monitoring activities. Indeed, 100% of the respondents indicated monitoring competence in cross-border issues, which is why the variable does not appear in the graph: it does not represent any variation in the sample.

Variables concerning dispute settlement powers have an intermediate position, with dispute settlement in tariffs and in congestion & balancing having relatively high coordinates on the second dimension.

The second graph, instead, presents the location of the categories of each variable along the first two dimensions. This information is crucial to understand over what categories of reply regulators converged (forming the cloud around the origins visible in the previous graph) or diverged. Most categories are illegible because of overlap. They are then very close to each other. It is clearly visible, however, that “mild” ex-ante powers and “basic” enforcement powers are the categories standing out of the central cloud, hence representing most variation. These were consistently less chosen, and represent a deviation from a more homogeneous pattern. Given that respondents are located in the low-dimensional space according to their reply pattern, shown in the graphs below, I can conclude that Slovenia and Spain declared to have a rather advisory ex-ante role, while Albania and possibly Montenegro and Latvia have very scarce enforcement powers.

The cluster analysis on the MCA coordinates should confirm or disprove this intuition, besides showing whether there are additional groups of regulators within the central cloud of respondents.
INITIAL DRAFT – PLEASE DO NOT QUOTE

Categories plot

Hierarchical Clustering

Click to cut the tree
The cluster tree (or dendrogram) shows that there are two main clusters, which seem to be rather distant from each other. Each of them is formed by two smaller groups of respondents. The software suggests a cutoff points in the dendrogram, which is the point where the split among the clusters is best defined, characterizing more stable and homogenous clusters.

Moreover, the software returns a graph, equal to the first observed, where the clusters are highlighted in the different colors that identified them in the dendrogram. One can clearly see two small groups, composed by Slovenia and Spain on one side, and Albania, Montenegro and Lavia on the other side. Regulators from Bulgaria, Serbia, Luxembourg, Sweden, Algeria, Ireland, Finland and Croatia also do cluster together. All other respondents, including a majority of regulators from the EU but also the regulators from FYROM and Bosnia-Herzegovina, form a single, bigger cluster of respondents.

In order to interpret the clusters, I will need to look at the variables that explain the dimensions and at the reply patterns of regulators ending up in the same cluster. While the two smaller groups, which stood outside of the sample quite clearly, have provided replies that it was easier to identify in previous graphs, the two bigger groups are more difficult to explain without looking at variables and categories in more detail.
Therefore, I looked at the same set of respondents by analyzing three separate, smaller datasets: one for ex-ante powers, one for enforcement powers and one for dispute settlement powers. I skipped monitoring powers as they are the most evenly spread across respondents, thus carrying out the least explanatory power in analyzing what differentiates them. I carried out a multiple correspondence analysis on each of the three remaining types of competence, with a view to see which were the variables most influencing the composition of the graphs dimensions and the features of the regulators. Moreover, I performed a cluster analysis in each instance, to check how regulators would group together. The graphs relative to the variables are displayed in the annex. As one can easily see, variables formed spontaneous nearly homogenous clusters in ex-ante powers and, in particular, dispute settlement, indicating that regulators normally have consistent categories or levels of competence in these kinds of duty across all fields of competence analyzed. This was especially true for dispute settlement competencies. As for enforcement, the patterns of reply are less clear and more mixed. Some regulators show a patchy pattern of reply in ex-ante and especially in enforcement powers. By “patchy” I mean that they seem to have adequate powers in some fields of competence and inadequate enforcement power in others. These rounds of MCA by type of power have allowed me to further shrink the number of variables considered, so that each regulator is described by only one category for each type of power in each field of competence (see Table X in the annex).

I performed a final round of MCA on the data so organized. The results are shown in the graphs below. As visible in the variables graph, ex-ante and enforcement powers represent most of the diversity in the sample, having higher coordinates than dispute settlement on both dimensions. Interestingly, all three
variables have very similar coordinates on both dimensions. The variable “TSO” is a supplementary variable; hence, it is not counted into the composition of the dimensions.

The plot of the categories shows how adequate competences are always negatively correlated with moderate, weak or patchy patterns of reply. Once more, the presence of two distinct groups in the sample is highlighted by the results of the analysis. One group is composed of regulators endowed with adequate competences in all types of powers and across all or most fields of competence. The other group is composed of regulators being less well endowed with regulatory competences, but to different degrees. The type of TSO or TSOs present in the country does not seem to have much relation to regulatory competences in the transmission segment.
The cluster analysis on the observations (i.e. the regulators) shows that the groups originally identified when considering all variables together have been largely confirmed. Overall, the core group of adequately endowed regulators held together, while re-arrangements occurred within the other part of the sample, formed by regulators that seem to be, to some extent or another, less adequately or not adequately endowed with regulatory powers. The disposition of the regulators along the axes corresponds to their endowment. For instance, Italy, Belgium and Lithuania are made close by their weak dispute settlement powers. At the opposite end of the left side of the graph, regulators from Montenegro, Austria, Bosnia-Herzegovina etc still end up in the core group, despite displaying patchy replies as regards enforcement powers, while however showing adequate dispute settlement powers. Finland and Albania form a cluster on their own as their reply characterize them as possessing very weak enforcement powers compared to the rest of the sample. Slovenia and Spain also form a cluster on their own; their replies consistently indicated mild powers in all types of powers, quite uniquely in the dataset. The group formed by Sweden, Algeria, Latvia, Luxembourg etc is brought together in the same clusters by a patchy pattern of reply as concerns both ex-ante and ex-post enforcement powers, with adequate competence in some fields of competence and inadequate or moderate competence in others. The group that is closer to the origins of the axis is the core group of regulators whose replies indicate adequate ex-ante, enforcement and dispute settlement powers in all or most fields of competence.
Going further

In order to deepen the analysis of this section of the survey, and also to ensure a “robustness check” of the results of the MCA, I performed an item response theory (IRT) analysis on the same dataset. Specifically, I used the “ltm” R package in order to perform an IRT analysis with polytomous variables (i.e. ordered categorical variables).

Item Response Theory refers to latent trait models, i.e. models which aim at assessing the presence of a specific ability or characteristic of the respondents, which is not directly observable, in accordance with their replies to a set of questions. These models are often applied to intelligence tests or psychometric tests. ITR consists of several components, which reveal information not only on the respondents but also on the questions themselves, allowing the researcher to distinguish which questions are more revelatory of the respondents’ ability. It does so through the Item Response Function, which is a mathematical function that relates the latent trait to the probability of endorsing an item; and the Item Information Function, which represents an indication of an item’s ability to differentiate among respondents. These functions correspond to the Location parameter (defined as the amount of the latent trait needed to have a certain probability of endorsing the item) and the Discrimination parameter. The latter indicates how strongly related the item is to the latent trait (like loadings in a factor analysis) and consequently how well that item (which is the same as question) helps distinguishing among respondents around the location point.
IRT models generally function for questions with binary outcome (i.e. yes/no, correct/incorrect). In this specific instance, however, I used a type of IRT, which works with polytomous data and is implemented according to the Gradient Response Model, whereby the order of the possible replies is taken into account and considered to represent thresholds of ability, rather than presence/absence of ability.

In fact, a shortcoming of explorative techniques such as MCA and cluster analysis is that there is no way to take account of the order of the variables considered. As explained in earlier sections, Article 37 of Directive 2009/72/EC was used as a benchmark against which to classify and re-order the replies regulator provided to the survey. On the basis of the Directive, I transformed the replies from multi-response to single response variables, ordered by “weight”.

The small sample size and the structure of the dataset, however, do not allow for hard conclusions at the outcome of the IRT analysis. However, interesting and confirming results emerge as regards the items explored. In fact, the results of the IRT (tables in the annex) show that the variables with highest discriminatory power are those related to cross-border issues and to congestion & balancing issues. Immediately after these two come the powers in investment planning and unbundling. Hence, the final result of the examination of this dataset is that there is a core group of “basic” powers that seem to be very widespread among regulatory authorities of the EU and the neighbourhood. These are in access rules, tariffs, quality and, to a certain extent, unbundling. Other fields of competence, however, are less homogenously widespread and crucially, they are the most important ones in a context of market integration.

**Discussion**

The main paradox that emerges from this dataset concerns the fact that several respondents appear to have a mismatch between their ex-ante and their ex-post powers. The fact that, seemingly, some regulators enjoy adequate ex-ante powers (i.e. rule-making or approval) in the Transmission sector, while showing moderate or weak enforcement powers (i.e. opinions only or lack of powers), sheds doubt on the de facto extent of the regulators’ reach in the relative markets. The importance of endowing regulators with adequate ex-post powers to correspond their ex-ante powers has not only been repeatedly advocated in all EU legislation, but it is also obviously needed if the regulator is to effectively have authority on regulated entities. In the realm of infrastructure regulation, where there is no room for competition by definition, the regulatory authority has to have the power to ensure compliance and enforce its decisions if it is to actually and effectively regulate.

The other perhaps unexpected result concerns the distribution of dispute settlement powers among respondents. Reply patterns for this variable are the most constant across the fields of competence investigated: some regulators do have dispute settlement powers, and some don’t. The variable seems to vary independently of ex-ante and enforcement powers. It must be borne in mind that the variable aggregates both dispute settlement and arbitration. Thus, it is entirely possible for a regulator to have scarce powers in the other areas but function as arbiter or dispute settler in disputes involving the TSO and its clients. The consistency of replies and the seemingly random distribution of the competence seem to suggest that, for European and neighboring regulators, dispute settlement competence is not as crucial as the other two or monitoring. This stands in stark contrast with the US model of Public Utility Commission, whose main and original function was to serve as a court for disputes involving parties in the utility sectors. However, consideration of the different needs utility regulatory authorities respond to in the two jurisdictions, and consideration of their historical development, help informing the interpretation of this result: utility regulators in the EU and in the neighborhood have a primarily
“market-making” function. NRAs came about with the abandonment of the state-owned monopoly model and the fragmentation of the electricity chain into potentially competitive sectors (generation and retail) and the natural monopoly linking them, to be regulated so as to permit the development of competition upstream and downstream. As for dispute settlement functions, Member States seem to have been left more freedom to choose whether to embody them in the NRA or not, in accordance with respective administrative traditions.

FYROM, Turkey and Serbia feature in the group of the best-endowed regulatory authorities in this sample. None of them is an EU member yet, although all of them (most famously, Turkey, who filed its application for membership in 1963) have applied to be. Croatia, Albania, Bosnia-Herzegovina and Montenegro show weaker regulatory powers, in particular in enforcement. Oddly, they all replied as having adequate ex-ante powers. The eagerness of these countries to enter the EU is no secret, as testified by their participation in the Energy Community (with Turkey being a somehow specific, different case than the others) that, as several observers pointed out, represented not only the disruption of the previous institutional setting (hence of previous centers of power) but also came at high political cost, since energy prices have strongly increased in these countries as a result of the abandonment of regulated prices.

The other finding of this analysis is that belonging to either of the Regional Regulatory Networks (CEER and/or MEDREG) and having one or another type of TSO (OU, ISO or ITO) do not seem to correlate with the extent of the powers of the regulators. Rather than membership to the RRA or model of unbundling, there seems to be a bias for less regulatory powers in smaller countries. However, FYROM, Hungary and Lithuania represent notable exceptions.

In a way, this acknowledgement may be encouraging, as it could be interpreted as confirming the success of the regional approach of the EU. In five years since the start of the Energy Community, most states of the area are reasonably on track as concerns their regulatory authorities, with some showing stronger eagerness to respect the letter of the law. As for the neighbours, without a membership perspective, the Turkish regulator features among the most empowered. In order to see whether the launch of MEDREG has had any tangible impact by itself, however, one will need to wait a bit longer, given its networked (and non-binding) nature. The presence, in MEDREG, of both EU and Energy Community regulators, plus two regional hegemons in their own right (Algeria and Turkey) could help steer convergence. The network does neither involve the European Commission nor the totality of EU regulators. In this sense, MEDREG is a completely new regional experiment, that implements regionalism within the EU to face regionalism outside of it. The initiative is clearly inspired by a logic of negative, rather than positive, integration that appears to be the natural sequel of many years of previous umbrella policy initiatives aimed at achieving harmonization with neighboring countries that have yield scant results. MEDREG seems to represent a turn towards removing obstacles to trade rather than imposing convergent frameworks, and a turn towards selected issues rather than broad programs of action. The other, important novelty of the network is that it involves regulators (famously described as the “new diplomats” by (Slaughter 1997)) only and focuses on exchange and learning in selected issues of interest to groups of members.

This survey represents a snapshot of a specific year; however, the result of the study of the replies in the transmission segment signal that non-EU regulators are well-acquainted with issues of EU relevance, and have sometimes taken steps towards complying with the relevant legislation ahead of schedule.
Several regulators from EU member states, by contrast, result scarcely endowed, although the bulk of them is adequately endowed. These cases need close-up analysis.

**Conclusions**

While most analyses of the state of the EU energy market, including those published by the European Commission, focus on the extent of competition in the generation and retail segments, this analysis focused on a rather less investigated aspect: regulators’ competencies as regards the natural monopoly of high-voltage transmission lines.

This choice, as mentioned, was due to both the way in which the survey has been structured (with special emphasis and investigation in the transmission sector) and, most importantly, to the kind of sample analysed, i.e. regulators from both the EU and the EU Neighbourhood, which have the common task (in particular for EU regulators and Energy Community members) of integrating their respective electricity markets so as to achieve competition where possible, but also security of supply, higher renewable energy sources penetration, and strongly developed interconnection (i.e. infrastructural investment).

The issue of adequate regulatory competence in the natural monopoly segment for EU and neighboring regulators has been surprisingly neglected in the literature and in policy-making: to the best of my knowledge, no assessment of it has been made by the European Commission, no infringement procedure has ever been opened on these grounds, no study has been attempted of the topic so far.

The examination of regulators’ replies to this survey, carried out by the international regulatory networks, testifies for the interest of regulators themselves into this topic and into knowing each other’s prerogatives and competencies: this interest may be due to an eagerness to better cooperate in the context of market formation, as well as to an eagerness to know whether other, and which, regulatory authorities are endowed with more expanded competence so as to advocate an increase in powers for themselves. The usage of networks as opportunity structures by network members is, indeed, a topic ripe for in-depth analysis.

This analysis represents a very first step towards investigating the issue of regulatory practice in more detail and in more sectors. It sought to underline the existence of a hole in the political science literature as concerns regulatory authorities, which should be analysed by adopting a more comprehensive approach that takes into consideration their formal and actual arrangements and practice and the extent of their autonomy and reach into the regulated sectors.

Avenues for future research could be represented by repeated assessments of the change in regulators’ competencies (in transmission and also in other segments of the electricity chain) through time. Further expansions of analysis of this survey would also certainly represent a welcome development, given that the other four sections of the survey have not yet been explored. Further comparisons with regulators from other corners of the world, whose replies are in the IERN/ICER database, could enrich the overall mapping of regulators’ competencies that is only sketched out in this analysis for a subset of them.

Finally, it needs to be stressed that any extent of regulatory competence does not imply any conclusion or correlation with independence, resources or expertise (i.e. the other main features of NRAs). Finding the nexus between these components, if there is one, will be the ambitious goal of future research.
References


ANNEX – Regulators’ powers and clusters

Ex-ante powers
Enforcement powers
Dispute settlement powers
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Ex-Ante Powers – IRT analysis – Discriminatory power in parenthesis

Enforcement Powers – IRT analysis – Discriminatory power in parenthesis
Dispute Settlement Powers – IRT analysis – Discriminatory power in parenthesis