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The formal delegation of regulatory decisions in the telecommunication sector:

An explanation using classification treesⁱ.

ABSTRACT: Research on regulation has traditionally focused on studying the delegation of regulatory competencies from political principals to an independent regulatory agency. In this paper, we argue that this delegation is nuanced by different factors that affect whether a specific regulatory decision is formally delegated. We examine and explain formal delegation patterns at the level of individual regulatory decisions in twelve countries located in Europe, Latin America and South Asia. The data were gathered by coding the twelve countries' telecommunications legislation. The data analysis was undertaken using a classification tree model – a non-parametric model. We found that the maturity of the market has the greatest effect on the formal delegation of regulatory decisions, but this effect is also influenced by the other theoretical factors considered, particularly the level of political constraints and the type of regulation.

Key words: formal delegation, telecommunication regulatory decisions, classification trees, regulation.

Introduction

Research on the regulation of liberalized markets has traditionally focused on studying the delegation of regulatory competencies from political principals (cabinet, ministers) to an independent regulatory agency based on the argument that this ensures a government's credible commitment to liberalization (Yesilkagit, 2004; D'Arcy & Nistotskaya, 2017; Overman, 2017). Hence, the emphasis of this research tradition has been more on organizational aspects, with particular attention paid to the characteristics of these sectoral regulatory agencies (such as independence and regulatory competencies). However, this organizational focus has its limitations. The existing studies do not distinguish between the different individual regulatory issuesⁱⁱ that exist in each regulatory framework. Rather, they

tend to focus on broad categories of delegated decisions (e.g., the extent to which regulation is fully delegated to an agency) (see, for example, Gilardi 2009). However, regulatory decisions range from economic to social and technical regulation and entail decisions about many different regulatory instruments, such as licensing and authorization. Even in countries with very powerful sectoral regulatory agencies, not all individual decisions concerning the economic, social and technical regulation of a market are delegated to such agencies. Instead, some decisions are allocated to other actors or kept with the minister or its ministry. *Therefore, the question as to which individual regulatory decisions are delegated and which are kept at the level of national ministers and ministries becomes relevant, as does the question as to why this is the case.*

The former implies that our focus is on the design of regulatory regimes by policy makers and legislators. We want to study the formal delegation of individual regulatory decisions. We argue that the delegation of regulatory competences needs to be interpreted at the level of individual regulatory decisions, as the delegation may be affected by the type of regulation that the decision addresses and by certain contextual factors. In that sense, we draw on certain theoretical factors that have been used to explain the delegation of regulatory competences at the organization level and test them at the decision level. This is important, in our view, because the different regulatory decision characteristics fit differently in the various formal delegation logics that previous research has stressed (Thatcher & Sweet, 2002; Majone, 2001; Eckert, 2010; Eckert, 2017). We also argue that, in addition to these decision-making logics, some other institutional factors at the country level or the market level affect whether regulatory decisions are delegated. In this sense, studying formal delegation at the decision level can provide a better understanding of the formal delegation process. It could be the case that a regulator has substantial regulation capacities and independence for economic regulation but not for social regulation.

This paper aims to study, compare and explain formal delegation patterns at the level of individual regulatory decisions in the telecommunications sector in different countries. This means that we take a political science perspective to understand the design of a regulatory regime. Thus, this paper considers two research questions. The first has a descriptive aim: *What types of individual regulatory decisions are more likely to be formally delegated (away from the minister or ministry)?* The second has an explanatory aim: *Why are some regulatory decisions formally delegated and others not?*

This study focuses on the telecommunications market because this sector was one of the first sectors to be liberalized worldwide, including in the countries studied in this research. Therefore, the telecommunications sector is now quite mature compared to other liberalized public services (e.g., post, electricity and public transport) (Bognetti & Obermann, 2008). Additionally, the maturity of the sector implies that formal delegation should have occurred already, and therefore it is possible to explore why it occurred. Furthermore, the telecommunication sector is a rather dynamic sector in comparison to other policy sectors due to its technological development, the entrance in other sectors (i.e., broadcasting) and the inclusion of organizations with regulatory function at different levels (i.e., European regulatory agencies). Therefore, the characteristics of the sector make it an interesting case to study.

To answer the research questions, we analyzed individual regulatory decisions in the telecommunication sector in twelve countries located in Europe, Latin America and South Asia, by looking to these countries' legislation. To conduct the data analysis, we used a classification tree model, which is a non-parametric statistical technique that predicts the occurrence of a categorical dependent variable (i.e., decision delegated or not) in terms of the classification power of different independent variables.

In the remainder of this paper, we will first present the approach taken and then discuss the theoretical model and hypotheses that guided our analysis. We then present the methodological section, followed by the results and discussion section.

1) Theoretical framework

The proposed theoretical framework aims to provide explanations for the formal delegation of regulatory decisions at the decision level. Thus, we seek to explain which decision characteristics fit better in each theoretical perspective. Our theoretical argument is based on Majone's (2001) two distinctive logics: first, the fiduciary logic, which is related to the commitment problem as a reason to delegate (Egeberg & Trondal, 2004; Bertelli, 2006), and second, the agency problem (Yesilkagit, 2004), which is related to the need to have control over the formal delegation.

The first part of the theoretical framework is related to the aim of the formal delegation: What is the expected outcome of the formal delegation of regulatory decisions, and why delegate? Therefore, these theoretical perspectives argue that decisions are delegated depending on what is expected from them. The second part of the framework brings theoretical perspectives that aim to explain formal delegation in relation to how it can be controlled. Specifically, we introduce theoretical elements that explain which decisions are more easily controlled or more difficult to control once delegated. Thus, the argument is that decisions are going to be delegated or not delegated based on how easy it is to control them. We added a third and final perspective to the theoretical framework regarding the relationship between the formal delegation and its context. This comes from the acknowledgement that any public administration decision, such as a delegate or regulatory decision, is nuanced by the context in which it occurs.

Before addressing the theoretical perspective, it is necessary to explain what we mean by "decision characteristics." We look at the type of regulation to which the decision belongs.

We distinguish between three types of regulation: technical regulation, economic regulation and social regulation (Aubin & Verhoest, 2014; González, 2017). Technical regulation includes all regulation related to the distribution of limited resources and standards. Economic regulation means regulation involving relationships between telecommunications providers. Finally, social regulation addresses the interactions between providers and users. The types of regulation categories are based on the relationships between the different actors, along with the scarce resources involved in the telecommunications sector. They do not refer to the objective of the regulation. This is important because some regulatory decisions that may end in the technical category of regulation may have substantial economic implications (i.e., the allocation of the spectrum).

Additionally, it is important to clarify that the types of relations that can occur between providers (economic regulation), providers and scarce resources (economic regulation), and users and providers (social regulation), can vary in its nature. For instance, the interaction that occurs between providers and user can be in terms of claims, users' rights, tariffs, and service coverage or services costs. Thus, it could be the case that the relation between providers and consumers has an economic or technical nature.

Figure 1 summarizes the theoretical argument of this paper. The formal delegation of regulatory decisions is in the middle box. At each side of the middle box are the two logics described by Majone (2001) and the type of regulation with which it is linked. Thus, we aim to interpret the fiduciary logic and the agency problem at the decision level. Further, we argue that those logics correspond to certain types of regulatory decisions. The contextual factors are located in the bottom part of Figure 1. These are expected to affect both the formal delegation of regulatory decisions as such and the effect of the decision-level characteristics.

The proposed theoretical framework is heavily grounded in the regulatory governance literature in general and in the regulatory design literature in particular. This literature

frequently explains the design, formal delegation and independence of regulatory agencies in terms of the expectations to create and delegate competencies to such agencies (credible commitment) and the need to control what is delegated (agency problem). Alongside these sorts of explanations, scholars have also explored the mediation effect of certain political contextual factors, particularly the political constraints of a country (Yesilkagit & Christensen, 2009; Gilardi, 2002; Van Thiel, 2004) and the maturity of the sector market (Coen & Héritier, 2005; Guidi, 2014) over the creation and formal delegation of competencies to a regulatory agency. Thus, our theoretical model (Figure 1) is based on the mainstream political science regulatory governance literature. Our contribution lies in the fact that we argue that those explanations need to be interpreted not at the organizational level but at the level of the decision, as regulations, in this case in the telecommunications sector, cover a wide range of topics and thus, these explanations might not apply to all those topics.

Insert figure 1 about here

This theoretical framework specifically focuses on studying why some regulatory decisions are formally delegated to country-specific regulatory agencies and why other decisions are not. Thus, we focus on studying how the regulatory framework is formally designed, and to do this, it is necessary to look at the legislation. We are particularly interested in the intention behind the design and formal delegation of regulatory decisions.

Such an approach is not uncommon in the field of regulatory governance (Hanretty & Koop 2012; Koop & Lodge, 2014, Mathieu et al., 2016). Previous studies investigated several elements: the institutional characteristics of regulatory agencies and the extent to which they assured independence and accountability, the mechanism provided in legislation to assure coordination in regulatory decision making, and the role of different regulatory actors in regulatory decision making, as indicated in the legislation. In this paper, we focus on a similar question and believe that the strategy of using legal texts is valid.

These studies argue in favor of using legal texts to approach the study of regulatory design. They use several arguments, which we believe apply to our case. In a paper that aims to measure the formal independence of regulatory agencies, Hanretty and Koop (2014) argue that studying legal text is worthwhile when one is interested in studying why politicians delegate power, as “drafting and passing a statute is the ultimate act in delegating power” (Hanretty and Koop, 2014 p. 199). A very similar argument can be found in Koop (2011) Wonka and Rittberger (2010) suggest that when studying European regulatory agencies, “assessing and explaining agencies’ formal-institutional independence is a crucial first step to explore the potential for the level of agencies’ influence in EU policy-making since the level of independence affects their ‘zone of discretion” (Wonka and Rittberg 2010 p. 733).

As an additional argument, we suggest that studying regulatory design, in this case the formal delegation of regulatory decisions, is necessary to understand regulatory output (Mathieu et al., 2016). Although a given regulatory decision is formally allocated to a given actor, other actors may indeed try to influence such a decision (Stokman and Van den Bos 1992; Stokman and Zeggelink 1996), and these actors will target their efforts towards the actor that has been given the final decision-making power. Thus, it is not possible to study the de facto interactions without also studying how the decision making is formally designed.

We argue that using legislation as the main source to study the formal delegation of regulatory decisions is a valid approach because the manner in which legislation is framed reflects, to some degree, the logics, reasoning, and motivations considered to decide how a government’s action – in this case, regulation – is arranged (Majone, 2001; Yesilkagit; 2004; Eckert, 2017). Furthermore, the central argument of this paper is that certain characteristics of the decisions and certain contextual factors affect whether a decision is delegated.

1.2) Theories related to the aim of the formal delegation (fiduciary logic)

1.2.1) Credible commitment

The main theoretical perspective belonging to fiduciary logic is credible commitment (Baldwin & Lodge, 2012; Overman, 2017). However, this explanation may not hold for all types of regulation. Although regulatory frameworks are composed of several types of regulation, not all of them are critical for maintaining investors' trust. For instance, in the case of telecommunications, regulatory decisions about administering telecommunications funds or homologating telecommunications equipment (i.e., technical regulation) may not be as important for providers as regulatory decisions involving connections between operators, market remedies or license granting (i.e., economic regulation). Furthermore, regulatory research has highlighted the fact that economic regulation is needed to ensure the functioning of a competitive market, which is especially important when there is still a public incumbent (Coen & Heritier, 2005).

On this basis, we argue that the credible commitment argument mainly applies to issues such as ensuring liberalization, avoiding market entry barriers, market abuse and competitive prices (Krapohl, 2004; Eckert, 2017). Such regulatory decisions can be classified within the economic type of regulation.

1.3) Theories related to the control of formal delegation (agency problem)

The other side of the formal delegation picture relates to the control of the decisions once they have been delegated (Eckert, 2010). Some theoretical perspectives highlight that the control side of formal delegation comes from the agency problem. The agency problem is derived from principal-agent theory (Zeckhauser and Pratt, 1985), which has its roots in economic transaction cost theory (Williamson, 1981). The former theory stresses the difficulties in transactions and contractual relations between a principal and an agent to whom the principal has delegated some decisions. The principal-agent problem is related to goal incongruence between the two, the asymmetry of information of the latter over the former, and the tendency of agents to use that information to pursue their own interests. This theory predicts how and

when the central government (principal) will delegate certain specific functions over others to desegregated bodies (agencies). Within this body of research, we have identified two factors that may influence the formal delegation of regulatory decisions: decision characteristics based on rational choice theories and the political salience of the regulatory decisions.

Two types of explanations exist from the perspective of the control of delegated decisions. The first relates to which decisions are more easy to delegate and the second relates to which decisions politicians are less likely to delegate.

Rational choice characteristics

The perspective explaining why some decisions are more easily delegated comes from rational choice theories: agency theory, transaction cost theory and public choice theory. They highlight that decisions have to have certain characteristics to be delegated. Verhoest et al. (2010) and Maggetti & Verhoest (2014) present the characteristics that facilitate the effective formal delegation of tasks. For this paper, we apply the same logic for the formal delegation of regulatory decisions. Following these scholars' insights, we argue that regulatory decisions are more efficiently delegated under the following conditions: when the results are observable or easy to measure, when the objectives are easy to define (Jensen and Meckling 1976), when the activities involved are homogenous (Wilson, 1989), and when there is a low level of asset-specific investment to be made (Van Thiel 2001).

In our view, these types of decisions fit primarily within technical regulation. This type of regulation deals mainly with operators' access to the spectrum, quality standards, equipment homologation, numbering, and so on. Each of these decisions is fairly homogenous and standardized (e.g., has the same quality standards and procedures for all providers), their outcome is easy to measure (e.g., the use of a particular frequency), and there are low asset-specific investments to be made as complexity is rather limited.

Political salience

The level of political salience of the involved regulatory decisions can also explain why some decisions are less likely to be delegated (Yesilkagit, 2004; Koop, 2011; Lavertu, 2015). Political salience is high when the regulatory decision has a significant direct impact on a large number of citizens or organizations. These types of decisions are likely to be more intensively controlled by the political principals and thus less likely to be delegated away from the minister or ministry. In the field of telecommunications, these types of regulatory decisions fall under the social type of regulation and address user rights, universal service obligations, telecommunications investment projects, and user complaints. These types of regulatory decisions can potentially affect citizens' support to the government in office. Thus, politicians prefer to keep close control over them. This observation does not imply that necessary regulatory decisions that have to do with telecommunications regulation will become a partisan or a major campaigning issue. What we argue is that the outcome of the social type of regulatory decisions, such as the manner in which and how universal service is provided, how billing to consumers should be handled, or how consumers can complain to their provider, can potentially affect citizens' support for a given government. This is particularly the case for Latin American and some South Asian countries that have public administered funds to build infrastructure to guarantee universal service provision.

In our case, highly politically salient regulatory decisions are more likely to be the social type of regulation. This is because social regulation has a more direct impact on how people perceive the service.

1.4) Theories that relate formal delegation with its context

Political constraints (veto players)

The political constraints of a given country have been a mainstream contextual characteristic treated by research as having an effect on formal delegation. Currently, there is a debate

among scholars regarding the effect of political constraints on formal delegation. The literature presents two main accounts of this effect. The first is based on formal delegation theory. Yesilkagit and Christensen (2009) argue that the creation of agencies and their particular characteristics depend on policy conflicts in a given country. The argument suggests that in regimes that are subject to periodic elections, it is unlikely that the governing party can make all decisions on its own. Opposition parties will try to influence agencies' design and the regulatory decisions that are delegated to them (Riker, 1986). Furthermore, opposition parties will try to retain some influence over regulatory agencies after they are created. Therefore, in moments of great political constraint, the original legislation specifying the formal delegation will allow only a limited number of regulatory decisions. Researchers have related policy conflicts to the number of independent veto players and their preferences within a political system (Yesilkagit & Christensen, 2009; Gilardi, 2002; Van Thiel, 2004). Veto players are actors located in any government branch that have the capacity to block policy changes.

In the second account, researchers (Keefer and Stasavage, 2002) relate political constraints, and particularly veto players, to lower levels of formal independence of regulatory agencies, particularly central banks. Here, veto players act as a functional equivalent of formal delegation. The idea is that if there are many veto players, then policies towards liberalization will not be easy to change; the need for credible commitment will therefore be lower, and there will be no need to delegate regulatory decisions from ministries.

Based on this argument, we claim that the level of political constraint has an effect on the formal delegation of regulatory decisions. Despite the fact that the two accounts differ in their explanation, they both suggest a negative relationship between policy conflict and formal delegation.

Market maturity

In addition to political constraint, market maturity is a factor that can affect the formal delegation of regulatory decisions (Coen & Héritier, 2005; Guidi, 2014). The level of market maturity refers to a combination of two indicators: the level of a market's liberalization and the extent to which the incumbent is publicly or privately owned. This is based on the idea that liberalization is supposed to lead to a more competitive market on the one hand and to exhibit less public ownership regarding the main operators (privatization) on the other.

The maturity of the market has a direct effect on the need for regulation. Regulation often occurs as a consequence of market failures (Baldwin, Cave, & Lodge, 2012). The theory of regulation has suggested that the main reason for regulation is the need to correct market failures, such as negative externalities, incomplete information, entry barriers, uneven risk delivery and monopoly abuse (Stiglitz, 2008).

Scholars have also highlighted the relationship that exists between market competition and regulation. In that regard, Jordana and Levi-Faur (2004, p. 6) distinguish between the regulation *of* competition and regulation *for* competition to describe the positive relationship between competition and regulation. Both concepts assume a positive intervention in the economy by the state, but the latter implies a greater capacity to do so than the former. Regulation *for* competition is normally done on a sector-specific basis and by a sector regulator (IRA), which acts proactively in an *ex ante* manner. The regulation *of* competition is done in a broader manner (whole economy), and with less intrusive capacities, in an *ex post* manner. The latter is normally done by general competition authorities.

Coen and Héritier (2005) developed a conceptual model that attempts to explain how regulation occurs in relation to the evolution of a given market. The amount and intensity of the regulation needed have a direct relationship with the state of the market. When markets

are less mature, the production of regulation is extensive and intense to establish a market where there was not one before and to prevent monopoly abuse (Edwards and Waverman, 2005). In this moment, more regulatory decisions need to be allocated to the sector regulator. When markets mature and the incumbent has been fully privatized, the chances of market failure are lower and the need for extensive ex ante regulation is lower; with a mature market, the need to create and ensure competition ex ante is reduced, and thus fewer regulatory decisions are delegated.

Based on the proposed theoretical factors, we posit the following two hypotheses. We expect that the effect of each factor reinforces the other to make formal delegation either more or less likely.

H1: Formal delegation to non-ministerial bodies is more likely when more of the following characteristics are present: there is low market maturity, there are few political constraints, and regulatory decisions are of the economic or technical type.

H2: Formal delegation to non-ministerial bodies is less likely when more of the following characteristics are present: there is high market maturity, there are high political constraints, and regulatory decisions are of the social type.

2) Methodology

2.1) Country selection

Twelve countries were selected for this research: (a) Europe: Belgium, Ireland, the Netherlands and Switzerland; (b) South Asia: Bangladesh, Nepal, India and Sri Lanka; and (c) Latin America: Colombia, Peru, Venezuela and Ecuador. The reason for this selection is, first, to see what general patterns can be found despite the heterogeneity of countries and, second, to see whether country-level variables such as political constraints have any explanatory value. Additionally, these countries present variations in the country-level variables that we selected, which allowed us to see their effect more clearly. Table 1 presents the distribution of

the selected cases across the two selected country variables. In sum, the case selection has two main goals. First, we aimed to select countries with a certain level of variability in the context variables to allow us to grasp their effect. Second, by including cases from different regions and characteristics we could assess whether patterns of formal delegation emerge among those differences.

*** insert Table 1 about here***

As the case selection strategy implies, we were looking not to detect countries' specificities but to find specific formal delegation patterns across the data. For that reason, in the results and discussion section, we explain the findings based on the theoretical perspectives, not based on the countries.

2.2) Data collection

The data collection was undertaken in 2014ⁱⁱⁱ. Our main source was the telecommunications laws, and their amendments, of the twelve countries studied^{iv}. When the primary telecommunications laws referred to secondary legislation or supranational directives, we also used these additional sources.

Using legislation as the main source of data collection might be problematic because sometimes legislation can be ambiguous. However, based on our experiences during coding, we argue that legislation is not ambiguous on whether the decision is delegated. In our experience, legislation is clear when assigning regulatory competencies.

We extracted the regulatory decisions that are part of the regulatory framework from each country's legislation. To limit the number of decisions that were included and make the results more easily comparable across countries, we decided to fit the decisions to a pre-defined set of issues. These issues, each involving several regulatory decisions, were defined using a two-part strategy. The first was inductively: After collecting the data for the twelve countries, we extracted some common issues that were included in the regulations of every

country. Second, we compared and refined our list of issues with the issues highlighted in manuals for telecom regulation published by the International Telecommunication Union (ITU) (Blackman, 2011). This process resulted in a list of 14 issues. These issues were aggregated via the three previously mentioned types of regulation, which matched the proposed hypotheses for the analysis. The issues and the aggregated categories are presented in Table 2.

*** insert Table 2 about here***

For each decision, we mapped three elements: the number of decisions mentioned in the country's legislation, the number of actors involved in each decision-making process, and the influence of each actor in each decision. The influence of each actor in the regulatory decision is based on the set of influence scores presented in Table 3.

We then transformed the influence scores to code whether a decision was delegated. To do so, we looked at the influence scores of the ministry or government for each individual decision and recoded them in the following way: if the influence score was 0.6, 0.8 or 1, we coded the regulatory decision as being 'not delegated' because the ministries or government retained the ability to determine the outcome of the regulatory decision even if other actors were involved in it. Even when a decision was shared with other actors, if ministers had veto power over it, we coded it as a decision that was not delegated.

We consider only decisions that are taken by the country telecommunication ministry or delegated the telecommunication regulator, other country specific regulator, or the competition authorities. This implies that we exclude from the analysis decisions that are delegated upwards to supranational and international organizations, or downwards to subnational governments.

Consequently, if the influence score of the ministry was 0.4, 0.2 or 0, we coded it as a delegated decision. In this case, the ministries or governments did not have the ability to

influence the final regulatory decision outcome; even if they did provide some advice, this advice was not binding.

*** insert Table 3 about here***

2.2.2) Limitation of the data collection

Our data collection approach relies on legal documents. This approach has two main shortcomings: first the fact that what is written in the law does not necessarily occur in reality, and second it could be the case that different factors, which do not reflect the particular logics of delegation, affect the framing of the legal text, causing a decision to be delegated or not.

The possible factors that might affect the delegation of regulatory decisions can be summarized as two categories. The first category refers to factors that might affect the delegation before it occurs; thus, these factors could affect whether a decision is delegated.

These factors include the activities of lobbyists, the role of international sectorial organizations and the diffusion of statute pieces between countries.

The second category is related to factors that might affect the outcome of the regulatory decision after it is delegated. These factors include governmental influence, judicial review, regulatory capture, lobbying and EU regulatory networks.

These factors are different from the delegation logics and contextual factors that were included in the theoretical framework (see Figure 1) and we highlight them in this section to acknowledge their potential relevance.

Regarding *lobbyists* (Bouwen, 2002; Michalowitz, 2007), it could be the case that lobbyist groups can push in favor or in disfavor of the delegation of certain regulatory decision.

International sectorial organizations (Coddington, 1994), such as the ITU, establish directives recommendations and guidance, which are adopted by the different countries in their regulatory framework. Countries might delegate regulatory decisions following these guidelines. Finally, *diffusion* makes references to the possibility that countries copy parts of

their statutes from each other, with the delegation of regulatory decisions responding to such diffusion and not to particular delegation logics (Jordana and Levi-Faur, 2005).

Regarding the factors that can affect the outcome of a given decisions, the first one is the influence that *government authorities* can exert over regulatory organizations (Edwards, and Waverman, 2006). It is plausible that government authorities, such as the telecom ministry of each country, manage to affect the decision-making of regulatory authorities, undermining the fact that the decision has been delegated to such authorities. Second, *jurisprudence and judicial review* (Bovis, 2006; Gauja, 2014) can affect the decisions made by a regulatory authority and either change their scope and interpretation or nullify the decision. Additionally, a situation where some degree of *regulatory capture* occurs (Dal Bó, 2006) will affect the outcome of regulatory decisions. If regulatees manage to intervene in the regulatory decision-making process in one way or another, it will call into question the degree to which the delegation process reflects the actual capacity of regulatory organizations to make regulatory decisions. Additionally, the influence of *lobbyist* organizations is considered here as well. The reason for this is that such an organization can also try to influence the outcome of specific regulatory decisions.

In the particular case of the European countries included in this paper, there is another factor that can influence the outcome of regulatory decisions: the existence of EU-level regulatory agencies and *regulatory networks*, which add more complexity to the possible factors that can affect the outcome of regulatory decisions (Eberlein and Grande, 2005; Coen and Thatcher, 2008; Thatcher and Coen, 2008).

It is true that formal dispositions can, in some cases, lack real effect. However, we argue that this will be less the case regarding the formal delegation of regulatory decision-making because regulatory actors have at least two powerful incentives to comply with what is formally stated (Mathieu et al. 2017). First, following rules and procedures determines the

regulators' procedural reputation, which is important for public organizations (Carpenter and Krause 2012). Second, if regulators abide by what is stated in the legislation, they reduce the possibility that regulatees will activate a judicial review mechanism, which they would do if there were room to challenge decisions that go against their interests (Mathieu and Aubin, 2014).

2.3) Data analysis

The method of analysis used for this research was a classification and regression tree (CART) model. The classification tree model was used instead of the regression tree model because it is the most appropriate when working with categorically dependent variables. We preferred this technique over more traditional models such as a logistic regression because the data violated the assumption of independence of the observations. This is because we had two levels of analysis: variables at the country level and variables at the decision level. The latter will be influenced by the former. Since we had only twelve countries in the study, there were not enough data to run a multilevel model. Because the classification tree model is non-parametric, it is not bound to comply with the assumption of independence of observations. Additionally, the classification tree model allows for the combination of explanatory variables. This is quite important and, in our view, is an advantage over other models because social phenomena do not have only one cause, nor do they have a set of independent causes. Rather, they are produced by the combination of several factors. This model accounts for that. A classification tree is a method that aims to predict an outcome based on a series of binary splits of subsets of the data using the independent variables fitted in the model (Kurt, Ture, & Kurum, 2008).

Classification trees start by choosing the best predictor, which is the one with the largest explanatory power. This is defined by looking at which predictor (independent variable), when split in two, causes the fewest misclassifications of the outcome (Rokach & Maimon,

2014). This main predictor is called the root or the main node. After the root of the tree is defined, the model continues to split each independent variable according to its classification capacity. These variables, from which two branches develop, are labeled intermediate nodes. This process continues until all cases classified belong to the same category of an outcome, which is called a leaf, or until no further splits are possible (Rokach & Maimon, 2014).

Classification trees have a hierarchical nature. This means that the explanatory power of each independent variable is not considered independently, as in more classic statistical techniques, but rather in relation to the other predictors. Therefore, this model can rank the different explanatory variables depending on their explanatory power.

Furthermore, since classification trees are non-parametric, there are no assumptions regarding distributions or variance. This makes it a more flexible technique that is suitable for working with nominal or ordinal variables, which are very common in the social sciences.

For the analysis in this paper, the dependent variable is a nominal variable with two values: no formal delegation, coded with 0, and full formal delegation, coded with 1. This was done based on the recodification of the influence scores, as explained above. The independent variables for the analysis were coded as follows. To operationalize the different types of regulation, we created one categorical variable based on the information in Table 1. This variable has three categories: decisions related to technical regulation, decisions related to economic regulation and decisions related to social regulation.

The independent variable at the market or sectoral level, market maturity, was operationalized by the creation of an index that measures its two dimensions: the level of the market's liberalization and the extent to which the incumbent is publicly owned. To accomplish this, we used the data from the Data Book on Information and Communication Technology, a publication of the World Bank. This source provides information about the main fixed line

operators and the level of liberalization of the main submarkets of the telecommunications sector (long distance, mobile, internet and international gateway)^v.

The Data Book provides annual information, and we calculated the average of the index for the years 2005, 2006 and 2007 – some years before the measurement of the formal delegation of regulatory decisions, depending on the year that the telecommunications legislation was issued in each country. This was done because we expect that governments need time to adjust the formal delegation of a regulatory decision in reaction to the observed level of market maturity. Because changing the formal delegation of regulatory decisions requires changing the legal framework, and hence an intervention by parliament and legislative actors, we assumed a time lag of at least five years. For the market maturity index, we completed the same transformation as the POLCON index. We ended up with a categorical variable with three categories. An overview of the variables included in the model and its operationalization is presented in Table 4.

To operationalize the independent variable at the country level, meaning the political constraints factor, we used the political constraints index (POLCON V) (Henisz, 2000), which provides a measure of how easily a policy can be changed in a country. It measures the extent to which a change in the preference of one actor may cause a policy change (Henisz, 2000). This index looks at the number of veto players in a particular country and the preferences of those veto players at a particular moment in time.

*** insert Table 4 about here***

The POLCON index was then transformed into a categorical variable with three categories: high political constraints, moderate political constraints and low political constraints. This was done to generate more aggregated categories and to keep all the variables in the model either nominal or categorical. The manner in which the POLCON index was transformed in three categories was: since the index values can range from 0 to 1, we established three cutoff

points to divide the distribution in three equal parts and then located the country scores in the corresponding category. This is a reasonable strategy because the index does have natural maximum and minimum values and therefore a direct categorization does not produce bias categories.

Similarly, for the market maturity, we used the POLCON index score for 2007 to account for the time that legislation needs to adapt to the political reality.

2) Results

In this section, we present the results of the analysis, starting with some descriptive results, followed by the results of the classification tree model.

3.1) Descriptive results

Table 5 presents the frequencies of each variable and how decisions are spread across countries. For the latter, the data set includes 505 regulatory decisions.

*** insert Table 5 about here***

With respect to the type of regulation as an independent variable, the largest category is “economic regulatory decisions” (43%) followed by “technical regulatory decisions” (35.2%) and “social regulatory decisions” (21.8%). For the POLCON index, the largest category is “decisions in countries with high POLCON values” (39%), followed closely by “decisions in countries with low POLCON values” (34.4%). The smallest category is “decisions in countries with moderate POLCON values” (24.8%). For the variable “market maturity,” the share of decisions for medium market maturity is 58.8%, which is significantly larger than the categories of “high market maturity” and “low market maturity,” which constitute only 25.5% and 15.6%, respectively, of the regulatory decisions.

3.2) Results of the tree model

Figure 2 presents the results of the model that classifies whether a regulatory decision will be delegated. The bold labels in Figure 2 represent the variables of the model, which are located according to their classification power, either in the main or root node or in an intermediate node. The boxes in the bottom part of the figure are the leaves of the tree, where no further splits can be completed and the final classification is presented. The information on the leaves includes the number of decisions that were correctly classified as well as those that were misclassified, and the percentage of decisions that each leaf represents. For instance, the leaf on the far left was classified as decisions that are fully delegated. This leaf represents 47% of the decisions, of which 174 were correctly classified (decisions that were actually delegated) and 35 were incorrectly classified (decisions that the model classified as fully delegated, but in fact were not delegated). On the opposite side of the tree, the leaf at the far right was classified as “decisions that are not delegated.” This leaf represents 13% of all the regulatory decisions, of which 43 regulatory decisions were correctly classified (decisions that in fact were not delegated) and 15 were incorrectly classified (decisions that were actually delegated).

*** insert Figure 2 about here***

The variable that has the largest classification power is “market maturity,” which is in the main or root node and refers to a low or moderate level of market maturity. From that point on, any branch that goes to the left means that the decisions fulfill the condition that is expressed in the main node (i.e., all the decisions that are classified to the left of the main node satisfy the condition of belonging to a telecommunications market that has low or moderate levels of maturity). Any branch that goes to the right means that the decisions do not fulfill the condition of this main node; instead, they meet the opposite condition, in this case being in a telecommunications market that is highly mature.

Table 6 presents the summary of the classification paths shown in Figure 2. It is important to note that in all the classification paths, the number of decisions that were correctly classified is larger than the number of misclassifications. Additionally, more decision paths lead to formal delegation in comparison to paths that lead to no formal delegation. Of all the paths presented in Table 6, path 1 covers the largest share of regulatory decisions (47%), with 82% of those decisions classified correctly. Paths 2, 4, 5 and 6 have similar coverage (approximately 10%). However, paths 2 and 6 have a significantly high percentage of correctly classified decisions (particularly path 6, with the highest percentage, 100%), whereas path 4 has the lowest percentage of correctly classified decisions (59%) and path 5 has an intermediate percentage of correctly classified decisions (74%).

*** insert table 6 about here***

Paths 3, 7 and 8 have the smallest coverage, with a moderate percentage of correctly classified decisions. The combination of the percentage of decisions covered by each classification path and the percentage of decisions that are correctly classified allows for the assessment of the empirical relevance of the different formal delegation paths.

With regard to the proposed hypotheses,

H1: Formal delegation to non-ministerial bodies is more likely when more of the following characteristics are present: there is low market maturity, there are few political constraints, and regulatory decisions are of the economic or technical type.

H2: Formal delegation to non-ministerial bodies is less likely when more of the following characteristics are present: there is high market maturity, there are high political constraints, and regulatory decisions are of the social type.

For Hypothesis 1, Path 1 contains two of the proposed characteristics: low market maturity and low political constraints. The high number of decisions covered by this path and the high

percentage of correctly classified decisions suggest that these two characteristics combined are extremely relevant.

Path 2 includes two of the proposed characteristics of the hypothesis, low market maturity and the economic type of regulation. However, it includes a characteristic that contradicts the hypothesis: high political constraints. However, this path has less coverage. Path 3 has only one of the characteristics proposed in Hypothesis 1 – low or moderate market maturity – and has two contradictory characteristics, high political constraints and the social type of regulation. The fact that this path contains characteristics that both favor and disfavor formal delegation may explain why it has a higher percentage of misclassification.

Path 6 contains only one of the characteristics proposed in the hypothesis, the economic type of regulation, and has two contradictory characteristics, high market maturity and high political constraints. Although this path has a high percentage of correct classifications, it covers a relatively small number of decisions. Similarly, path 8 contains a proposed characteristic, the technical type of regulation but has the same two contradictory characteristics as path 6.

In sum, although three of the four paths that lead to formal delegation contain contradictory characteristics, Path 1, which is most consistent with Hypothesis 1, has the largest coverage and one of the largest percentages of correctly classified decisions. This hypothesis therefore has substantial support, particularly the combination of low market maturity with low political constraints and the economic type of regulation.

With regard to Hypothesis 2, Path 4 contains two of the proposed characteristics – high political constraints and the social type of regulation. However, it has a contradictory characteristic, which is moderate market maturity. Here, again, the presence of contradictory characteristics could be related to the high percentage of misclassification (this path has the

worst performance of all paths in this regard). Additionally, the number of decisions covered is limited.

Path 5 has one of the characteristics presented in Hypothesis 2 – high market maturity – and has a contradictory characteristic – low political constraints. Here, again, the combination of factors that foster and prevent the formal delegation of regulatory decisions is reflected in the lower percentage of correctly classified decisions.

Path 7 has three characteristics proposed in Hypothesis 2: high market maturity, high political constraints and the social type of regulation. Although this path resembles Hypothesis 2 more than paths 4 and 5, it covers only 1% of the decisions; therefore, its relevance is limited.

In sum, there is some support for Hypothesis 2, but due to the misclassifications and low coverage of the paths involved, this support is tenuous.

3) Discussion

The results of the classification tree model present an interesting insight when they are viewed through the theoretical perspectives used in this paper. The theoretical factors that address the relationship between the context and the formal delegation proved to be the most relevant, particularly for the upper position that they occupy in the classification tree. With regard to the perspective related to the reasons to delegate (fiduciary logic), the result shows that credible commitment is indeed a valid explanatory factor as it is present in two paths that lead to formal delegation. The control of formal delegation perspective (agency problem) had some support (paths 6 and 7); however, these theoretical perspectives account for a rather limited number of regulatory decisions.

Several elements must be stressed when the findings of this paper are discussed in terms of their relationship with the theories that were presented in the theoretical framework. First, with regard to market maturity, the results support the proposed relationship between market

maturity and formal delegation. In particular, Baldwin, Cave and Lodge's (2012) theory is supported. They present a case where it could be reasonable to expect that there is more need for regulation by sector regulators as a consequence of market failures, which are more likely to occur in less mature markets. Coen and Héritier's (2005) claims that in less evolved markets, there is a need for more formal delegation and thus more competencies are delegated to the sector regulator are also supported. Finally, the findings also support the distinction between regulation for competition and the regulation of competition; the former is needed more in less competitive markets (Jordana & Levi-Faur, 2004).

The findings about political constraints present an interesting insight into the role of veto players. As mentioned in the theoretical framework, some scholars (Yesilkagit and Christensen, 2009; Moe, 1995; Van Thiel, 2004) have related veto players to high policy conflict and in turn to less formal delegation. Some other scholars (Keefer and Stasavage, 2002) have suggested that veto players can act as a functional equivalent for formal delegation, with many veto players enabling less formal delegation.

Our findings suggest that political constraints, represented by the number of veto players, can or cannot have a negative relationship with formal delegation depending on the combination of the number of veto players with other factors. The effect of political constraints seems to depend more specifically on the level of market maturity in the telecommunications sector of each country. When lower levels of political constraints are present in a country that has a telecommunications market that is not very mature, formal delegation of regulatory decisions is seen (Path 1). This suggests that when markets are not highly mature, the lack of veto players generates formal delegation. This finding is in line with the theoretical expectation.

Nevertheless, when there are low levels of political constraints in a country that has a more evolved market, this seems to result in non-formal delegation of regulatory decisions (Path 5). In this case, there are few veto players, so low policy conflict is related to less formal

delegation. This goes against what the literature suggests and therefore could be an interesting line for future research.

The relationship between the level of market maturity and political constraints is nuanced by the type of regulation, and particularly by the credible commitment idea, which is related to the economic type of regulation. Paths 2 and 6 show that even when the political constraints are high, if the decision is about economic regulation, then it will lead to formal delegation. This suggests that the credible commitment need of governments is important, even if political constraints are high (many veto players). Hence, when the regulatory decision is of an economic type, high political constraints do not lead to less formal delegation.

The relationship between credible commitment (economic type of regulation) and formal delegation, as well as the lack of a relationship between political constraints and credible commitment, goes in the same direction as Gilardi's (2003) findings. Gilardi found that formal delegation was more related to economic regulation than to other types of regulation and that veto players did not have a negative impact on the necessity for credible commitment.

The manner in which the different factors seem to interact in our findings suggests that the contextual factors (market maturity and political constraints) not only have an effect on the formal delegation but also have a mediation effect on the effect that the type of regulation has over formal delegation.

*** insert table 7 about here***

From the possible alternative factors that can influence the delegation of regulatory decisions explained in section 2.2.2, here we address two of them. We do not address the other ones as it is not possible with the data we have. The first one is the possibility that the findings of this paper respond more to a diffusion process where countries copy pieces of legislation from

each other, rather than to the proposed delegation logics and contextual explanations elaborated in this paper.

To assess this possibility, in Table 7, the different patterns of formal delegation for each country that belongs to one of the three regions of our sample are presented.

The data in Table 7 make it possible to see that there are some similarities between countries within the same region, and across regions, but this is neither generalized nor conclusive. Some countries are similar to others in one type of regulation but not in the others. The countries that present a more similar pattern are the European countries in the economic type of regulation. Nevertheless, based on Table 7, we cannot conclude that the telecommunication statutes of these countries are copied among each other. What can actually be seen is that, in almost all countries, the type of regulatory decision that is more delegated is the economic type, followed by technical and finally social regulation. This supports our theoretical expectation.

In the case of European countries, the formal delegation of economic regulatory decisions tends to look alike. This is most likely the effect of European Union directives, which have a harmonizing role in the European countries^{vi}. These directives have to be incorporated by countries in their legislation, causing EU countries to have similar formal delegation arrangements in some specific regulatory issues. In this particular case, the findings can be interpreted not at the country level but at the EU level. This means that the logics of regulatory design might apply at the European level.

The second possible element that can contradict the findings of this paper is the possibility of lobbyists affecting the design of regulatory frameworks. We argue, however, that this is not dramatically problematic in this paper, because research has found that there is a negative relationship between the veto points in one country and the capacity that lobbyists have to influence the outcome of a given policy (Gehlbach and Malesky, 2010; Henisz, and Zelner,

2006; Peterson and Thies, 2011). This implies that when there are more veto players, the influence of lobbyists and interest groups decreases. In our analysis, we included the political constraints that each country has as an explanatory variable using the POLCON index. This index measures how difficult it is to change a given policy in a country based on the number of veto points and the extent to which their preferences are aligned.

Table 1 shows each country's characteristics and provides a view of the level of political constraints in each of the studied countries. From our sample, only two countries have low political constraints – Peru and Ecuador – which is a relatively low percentage of our sample. This indicator is not conclusive proof that lobbyists do not affect regulatory decisions, but it does provide a certain level of confidence that the effect of lobbyists is not large enough to invalidate our analysis.

The conclusions in this paper have some limitations. The first, of course, is that it covers only the telecommunications sector. The formal delegation dynamics may not be the same in other sectors; therefore, comparative research that looks at different utility sectors is required. Additionally, this paper provides data from only twelve countries, so it may be necessary to expand the number of countries and cover other regions. Finally, we looked at delegation in a formal manner; we do not say anything about whether delegation actually occurs (see the wide literature on *de facto* regulatory decision-making and independence: Maggetti, 2007; Badran and James, 2012; Ingold, Varone, and Stokman, 2013; Ingold and Varone, 2014). However, we believe that despite the fact that our results refer mainly to the design choices, they function to fulfil the objective of the paper. Nevertheless, more research would also be useful in that regard.

Despite these limitations, what has been presented here has much strength. First, we have presented data from countries in different regions, which means that what we found has significance across three different world regions. Second, we looked at the regulatory decision

level. In general, research on formal delegation focuses on the sectoral regulator level and its level of independence. We believe that looking at the decision level can provide a complementary and more detailed account of the formal delegation process. Third, by looking at the different types of regulation and types of regulatory decisions, we were also able to approach the theoretical arguments in a more refined manner.

Finally, this paper has a major methodological strength because of the analytical technique we used. We were able to go beyond the assessment of individual effects and see how the different variables used in this research interact with each other, generating different formal delegation paths. This is interesting because, in the social sciences, a phenomenon seldom has a single independent cause; rather, phenomena are due to the combination of different explanatory factors. The classification tree model allowed us to capture that peculiarity.

References

- Aubin, D., & Verhoest, K. 2014. *Multi-Level Regulation in the Telecommunications Sector: Adaptive Regulatory Arrangements in Belgium, Ireland, The Netherlands and Switzerland*. Hampshire: Palgrave Macmillan.
- Badran, A., and James, O. 2012. Does formal independence matter for regulatory outcomes? Measuring regulatory interdependence in networks: The case of telecoms sector in Egypt. *International Journal of Politics and Good Governance*, 3(3.2), 1-30.
- Baldwin, R., Cave, M., & Lodge, M. 2012. *Understanding regulation: theory, strategy, and practice*. New York: Oxford University Press.
- Bel, G., & Warner, M. 2008. "Does privatization of solid waste and water services reduce costs? A review of empirical studies". *Resources, Conservation and Recycling* 52(12):1337-1348.
- Bertelli, A. M. 2006. "Delegating to the Quango: Ex ante and ex post ministerial constraints". *Governance* 19(2):229-249.
- Blackman, C., & Srivastava, L. (2011). *Telecommunications regulation handbook*. World Bank and the International Telecommunication Union, Washington, DC.

- Bouwen, P. (2002). Corporate lobbying in the European Union: the logic of access. *Journal of European public policy*, 9(3), 365-390.
- Bognetti, G., & Obermann, G. 2008. "Liberalization and privatization of public utilities: origins of the debate, current issues and challenges for the future". *Annals of Public and Cooperative Economics* 79(3):461-485.
- Bovis, C. H. (2006). Developing public procurement regulation: Jurisprudence and its influence on law making. *Common Market L. Rev.*, 43, 461.
- Carpenter D, Krause GA (2012) Reputation and Public Administration. *Public Administration Review* 72 (1): 26–32.
- Codding Jr, G. A. (1994). The International Telecommunications Union: 130 years of telecommunications regulation. *Denv. J. Int'l L. & Pol'y*, 23, 501.
- Coen, D., & Héritier, A. 2005. *Refining Regulatory Regimen*. Cheltenham: Edward Elgar Publishing.
- Coen, D., & Thatcher, M. (2008). Network governance and multi-level formal delegation: European networks of regulatory agencies¹. *Journal of Public Policy*, 28(1), 49-71.
- D'Arcy, M., & Nistotskaya, M. (2017). State first, then democracy: Using cadastral records to explain governmental performance in public goods provision. *Governance*, 30(2), 193-209.
- Dal Bó, E. (2006). Regulatory capture: a review. *Oxford Review of Economic Policy*, 22(2), 203-225.
- Eckert, S. (2010). Between commitment and control: varieties of formal delegation in the European postal sector. *Journal of European Public Policy*, 17(8), 1231-1252.
- Eckert, S. (2017). Two spheres of regulation: Balancing social and economic goals. *Regulation & Governance*.
- Edwards, G. A., & Waverman, L. (2005). The Effects of Public Ownership and Regulatory Independence on Regulatory Outcomes: A Study of Interconnect Rates in EU Telecommunications.
- Egeberg, M., & Trondal, J. 2004. "Political leadership and bureaucratic autonomy: Effects of agencification". *Governance* 22(4): 673-688.

- Eberlein, B., & Grande, E. (2005). Beyond formal delegation: transnational regulatory regimes and the EU regulatory state. *Journal of European Public Policy*, 12(1), 89-112.
- Gauja, A. (2014). Building competition and breaking cartels? The legislative and judicial regulation of political parties in common law democracies. *International Political Science Review*, 35(3), 339
- Gehlbach, S., & Malesky, E. J. (2010). The contribution of veto players to economic reform. *The Journal of Politics*, 72(4), 957-975.
- Gilardi, F. 2002. "Policy credibility and formal delegation to independent regulatory agencies: a comparative empirical analysis". *Journal of European Public Policy* 9(6): 873-893.
- Gilardi, F. 2003. " Formal delegation to independent regulatory agencies in Western Europe: a cross-sectional comparison". *In University of Lausanne, Paper prepared for the workshop Formal delegation in Contemporary Democracies ECPR Joint Sessions of Workshops*, 29, p. 38. Edinburgh.
- Gilardi, F. (2009). *Formal delegation in the regulatory state: independent regulatory agencies in Western Europe*. Edward Elgar Publishing.
- Gonzalez, C.I., Measuring and comparing the distribution of decision-making power in regulatory arrangements of the telecommunication sector in Latin America, *Utilities Policy* (2017), <http://dx.doi.org/10.1016/j.jup.2017.04.002>
- Guidi, M. (2014). Formal delegation and varieties of capitalism: Explaining the independence of national competition agencies in the European Union. *Comparative European Politics*, 12(3), 343-365.
- Henisz, W. J. 2000. "The Institutional Environment for Economic Growth". *Economics and Politics* 12(1): 1-31.
- Henisz, W. J., & Zelner, B. A. (2006). Interest groups, veto points, and electricity infrastructure deployment. *International Organization*, 60(1), 263-286.

- Ingold, K., and Varone, F. (2014). Regulatory of the Telecommunication in Switzerland: A Network Approach to Assess the Regulatory Agencies' Independence . En D. Aubin, and K. Verhoest, Multi-level Regulation in the telecommunication sector. Adaptative Regulatory Arrangements in Belgium, Irland, the Netherlands, and Switzerland (págs. 137-161). Hampshire: Palgrave Macmillan.
- Ingold, K., Varone, F., and Stokman, F. (2013). A social network-based approach to assess de facto independence of regulatory agencies. *Journal of European Public Policy*, 20(10), 1464-1481.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4), 305-360.
- Jordana, J., & Levi-Faur, D. (2005). The diffusion of regulatory capitalism in Latin America: Sectoral and national channels in the making of a new order. *The Annals of the American Academy of Political and Social Science*, 598(1), 102-124.
- Jordana, J., & Levi-Faur, D. (Eds.). (2004). *The politics of regulation: institutions and regulatory reforms for the age of governance*. Edward Elgar Publishing.
- Keefer, P., & Stasavage, D. 2002. "Checks and balances, private information, and the credibility of monetary commitments". *International organization* 56(04):751-774.
- Koop, C. (2011). Explaining the accountability of independent agencies: The importance of political salience. *Journal of Public Policy*, 31(02), 209-234.
- Krapohl, S. (2004). Credible commitment in non-independent regulatory agencies: A comparative analysis of the European agencies for pharmaceuticals and foodstuffs. *European Law Journal*, 10(5), 518-538.
- Kurt, I., Ture, M., & Kurum, A. T. 2008. "Comparing performances of logistic regression, classification and regression tree, and neural networks for predicting coronary artery disease". *Expert Systems with Applications* 34(1): 366-374.
- Lavertu, S. (2015). For fear of popular politics? Public attention and the formal delegation of authority to the United States executive branch. *Regulation & Governance*, 9(2), 160-177.

- Levy, B., & Spiller, P. T. (1994). The institutional foundations of regulatory commitment: a comparative analysis of telecommunications regulation. *JL Econ. & Org.*, 10, 201.
- Levi-Faur, D. (2005). The global diffusion of regulatory capitalism. *The Annals of the American Academy of Political and Social Science*, 598(1), 12-32.
- Maggetti, M. (2007). De Facto Independence after Delegation: A Fuzzy-Set Analysis'. *Regulation and Governance*, 1(4), 271-294.
- Maggetti, M., & Verhoest, K. (2014). Unexplored aspects of bureaucratic autonomy: a state of the field and ways forward. *International review of administrative sciences*, 80(2), 239-256.
- Mathieu, E., Verhoest, K., and Matthys, J. (2017) Measuring multi-level regulatory governance: Organizational proliferation, coordination, and concentration of influence. *Regulation & Governance*, 11: 252–268. doi: 10.1111/rego.12127
- Majone, G. (2001). Two logics of formal delegation: agency and fiduciary relations in EU governance. *European Union Politics*, 2(1), 103-122.
- Mathieu E, Aubin D (2014) Regulation of Telecommunications in Belgium: Organizational Complexity and Regulatory Effectiveness. In: Aubin D, Verhoest K (eds) *Multi-level Regulation in the Telecommunications Sector*. Palgrave Macmillan, Basingstoke, 45–77.
- Mathieu, E., Verhoest, K., and Matthys, J. (2017) Measuring multi-level regulatory governance: Organizational proliferation, coordination, and concentration of influence. *Regulation & Governance*, 11: 252–268. doi: 10.1111/rego.12127.
- Michalowitz, I. (2007). What determines influence? Assessing conditions for decision-making influence of interest groups in the EU. *Journal of European Public Policy*, 14(1), 132-151.
- Moe, T. M. (1995). Toward a Theory of Public Bureaucracy. *Organization theory: From Chester Barnard to the present and beyond*, 116.
- Overman, S. (2017). Autonomous Agencies, Happy Citizens? Challenging the Satisfaction Claim. *Governance*, 30(2), 211-227.
- Peterson, T. M., & Thies, C. G. (2011). Intra-industry Trade, Veto Players, and the Formation of Preferential Trade Agreements. Unpublished manuscript.

- Riker, W. H. (1986). *The art of political manipulation* (Vol. 587). Yale University Press.
- Rokach, L., & Maimon, O. 2014. *Data mining with decision trees: theory and applications*. Singapore: World scientific.
- Stiglitz, J. E. 2008. *Government failure vs. market failure: Principles of regulation*.
- Thatcher, M., & Sweet, A. S. 2002. "Theory and practice of formal delegation to non-majoritarian institutions". *West European Politics* 25(1):1-22.
- Thatcher, M., & Coen, D. (2008). Reshaping European regulatory space: An evolutionary analysis. *West European Politics*, 31(4), 806-836.
- Van Thiel, S. 2001. *Quangos: trends, causes and consequences*. Aldershot: Ashgate.
- Van Thiel, S. 2004. "Trends in the Public Sector Why Politicians Prefer Quasi-Autonomous Organizations". *Journal of Theoretical Politics* 16(2):175-201.
- Verhoest, K., Roness, P. G., Verschuere, B., Rubecksen, K., & MacCathaigh, M. 2010. *Autonomy and Control of State Agencies*. New York: Palgrave.
- Williamson, O. E. 1981. "The Transaction Cost Approach". *American Journal of Sociology* 87(3): 548-577.
- Wonka, A., & Rittberger, B. (2010). Credibility, complexity and uncertainty: Explaining the institutional independence of 29 EU agencies. *West European Politics*, 33(4), 730-752.
- Yesilkagit, K. 2004. The design of public agencies: overcoming agency costs and commitment problems. *Public administration and development* 24(2): 119-127.
- Yesilkagit, K., & Christensen, J. 2009. Institutional Design and Formal Autonomy: Political versus Historical and Cultural Explanations. *Journal of Public Administration Research and Theory*, 20(1):53–74.
- Zeckhauser, R. J., & Pratt, J. W. (Eds.). (1985). *Principals and agents: The structure of business* (p. 37). Boston: Harvard Business School Press.

Table 1. Distribution of countries across the two country-level variables^{vii}.

| Country | Political constraints | Market maturity |
|-----------------|--------------------------------|--------------------------|
| India | High political constraints | Moderate market maturity |
| Bangladesh | Moderate political constraints | Low market maturity |
| Nepal | High political constraints | Low market maturity |
| Sri Lanka | Moderate political constraints | Moderate market maturity |
| Belgium | High political constraints | Moderate market maturity |
| Ireland | High political constraints | High market maturity |
| Switzerland | High political constraints | Moderate market maturity |
| The Netherlands | High political constraints | High market maturity |
| Colombia | Moderate political constraints | Moderate market maturity |
| Ecuador | Low political constraints | Moderate market maturity |
| Peru | Low political constraints | High market maturity |
| Venezuela | Mid political constraints | Moderate market maturity |

Table 2: List of issues coded in the telecommunications legislation.

| | Issue |
|-----------|---|
| Technical | Numbering |
| | Frequencies and spectrum |
| | Technical standards |
| | Infrastructure building and shared use of infrastructure |
| Economic | Interconnection |
| | License and general authorization |
| | Definition analysis and market remedies (ex-ante remedies) |
| | Ex post regulation (based on general competition law) |
| Social | Universal access and social telecommunications policy (funds) |
| | Quality of service |
| | Users' rights |
| | Tariffs and billing |

Table 3. Measurement of actors' influence.

| Weight | Coding | Description |
|--------|---------------------|--|
| 0 | Not involved | The actor is not involved in the decision |
| 0.2 | Informed | The actor is informed of the decision |
| 0.4 | Consulted | The actor is consulted or gives non-binding advice |
| 0.6 | Binding opinion | The actor holds a binding position or can make proposals |
| 0.8 | Co-decision maker | The actor is a co-decision maker |
| 1 | Main decision maker | The actor is the main decision maker |

Source: Aubin & Verhoest (2014)

Table 4. Theoretical model: its operationalization and coding.

| Theoretical perspective | Theoretical framework/factor | Variable operationalization |
|-------------------------|------------------------------|---|
| Delegation objectives | Credible commitment | Variable name: type of regulation Nominal variable with three categories: economic, technical and social regulatory decision |
| Delegation Control | Agency problem | |
| | Political Salience | |
| Contextual factors | Political constraints | Variable name: Polcon Ordinal variable with three categories: high, moderate and low POLCON scores |
| | Market maturity | Variable name: market maturity Ordinal variable with three categories: high, moderate and low maturity scores |

Table 5. Frequency of explanatory variables.

| Variable | Variable operationalization | Frequency | Percentage |
|-----------------------|--------------------------------|-----------|------------|
| Type of regulation | Economic regulatory decisions | 217 | 43.0 |
| | Technical regulatory decisions | 178 | 35.2 |
| | Social regulatory decisions | 110 | 21.8 |
| POLCON index | High POLCON | 201 | 39.8 |
| | Moderate POLCON | 179 | 24.8 |
| | Low POLCON | 125 | 34.4 |
| Market maturity index | High market maturity | 129 | 25.5 |
| | Moderate market maturity | 297 | 58.8 |
| | Low market maturity | 79 | 15.6 |

| | | | |
|---------|-----------------|----|------|
| Country | Bangladesh | 39 | 7.7 |
| | Belgium | 46 | 9.1 |
| | Colombia | 49 | 9.7 |
| | Ecuador | 59 | 11.7 |
| | India | 37 | 7.3 |
| | Ireland | 32 | 6.3 |
| | Nepal | 40 | 7.9 |
| | Peru | 66 | 13.1 |
| | Sri Lanka | 31 | 6.1 |
| | Switzerland | 15 | 3 |
| | The Netherlands | 31 | 6.9 |
| | Venezuela | 60 | 11.9 |

Table 6 . Summary of classification paths.

| No. | Path | Percentage of decisions covered | Classification | Number of decisions correctly classified | Number of decisions incorrectly classified | Percentage of decisions correctly classified |
|-----|--|---------------------------------|----------------------|--|--|--|
| 1 | Moderate or low market maturity – low or moderate political constraints | 47% | Formal delegation | 174 | 37 | 82% |
| 2 | Moderate or low market maturity – high political constraints – economic type of regulation | 12% | Formal delegation | 46 | 7 | 86% |
| 3 | High political constraints – technical or social type of regulation – low market maturity | 6% | Formal delegation | 21 | 7 | 75% |
| 4 | High political constraints – technical or social type of regulation – moderate market maturity | 10% | No formal delegation | 28 | 19 | 59% |
| 5 | High market maturity – moderate or low political constraints | 13% | No formal delegation | 43 | 15 | 74% |

| | | | | | | |
|---|--|-----|----------------------|----|---|------|
| 6 | High market maturity – high political constraints – technical or economic type of regulation | 11% | Formal delegation | 38 | 0 | 100% |
| 7 | High market maturity – high political constraints – social type of regulation | 1% | No formal delegation | 4 | 1 | 80% |
| 8 | High market maturity – high political constraints – technical type of regulation | 2% | Formal delegation | 6 | 3 | 66% |

Table 7 patterns of formal delegation per country and regions

| Region | Country | Variable | Percentage of formal delegation | percentage of no formal delegation |
|---------------|-----------------|--------------------------------|---------------------------------|------------------------------------|
| South Asia | India | Economic regulatory decisions | 70.59 | 29.41 |
| | | Social regulatory decisions | 62.50 | 37.5 |
| | | Technical regulatory decisions | 16.67 | 83.33 |
| | Sri Lanka | Economic regulatory decisions | 90 | 10 |
| | | Social regulatory decisions | 75 | 25 |
| | | Technical regulatory decisions | 92.31 | 7.69 |
| | Bangladesh | Economic regulatory decisions | 61.11 | 38.89 |
| | | Social regulatory decisions | 50 | 50 |
| | | Technical regulatory decisions | 92.31 | 7.69 |
| | Nepal | Economic regulatory decisions | 100 | 0 |
| | | Social regulatory decisions | 81.82 | 18.18 |
| | | Technical regulatory decisions | 75 | 25 |
| Latin America | Colombia | Economic regulatory decisions | 78.57 | 21.43 |
| | | Social regulatory decisions | 81.82 | 18.18 |
| | | Technical regulatory decisions | 45.83 | 54.17 |
| | Venezuela | Economic regulatory decisions | 93.75 | 6.25 |
| | | Social regulatory decisions | 94.44 | 5.56 |
| | | Technical regulatory decisions | 100 | 0 |
| | Peru | Economic regulatory decisions | 35.48 | 64.52 |
| | | Social regulatory decisions | 53.85 | 46.15 |
| | | Technical regulatory decisions | 100 | 0 |
| | Ecuador | Economic regulatory decisions | 100 | 0 |
| | | Social regulatory decisions | 71.43 | 28.57 |
| | | Technical regulatory decisions | 100 | 0 |
| Europe | Belgium | Economic regulatory decisions | 92.59 | 7.41 |
| | | Social regulatory decisions | 33.33 | 66.67 |
| | | Technical regulatory decisions | 50 | 50 |
| | The Netherlands | Economic regulatory decisions | 100 | 0 |
| | | Social regulatory decisions | 33.33 | 66.67 |
| | | Technical regulatory decisions | 50 | 50 |
| | Ireland | Economic regulatory decisions | 100 | 0 |

| | | | | |
|--|-------------|--------------------------------|-------|-------|
| | | Social regulatory decisions | 0 | 100 |
| | | Technical regulatory decisions | 100 | 0 |
| | Switzerland | Economic regulatory decisions | 75 | 25 |
| | | Social regulatory decisions | 60 | 40 |
| | | Technical regulatory decisions | 66.67 | 33.33 |

Figure 1. Summary theoretical argument

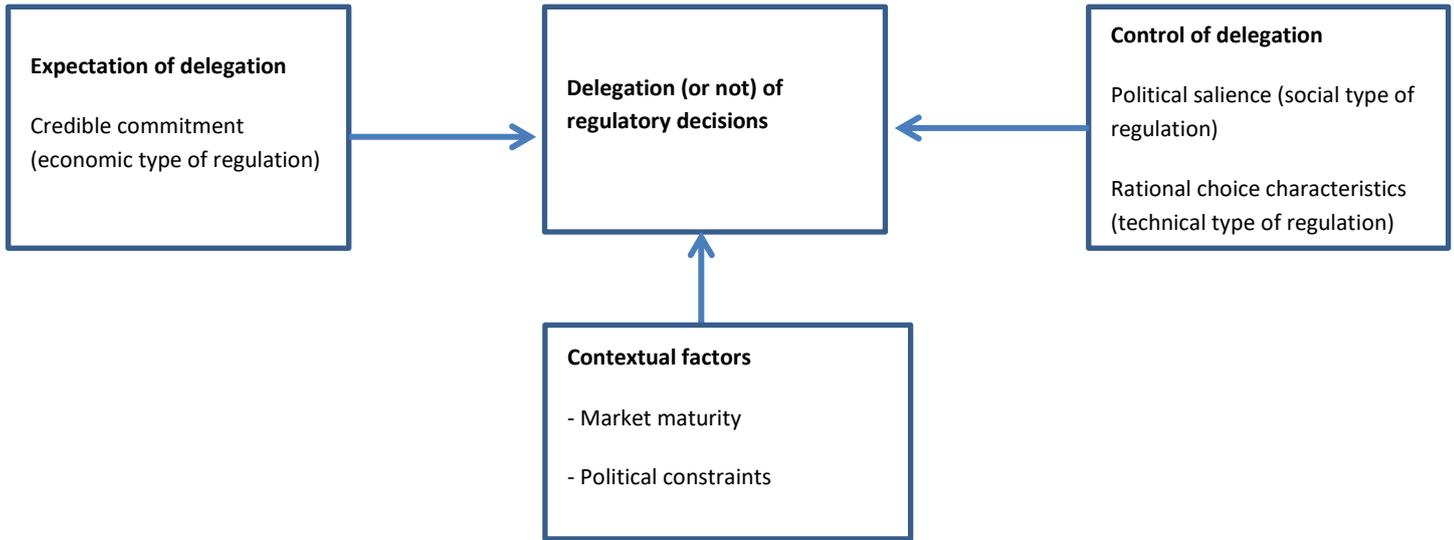
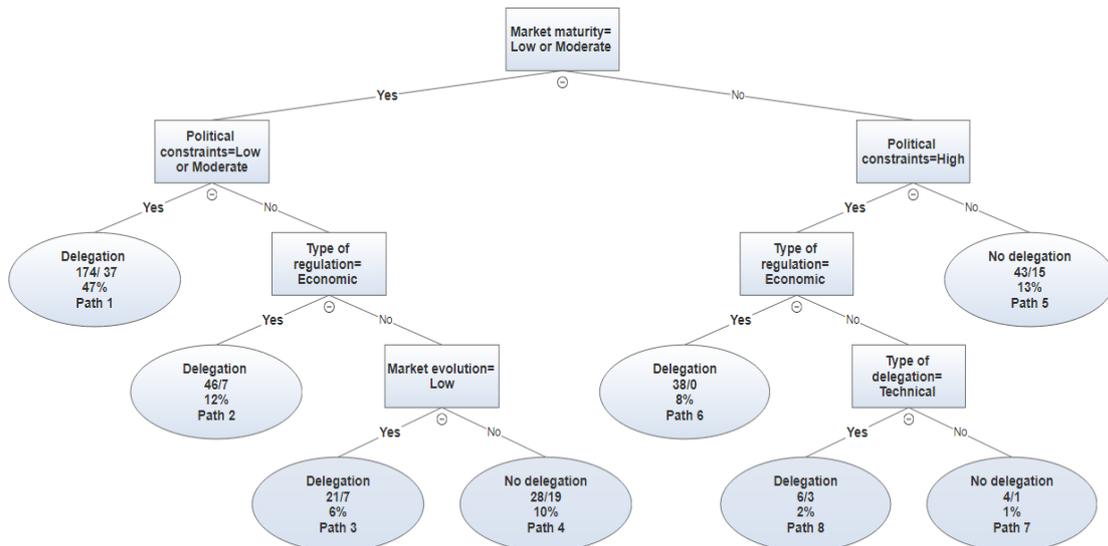


Figure 2. Results of the classification tree model for the variable formal delegation.



ⁱ Acknowledgement omitted for anonymization reasons.

ii By regulatory issues, we mean the topics that are addressed in the regulation. We distinguish between regulation that aims to regulate economic issues, technical issues, and social issues.

iii Although the data collection was undertaken in 2014, not all the legal legislation of these countries was adopted in that year. In fact, the majority of statutes were issued or amended between 2007 and 2012. The legislation consulted per country corresponds to the following years:

Colombia: main law 2009, last amendment consulted 2009,

Venezuela: main law 2011, last amendment consulted 2011,

Peru: main law 2007, last amendment consulted 2011,

Ecuador: main law 2011, last amendment consulted 2011,

India: main law 2000, last amendment consulted 2014,

Sri Lanka: main law 2011, last amendment consulted 2013,

Bangladesh: main law 2001, last amendment consulted 2010,

Nepal: main law 1997, last amendment consulted 2013,

Belgium: main law 2005, last amendment consulted 2013,

The Netherlands: main law 1998, last amendment consulted 2012,

Ireland: main law 2007, last amendment consulted 2010, and

Switzerland: main law 1997, last amendment consulted 2010.

iv Omitted for anonymization reasons.

v It is important to mention that this indicator misses the VoIP market and the extent to which international telephony has moved to VoIP. However, in addition to international and long distance, there are two other submarkets considered in the market maturity indicator; thus, we argue that it is still valid.

^{vi} The European directives that had a larger effect over the European countries telecommunication legislation are: the 2002/21/EC directive on a common regulatory framework, the 2002/19/EC directive on access and interconnection, the 2002/20/EC directive on the authorisation of electronic communications networks and services, the 2002/77/EC directive on competition in the markets for electronic communications networks and services, as well as the 2009/140/EC Better Regulation Directive.

vii To see how we operationalized political constraints and market matureness, see the methodological section.