

Departament d'Economia Aplicada

Behavioral Regulatory Agencies

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Universitat Autònoma
de Barcelona

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Aquest document pertany al Departament d'Economia Aplicada.

Data de publicació : **Maig 2016**

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Behavioral Regulatory Agencies¹

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February 2016

General De Gaulle (Septembre 1963, quoted in Landier and Thesmar, 2010):

"L'essentiel (...), ce n'est pas ce que peuvent penser le comité Gustave, le comité Théodule ou le comité Hyppolyte. L'essentiel pour le général De Gaulle, président de la République française, c'est ce qui est utile au peuple français, ce que sent, ce que veut le peuple français. J'ai conscience de l'avoir discerné depuis bientôt un quart de siècle. Et je suis résolu, puisque j'en ai encore la force, à continuer de le faire."

Abstract

This article analyses how the commitment problem in regulation, and the potential for a strategic delegation solution, is affected by the consideration of bounded rationality by agents that participate in the regulatory interaction. Regulators and other agents have endogenous preferences. Non-optimizing behavior, expert biases (and related de-biasing strategies), and a concern for fairness and process also modify the traditional regulatory game. As a result, on the one hand independent regulators are seen as part of a potentially more robust regulatory system, and on the other hand their contribution to this system can be based on a wider range of instruments.

Key Words: bounded rationality, regulation, commitment, delegation.

1. Introduction

The analysis of the bounded rationality of agents involved in policy-making has recently enriched the literature on behavioral economics² (see review in Section 2 below). Indeed, it would be an inconsistency to assume that agents behave with bounded rationality in a market context,³ but that they are perfectly rational when they intervene in the design and choice of collective solutions.

In this article, I apply this basic insight to a well-known problem in the literature on regulation: the time inconsistency of regulation in the face of sunk investments, and the associated potential solution of delegating into an independent regulator. This problem has been

¹ I thank comments received in presentations given at Bristol and Paris.

² A recent discussion of the insights of behavioral economics is provided for example in Akerloff and Shiller (2015). For general applications to public policy, see for example Congdon et al. (2011), Cullis and Jones (2009) and Shafir, ed. (2013).

³ See Spiegler (2011) for an analysis of Industrial Organization models with boundedly rational consumers, and Armstrong and Huck (2010) and Cyert and March (2000) for an analysis of the bounded rationality of firms' decision-makers.

analyzed theoretically and empirically, and is recognized to shed light on public intervention in infrastructure industries such as transport, energy or telecommunications. In their classic book on regulatory reform in the UK, Armstrong et al. (1994) argued that the task of regulators in these industries would be easy except for the presence of asymmetric information, potential regulatory capture and commitment problems. The recent literature suggests a fourth source of difficulty (which is complementary of the others⁴): the behavioural biases of regulators.

There is a parallelism in the evolution from welfare economics to political economy and the evolution from behavioral economics to behavioral political economy. Traditional welfare economics was criticized by the Public Choice School because of the asymmetry between assuming self-interested market agents and benevolent policy-makers. However, this school broadly interpreted this asymmetry as providing a rationale for reducing to the minimum public intervention (Stern, 2010). A more agnostic synthesis was provided by the more general concept of political economy, where all agents have similar motivations but there is no bias in favour or against public intervention: quite generally, the assumption of self-interested agents changes, but does not necessarily eliminate, public intervention. It is precisely from political economy models that the suggestion to alleviate time inconsistency in policy with delegation emerged. In an analogous asymmetry, early analysis of public policy using behavioral insights assumed that bounded rationality only affected agents operating in market contexts, but not perfectly rational policy makers who could supposedly nudge the former into behaving in ways that were good for their long run selves (see among others Sunstein, 2006, Thaler and Sunstein, 2008, Thaler, 2015, and their critics such as Kahan et al., 2006). Some of the critics have been right in highlighting this asymmetry, but getting close to the risk of arguing that assuming boundedly rational policy-makers would justify removing public intervention in many contexts. Again, a more agnostic behavioral political economy would assume similar at least potential degrees of bounded rationality in all agents, which would most probably modify public intervention, without necessarily eliminating it (in some cases it might, in others it might increase the need for some collective intervention; in many cases, I conjecture that it would modify the intervention).

It is significant that some regulators with an academic background have started to provide interesting experienced insights into the topic, as in Cooper and Kovacic (2012) and Vickers (2002). Kovacic is a former chairman of the Federal Trade Commission in the US and in his paper with Cooper recognizes the difficulties that regulators have in avoiding well-known biases such as the availability or the confirmation bias. Vickers is a former president of the Office of Fair Trading in the UK and former chief economist and member of the Monetary Policy Committee of the Bank of England, and explains the differences in the tasks of regulators

⁴ For example, complementarities occur with the potential for “cultural capture” (see Kwak, 2014).

(“foxes”) and central bankers (“hedgehogs”). This distinction is reminiscent of the distinctions in experts and task characteristics that have been observed to trigger different degrees and forms of bounded rationality.⁵

Delegation of policy decisions into insulated expert agencies has become common in the recent past in a number of areas, such as central banking or infrastructure industry regulation. Delegation is a response both to the commitment, and the asymmetric information problems. The assumption is that these experts have the will and the knowledge to implement whatever policy is best for society. However, behavioral economics teaches us that all agents, including experts, may be vulnerable to biases and departures from full rationality. The preferences of experts, as those of anybody else, are contingent on framing effects, and more generally, are endogenous and potentially volatile. The global financial crisis since 2008 has exacerbated a debate about the extent and limits of technocracy that has been going on for long: central bankers have been accused of not foreseeing the crisis, but Italian and Greek parliaments have resorted to technocratic governments in the worst passages of the crisis. The reason of the tension is that there are difficulties of reconciling populist tendencies of democracy with sound long run policies. Rodrik (2012) believes that the need to hold technocrats accountable is an intrinsic part of a well functioning democracy (see also Easterly, 2014), whereas Sachs (2012) stresses the increasing risks that we face as society becomes more complex and we are exposed to global hazards. Shiller (2001) in finance and Flyvbjerg et al. (2003) in infrastructure project evaluation, among others, stress the limits of expert knowledge, whereas Engel et al. (2014) argue that independent expert agencies should be an important part of an institutional strategy to improve cost-benefit analysis to avoid white elephants in public-private partnerships. Expert bias suggests divergent implications for democracy to Hertz (2013), who argues that more power should be given to consumers and voters as a result, or Tasic (2009), who suggests that expert bias calls for less regulation.

The focus here is on contexts where removing regulation is not in the agenda. If you have cancer, or a mental illness, or both, people should still see a doctor before implementing self-treatment or trusting market advice in the Internet. The paper is thus motivated by the premise that doctors, teachers, sports referees and other expert regulators still have some value to society, even recognizing their bounded rationality.

Of course, the potential challenges of behavioral economics to the existing literature on regulation go beyond the commitment problem that is addressed in this article. Difficulties of normative welfare economics and incentive theory in the face of behavioral economics spill

⁵ For example, Tetlock (2006) reports that experts that resemble “foxes” (people who know a little bit of many things) are less prone to make forecasting mistakes than “hedgehogs” (people who know a lot of one thing). See also Tetlock and Gardner (2015).

over into many normative models in regulation (Laffont and Tirole, 1993, is based on models of normative economics, political economy and incentive theory that assume full rationality). I limit myself here to reinterpret previous research (including mine) at the light of behavioral political economy, or to collect previous isolated references to psychological issues in the literature on the political economy of regulation, to analyse how they affect the commitment problem. The main result/message is that on the one hand independent regulators are seen as part of a potentially more robust regulatory system, and on the other hand their contribution to this system can be based on a wider range of instruments.

In the remainder of this article, in Section 2 I review the literature on the bounded rationality of regulators. In Section 3, I analyze how the introduction of bounded rationality in agents involved in policy-making (voters, politicians, regulators) affects the commitment problem in the regulation of infrastructure industries, and how it affects the potential solution of strategic delegation into an independent regulator. Section 4 reinterprets some pieces of the empirical and policy literature using insights from this analysis. Finally, Section 5 concludes and offers some thoughts for future research.

2. Departures from bounded rationality in the regulation literature

A variety of articles in the literature suggests that regulators, as opposed to what is assumed in standard models, do not always optimize, may hold non-standard preferences, and are potentially affected by expert biases.

In the field of microeconomic regulation, after Joskow's PhD thesis ("A Behavioral Theory of Public Utility Regulation") and the resulting articles in the early 1970s, there wasn't much explicit academic formal work in the economics literature (as opposed to the social psychology or legal literatures) on behavioral microeconomic regulation until Cooper and Kovacic (2012). Joskow's early work suggests that **non-optimizing behavior** was a constant in the history of US utility regulation. Joskow (1972) argued that "Commissions appear to have the most rudimentary understanding of the relationship between the return permitted to earn and the operational objectives the Commission wishes to achieve. The ability of the Commission to scientifically evaluate the rate of return requests made by the firms is therefore probably quite limited." Joskow (1974) shows that the objectives of regulatory commissions are more complex than those of firms (as in Dixit, 2002) and their statutes are quite vague. In practice, regulatory agencies seek to minimize conflict and criticism. The regulatory agency has then evolved a structure which satisfactorily balances the conflicting pressures from the external environment. More recently, Leaver (2009) described this behavior as "minimal squawk:" regulators are motivated to do a good job and are worried about their reputation. In the presence of interest

groups that may highlight bad decisions that harm them, regulators may opt for a “minimal squawk” behavior (similar to the omission bias of sports referees, and similar to the satisficing behaviour considered by Joskow, 1974, but as an equilibrium outcome). As a result, it may be a bad idea to appoint mid career professionals for limited terms. Longer terms in US PUCs are associated with better decisions for consumers that are less generous for firms. It is when an equilibrium with the environment breaks down, such as in macroeconomic shocks, that agencies enter into innovation mode. In the US since WWII, the primary concern of regulatory commissions according to Joskow had been to keep nominal prices from increasing.

Since Joskow’s thesis, regulatory agencies have been studied as commitment devices in the presence of sunk investments or the ratchet effect,⁶ or as mechanisms to alleviate information asymmetries. They have been mostly assumed to behave rationally, according to some objective function or monetary reward. An exception is Bendor and Moe (1985), where the interaction between agencies, politicians and interest groups is modelled as a dynamic process in which participants make choices adaptively rather than optimizing following the tradition of Simon (1947) like in Joskow’s dissertation. Bounded rationality has been used to explain contract incompleteness, which is at the basis of the economic and political hazards that investors in sunk assets must face. But in the bargaining process that results from contract incompleteness, agents are assumed to behave consistently with well-defined objectives. A step forward is provided by Henisz and Zelner (2004), who explain that individuals in regulatory interactions have limits in their ability to craft complete contracts but also in their carrying capacity and understanding of current and likely future political debates: “as a result, they process information selectively, typically relying on pre-existing heuristics and shortcuts to structure the information with which they are presented and assess both their preferences with respect to current policies and the likelihood that these policies may be subject to future change.” Institutions then shape the ensuing battle for the perceptions of public opinion.

The role of regulators as correcting information asymmetries is consistent with the view that regulatory agencies should be staffed by experts. Experts may provide technical knowledge in complex matters (risk, technologies, finance). But they are not free from empirically documented **biases** (Landier and Thesmar, 2010; Kahan et al., 2006; Kuehnhanss et al., 2015):

- Fear of ostracism (conformity), by which regulators instead of making use of their independent discretion, may fall prey of conventional wisdom or expedient policies;
- Loss aversion, by which regulators will only significantly act under severe welfare losses or political scandals;

⁶ See Currie et al. (1999).

- Overconfidence (confirmation bias, cultural views), by which regulators and other experts will weigh too much their prior beliefs;
- Availability, by which regulators may give too much importance to recent salient events such as accidents or scandals;
- Action bias, by which decision-makers may have a tendency to be seen as acting when the optimal thing would be to wait and collect more information;
- Narrow frames and tunnel vision by which regulators may become myopically focused on their specific missions (for example, promoting competition).

Choi and Pritchard (2003) describe and give examples of these biases in the field of financial regulation and Rachlinski and Farina (2002) for a variety of regulatory fields. Choi and Pritchard (2003) argue for example that the indifference of the Securities and Exchange Commission (SEC) in the US to various areas of securities regulation absent a large loss to investors suggests not only bounded rationality (and the related availability and hindsight biases) but also the importance of loss aversion (similarly to the early work by Joskow about satisficing behavior and the importance of nominal prices).

Not only “fast thinking,” but also "System II" reasoning (slow, deliberative thinking, see Kahneman, 2011), the one many would naturally associate to expert reasoning, is vulnerable to biases: experts tend to deploy "defense motivation", ie deliberate, calculating and methodical analysis to support beliefs taken a priori. Narrow frames yield inconsistencies derived from uncoordinated regulation. Kahneman (2011) explains that in the US, the fine for a "serious violation" of the regulations concerning worker safety is capped at \$7000, while a violation of the Wild Bird Conservation Act can result in a fine of up to \$25000.

Experts often disagree. It could be because of inconclusive or scant evidence. But they disagree in "suspicious" clusters: gender, professions (eg Central Bankers), food (parole judges in Israel tend to deny parole when they are hungry in Danziger et al., 2011). Some personal characteristics of experts determine the extent to which they make mistakes. Some characteristics of the tasks of experts are also more or less conducive to mistakes (help of technology makes meteorology more predictable than clinical psychology; see examples in Ericsson et al. eds., 2006, and Stewart et al., 1997). In Callander (2007) expertise is conceived as private information about a parameter; private information about the process by which policy is transformed into an outcome (allowing for measures of complexity across different policies); or an ability or skill in a context where populations have a diversity of skills. In the second case, complex policies can be delegated with commitment because the principal cannot easily learn about the expert's private information and is reluctant to decide under uncertainty. In this case, insulated experts exert authority in an informal *de facto* way, beyond the legal or *de iure* aspects of legislation.

In Frank (2004), consumers assess the quality of physicians paying attention to dimensions of quality that are not necessarily the most important ones for their welfare (parallels can be made in regulation; for example, consumer/voters may pay more attention to static efficiency issues than to dynamic efficiency due to saliency of static concerns, which could be countered by using separate agencies for each issue). Physicians decide taking into account local codes of conduct that are not necessarily the most efficient ones because of *regret* problems, giving rise to group or geographical *styles*.

Will regulators suffer from biases in the long run? Experience of professional bureaucracies make expert regulators theoretically better than lay citizens at learning from mistakes. However, overconfidence has been found to be positively correlated with perceived expertise. Do expert regulators develop the type of expert intuition that is better at avoiding biases? Effective learning (of the type fire-fighters or tennis players use in developing their expert intuition) takes place only under certain conditions: it requires specialization, high stakes, clear rules, and accurate and immediate feedback. But the necessary feedback is often lacking for the decisions made by managers, entrepreneurs and politicians because:

- i) Outcomes are commonly delayed and not easily attributable to a particular outcome.
- ii) Variability in the environment degrades the reliability of the feedback, especially where outcomes of low probability are involved.
- iii) There is often no information about what the outcome would have been if another decision had been taken.
- iv) Most important decisions are unique and therefore provide little opportunity for learning.

Cooper and Kovacic (2012) argue that the feedback mechanism that facilitates learning is an important distinguishing feature between firms and regulators. Unlike the marketplace, which produces feedback for firms quickly in the form of prices, profits and output, the link between policy decisions and outputs is attenuated, measurement is difficult and lags are long. The costs for the regulator with being wrong are quite low compared to those of the firm. A regulator who systematically produces welfare reducing outcomes may still enjoy her position or even better ones if she produces outputs (cases, rules, number of high profile mergers stopped) that are politically expedient. Regulatory competition, to the extent that it occurs, is on outputs (cases on high profile companies) rather than outcomes.⁷ As a result, regulators with a short term bias are

⁷ Velikonja (2016) reports the efforts of the Securities and Exchange Commission in the USA to distort their performance measure to exaggerate their activism.

likely to be over-represented in the population of regulators. Possible de-biasing mechanisms⁸ include then the following:⁹

-Attach a higher value to experience and intrinsic preferences in recruiting, perhaps by having a pool of certified potential regulators. Intrinsic preferences may be related to a record of public sector ethos and a reputation for integrity.

-Introduce adversarial internal and external review mechanisms, bringing thus diverse perspectives.

-Introduce mechanisms of greater accountability and outsource the measuring of regulatory performance focusing on outcomes rather than outputs.

-Emphasize ex post analysis of decisions.

3.The theory of strategic delegation in regulation with bounded rationality

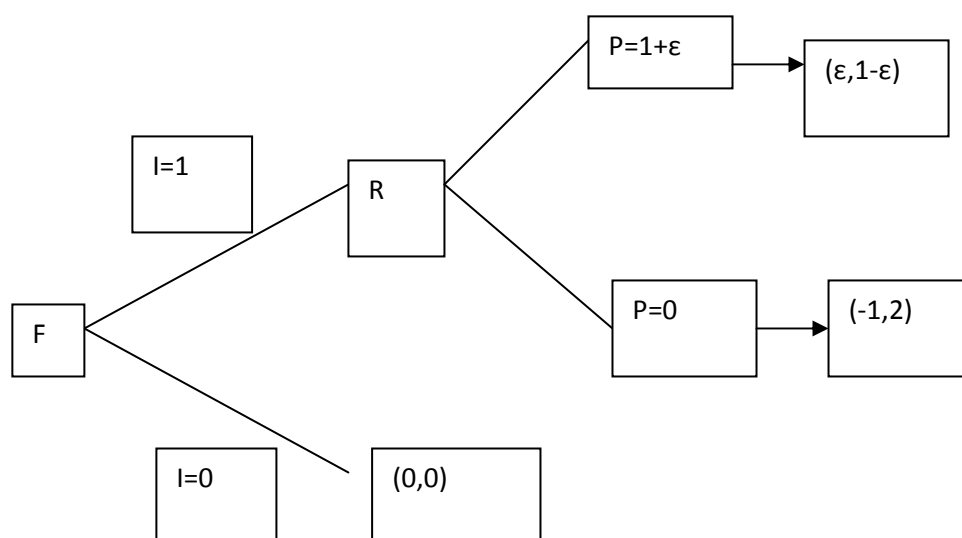
One of the main problems of regulation, as explained in Armstrong et al. (1994), Newbery (2000) and Spiller and Tommasi (2007) is the commitment problem: investors will be reluctant to incur specific investments anticipating rational representative regulators that will decide on prices once investments are sunk. Historically, different mechanisms have been used to alleviate this problem, such as state-ownership, detailed contracts or legislation, or popular capitalism. Strategic delegation into a relatively pro-industry regulator that is to some extent independent from political principals is one such solution (see Levine et al., 2005). This section explores how each step of the theory of strategic delegation in regulation is affected by bounded rationality.

To formalize the idea of time inconsistency or the commitment problem in regulation and the corresponding convenience of delegating into a pro-industry regulator in the simplest way, let us assume a sequential relationship between a firm with objective function $\Pi = p - I$ and a government or representative regulator with objective function $W = \gamma - p$, with $\gamma > 1$ (thus guaranteeing that the investment is socially valuable –the graph below uses $\gamma=2$ for concreteness). The firm can invest in period 1 a completely asset-specific sum $I=1$ or not invest, i.e. $I=0$. If the firm does not invest, the game finishes and the pay-off is 0 for both players. If the firm does invest, then in period 1 the government can choose between prices $p=0$ and $p = 1 + \varepsilon$ with $\varepsilon \geq 0$. If the regulator chooses a zero price, then the pay-off of the firm is -1 and the payoff of the government is γ . The value of this parameter can of course vary across different

⁸ These mechanisms are also appropriate to prevent regulatory capture.

⁹ For additional examples and sources of endogenous preferences, expert bias and potential debiasing strategies, see Kuehnhanss et al. (2015), Tasic (2009 and 2013), Viscusi and Gayer (2015), Rickman and Witt (2008), Sutherland and Burgman (2015), Schnellenbach and Schubert (2015), Prendergast (2007), Göhlmann and Vaubel (2007), Guthrie et al. (2001), Hirshleifer (2008), Belden (1989), Havrilesky and Schweitzer (1990), Harris et al. (2011), Garside et al. (2012).

regulated sectors. If the government chooses the positive price, then the pay-off of the firm is ϵ and the pay-off of the regulator is $\gamma-1-\epsilon$. Since the regulator obtains a higher pay-off when the price is zero, this is the decision that the firm will expect when it must decide whether to invest or not, and therefore the sub-game perfect equilibrium of the game is that there is no investment. This illustrates the well-known under-investment problem in utilities regulation. The decision of the government can be interpreted in the narrow sense of a pricing decision, or in the broader sense of any policy that affects the incentives for private investments. In practice, the policy domain can be continuous, with $p=0$ being an extreme option. Similarly, the option of $I=0$ in practice can translate into less than efficient investments, for example suboptimally investing in a technology that has less than 100% of specificity.



Next, I discuss how each stage of the analysis of the game's solution by backward induction is affected by behavioral considerations.

The pricing decision by a representative regulator

A non-independent regulator would decide on price as influenced by the electorate (in general, the universe of consumers). Politicians' and voters' biases (Schnellenbach and Schubert, 2015, p. 408) will determine the final policy. A key determinant will be the availability bias: it will determine to what extent voters give importance to p , the regulatory policy. Recent events or historical experience (hyperinflation, earthquakes, takeovers) will influence the salience of regulatory policies, as well as the salience of the relationship between the policy and its long run consequences in terms of investment and welfare. Then p is

transformed into $\beta(p)$ as in Congdon et al. (2011), where $\beta(\cdot)$ is a function that transforms policies into perceptions of policies. For example, in the application to regulation of the lobbying model by Grossman and Hepman (1996),¹⁰ the degree of information of the electorate relative to regulated policies can be re-interpreted as the salience of these policies in the minds of the voters.

New policy instruments open up (framing, persuasion, influencing perception) that may influence $\beta(\cdot)$. To some degree this function is exogenous: for example, vehicle inspection prices¹¹ are less salient than electricity prices. Also, the degree of poverty or inequality, or the process followed to choose on p , may influence the perceptions of the public opinion. But it also has an endogenous component that can be affected by policy. For example, Evans et al. (2008) argue that non-independent regulatory agencies can influence the degree to which voters are informed about regulatory policies. Perception policies may include campaigns that make voters aware of the long run consequences of their consumption decisions (for example, in terms of long run investment incentives or climate change), or ways to make consumers less aware that they are paying a price (for example, motorway tags).

The underinvestment problem and two potential solutions

In the basic model, the investment decision is taken by a private agent. Throughout history, investment has been made also by governments or state-owned firms. There are also many cases of hybrids or partially privatized firms. In all cases, these being large unique investments (tunnels, bridges, airports, electricity plants or networks) there is little immediate feedback if there are investment mistakes. In this context, over-optimism and inflated expectations create the problem of cost overruns and bad project choice (see Flyvbjerg et al., 2003). This may mitigate under-investment at the cost of inefficiency.

Even in the presence of under-investment, non-independent regulation could work under educated, time-consistent voters that have a perception for fairness. Bundling of issues and strategic manipulation of issue salience may also provide commitment (see Besley and Coate, 2003, and Evans et al., 2008). After all, people vote (voluntarily in most democracies) and voluntarily contribute to public goods (for example, taxation under democratic control, Schnellenbach and Schubert, 2015, p. 406).

In theory, another way to alleviate underinvestment is capture: a regulator or government that takes into account heavily industry interests because of lobbying or corruption

¹⁰ See Evans et al. (2008).

¹¹ See Trillas et al. (2011).

would automatically alleviate underinvestment, of course creating other problems in terms of illegitimacy or distortion of incentives. However, the historical or empirical literature is inconclusive about the scope of the presence or effectiveness of capture strategies, or finds that this depends on specificities of time and space (see Glaeser and Shleifer, 2003). For example, in the literature on political connections (see Castells and Trillas, 2013a and 2013b), former politicians in boards of directors may be appointed because of behavioural judgmental biases where politicians, being more public and salient figures, are more likely to be appointed than other candidates (in a similar way that tall good-looking centre forwards are more likely to be transacted in the soccer transfer market). It is therefore possible that firms recruit politicians because they are well known (availability bias) and are thought to be able (after analysing their political career) to stir circumstances in the direction of the firm's objective (attribution bias).

The delegation solution

Despite the appeal of some of the ways to alleviate under-investment that are not based on delegation into a discretionary regulatory institution (such as rules, rigid legislation or contracts), some discretion remains necessary.¹² There will be contingencies not contemplated in initial contracts. Some¹³ even argue that credibility may require some discretion, and not completely rigid rules, because the latter will have to be changed in any case, and it is better to have some knowledge and practice with unforeseen contingencies and discretionary decision makers before the unforeseen contingencies causes the crisis of a well established institution. For industries that are organized as systems so that isolating individual lines or projects is complex, the alternative to organize them through concession contracts (which in theory would not need a standing agency, but could be enforced by courts of justice) is certainly difficult. The main problem with discretion in the public sector is that the introduction of monetary incentives to discipline agents is challenging.

Of course, delegation of important decisions or policy areas to agents that are not politicians and that have some degree of discretion, has many forms and is not limited to network industries regulation. The academic analysis of regulatory independence to alleviate underinvestment was actually imported from monetary policy.¹⁴ It was part of a consensus that was at least partially shaken by the last global financial crisis,¹⁵ but that still has enormous

¹² See Goldberg (1976) and Williamson (1976).

¹³ See Cowen et al. (2000).

¹⁴ See Levine et al. (2005). There are also parallels between monetary policy and competition policy, as explained in Monti (2006).

¹⁵ See Cukierman (2012), Blinder (2012) and Bordo and Siklos (2015).

influence.¹⁶ Strategic delegation into an independent regulator with preferences characterized by some positive weight on firm's profits would avoid the zero price branch of the extensive form game described above, and hence would induce positive investment. In practice, different industries will vary in terms of the degree of asset specificity and the degree to which governments care or not about industry profits (depending on policy complementarities, distributive concerns and industrial structure). Therefore, the optimal degree of regulatory independence will vary across industries. But starting with the federal Interstate Commerce Commission and the State Regulatory Commissions in the US, and following with the independent regulatory agencies of the UK after the privatizations in the 1980s and 1990s, these agencies are today part of the standard reform package of network industries as established by international institutions such as the European Union or the World Bank (this standard reform package, which includes vertical unbundling and privatization,¹⁷ is called a "paradigm" by Florio, 2013).

One must distinguish between decision makers that are motivated by re-election concerns (politicians) and decision makers that are more motivated by career or idiosyncratic concerns (bureaucrats or judges).¹⁸ Regulation of public utilities or of specific industries are certainly in principle examples of policies that lend themselves to bureaucratic delegation, since they pit special interests against those of consumers as a whole, do not have large spillover effects, and policy performance can be evaluated on the basis of efficiency or other semi-technical criteria. The spillover effects and large distributional implications would make, say, fiscal or trade policy less amenable to delegation, and the changing and vague objectives of foreign policy would make it a typical field reserved to politicians (at least, at the top of the hierarchy). However, in many cases things are less clear cut concerning regulation. Regulatory decisions often have important redistributive implications, especially in developing countries (but also in developed countries such as Spain, for example concerning the tariff deficit in electricity¹⁹); regulation interacts with many other policies, such as environmental policy or industrial policy; and objectives are much more multi-faceted and changing than, say, a target level of inflation in monetary policy.²⁰ It is not clear either that the electorate is poorly informed as required for reserving a field for agents other than politicians (actually the case can be made

¹⁶ For example, Vickers (2010a) claims that the global financial crisis, even acknowledging that it has led to unorthodox and less independent monetary and competition policies, has not undermined the long-term case for independence.

¹⁷ See Armstrong and Sappington (2006).

¹⁸ See Trillas (2010a) for a lengthy discussion of the pros and cons.

¹⁹ On regulation and distribution, see Trillas and Staffiero (2007). See Cukierman (2012) on the evolution of monetary policy, and independence being ill suited for multi-dimensional policies that have a redistributive component.

²⁰ See Vickers (2002 and 2010).

that the electorate is often too informed for commitment purposes,²¹ although information is not the same as expertise). And often, as in access pricing or cross subsidies, it is not true that policies just pit firms against consumers, but also some firms against others and some consumers against others.

In regulation and other fields, delegation is not the only solution to the underinvestment problem. But the alternative to reputational and contract based solutions to commitment and other problems in the infrastructure sectors and, increasingly, the preferred solution to the time inconsistency problem (as in monetary policy, see Levine et al., 2005), has been for governments to delegate the operation of some elements of the policy vector to authorities with powers of discretion. Delegating into a regulator that is more pro-industry than a representative government alleviates time inconsistency. The solution is actually more necessary and more difficult to achieve at the same time in regulation than in monetary policy, because slow depreciation and slow demand growth may increase the length of the “temptation period” to renege on initial commitments, as compared to monetary policy. A problem is that it is assumed that the government can choose a regulator with the appropriate, optimally pro-industry bias (or optimally pro-long-run consumer self bias), as if there was a pool of potential regulators with known track records from which to choose. Delegation into any regulator may be supplemented by statutes that oblige him or her to behave in an optimal way. The need to appoint authorities with a high expertise in complex matters and to avoid policy polarization reinforces the arguments in favor of delegation. Behavioral aspects of the delegation act include then finding the right person or influencing the endogenous preferences of these persons through statutes or other mechanisms. Munro (2009) explains that in economic models one can think of ways in which some agents delegate into others with heterogeneous degrees of rationality and also heterogeneous degrees of awareness about their own rationality.

The preferences of regulators would not matter if public policy makers could be subject to monetary incentives. However, it is in the nature of the public sector that incentives must have less power, because tasks are multidimensional, objectives are vague and there are a variety of principals. This makes intrinsic preferences much more important than in the private sector.²² But behavioral biases such as confirmation or availability bias usually go into the direction of making policies closer to the more politically expedient (or populist) options, as argued by Cooper and Kovacic (2012). Biases may be useful (see Prendergast, 2007) in appropriate contexts when strategic delegation is necessary. However, a precise knowledge of the preferences of the potential regulators is needed.

²¹ See Evans et al. (2008).

²² McCraw (1984) shows the importance of regulators’ personalities.

Moe (2013) stresses the political nature of regulatory delegation, and explains how the commitment problem interacts with the expertise rationale for delegation. He argues that after Niskanen's contribution in the 1970s, based on the idea of self-interested bureaucrats, attention centered on the key role of information –expertise- and the leverage it gives bureaucrats in pursuing their own interests, as in Laffont and Tirole (1993). The latter's model struck a balance between the public choice view of very powerful agencies of Niskanen and Buchanan and the view of dominant legislators proposed by scholars such as McCubbins et al. (1987). Legislative institutions play a key role, because their rules provide stability in contexts where social choice theory predicts indeterminacy due to inherent instability of collective preferences. Moe argues that the stable hierarchies that try to control regulators have a multi-principal nature, where the executive and the courts also play an important role (this role can also be interpreted as cognitive review, see Rachlinski and Farina, 2001). Legislators may want to partially restrict their own control of the agencies for commitment reasons, to avoid future majorities or themselves from reversing the initial policies. The less controlled the agency, the more it will be able to use its expertise to the benefit of the agency's own preferences, although there may be complex policy contexts where their expertise leaves the objectives of the legislators in a better position than in the status quo without delegation. However, expertise is not exogenous, but the result of investment, and therefore it must also be the outcome of an appropriate stable institutional structure that remunerates this investment, and makes it less valuable outside government. This is particularly difficult in regulated industries with large firms that are able to offer monetary packages that more than compensate for the benefits of public sector jobs, as illustrated by the revolving door phenomenon. And expertise may not be correlated with capacity, understood as the ability to carry out policy effectively.

There may be dilemmas between political appointees versus professional civil servants: it could be conjectured that the probability of observing independent agencies is higher in systems characterized by divided government. The use of political appointees (including independent agencies) arises from the fact that in systems characterized by divided government the executive has less control over the professional bureaucracy, as the latter will naturally tend to be aligned with the legislative powers, which usually last longer than the executive counterparts. In a system of division of powers legislative specificity will most probably not be the norm, as legislative costs will be high and preference homogeneity among the members of the legislature will most probably be low, increasing the costs of reversing agencies and courts. It is under these circumstances where we can expect agency independence. The positive correlation between independence and divided governments remains to be tested across countries. In countries such as the UK with unified governments (centralized structures where the executive controls the legislative) the existence of independent agencies (whose statutes may

be easily changed by a law) may not be the main factor driving private investment, but it is the contract licences that provide the assurance that investments will not be expropriated. The incomplete nature of such contracts, however, is conveniently supplemented by the works of regulatory agencies with qualified staff.

In many cases regulation and contracts are complementary, because i) some sort of supervision is necessary to enforce previous agreements and react to unforeseen contingencies or contract renegotiation; and ii) discretionary independent regulation needs to be accompanied by mechanisms of social control, accountability, and adequate procedures, if it is to obtain social legitimacy and market credibility.

Scholars have proposed recommendations (such as professional qualifications and transparency) about the criteria to take into account when appointing regulators to make sure that some degree of political and industry insulation is achieved. However, insulating agencies from politics may have the undesired effect of keeping alive policies that are not feasible in the medium to long run. Some political discretion that allows for well targeted concessions to stakeholders may be useful to make short term agreements, find the collaboration of some agents and increase the political legitimacy of policies. Reform policies need local politicians that can build alliances that make policies feasible on the ground, so that consumers/voters and key interest groups perceive that outcomes have been reached through fair processes. Policy reforms which are not perceived as imposed from abroad, and which involve local investors, tend to benefit from higher political legitimacy than those that are seen as “foreign” solutions. Reforms that survive are able to manage the perceptions and socially determined frames of public opinion, and to resist the opposite efforts of interest groups that are interested in the previous status-quo, as explained by Henisz and Zelner (2005).

To minimize the negative impact of psychological biases, it is useful to think about the existence of framing effects which are not necessarily pernicious if they help to otherwise “debias” boundedly rational agents, including voters and regulators. Then the selection, design, resources, and review mechanisms are important to counteract expert bias (as they are important to counteract problems of asymmetric information, capture and commitment). One can make analogies between tax compliance and regulatory compliance: behavioral tricks to achieve tax compliance²³ are now well accepted in the tool box of fiscal reforms, and the same could happen in terms of “regulatory compliance” (for example, the acceptance that infrastructure investment comes at a cost).

²³ See Hallsworth et al. (2014).

Caveats about the delegation solution

In his early criticism of regulatory agencies Bernstein (1955) pointed out two main problems: coordination problems with the rest of government and the risk of capture. These two criticisms resonate with current concerns derived from the recent literature on behavioral regulation. Tunnel vision of hyper-specialized overconfident regulators may make policy coordination even more difficult than in the absence of behavioral issues, and may make independent regulators more vulnerable to cognitive or epistemic capture as derived from educational or professional backgrounds (Schnellenbach and Schubert, 2015, and Kwak, 2014).

A regulator that is insulated from the political process will lack the skills and the tools to push some needed reforms through the political process, in terms of convincing the public opinion or affecting their perceptions, or building the necessary alliances. Politicians who anticipate that regulators will be insulated, and many years in their job carrying out their own agenda, will be reluctant to appoint regulators with strong political skills. Classic regulators (see McCraw, 1984) such as Alfred Kahn in the US and Stephen Littlechild in the UK were probably political entrepreneurs as much as good regulators, but their stature has been hard to replicate. The problem may be alleviated by having regulators that are pedagogic and that spend resources educating the public opinion. However, sometimes it is not enough with education and pedagogy, but political enemies have to be defeated and the corridors of democratic politics (political parties, parliaments, executive powers, judicial arenas, the media) have to be used so that needed reforms are passed.

Other problems of independent regulators must be associated to the agency costs of delegation: the agent may behave in ways that are not in the best interest of the principals (the voters, the politicians). Incentive contracts are theoretically possible as mentioned above, but problematic in practice. The threat of ousting (see Hauge et al., 2012), or not reappointing, and the monitoring by interest groups, are then forms of imperfect control by principals.²⁴

The interaction with other public interventions also raises questions about the relationship between policy areas with commitment and policy areas without commitment. If there is commitment in one policy dimension (say, monetary policy) but not in another complementary dimension (say, fiscal policy), discretionary decision makers in this complementary dimension may ruin the work of those with commitment.²⁵ In some cases, if there is policy interaction between several dimensions, it may even be better to avoid

²⁴ But in all these mechanisms, account must be made for the fixed administrative costs of specialized regulation and control, which decrease in per capita terms as population increases (Mulligan and Shleifer, 2005). That means that, all else the same, large jurisdictions find it easier to create and control independent regulatory agencies.

²⁵ See Dixit and Lambertini (2003).

committing in the first dimension, unless commitment can be achieved in the other dimension as well. This may be applicable to regulation, when the work of independent agencies interacts with interventions that are usually in the hands of politicians, such as industrial policy, fiscal policy or environmental policy. It may also be applicable when the work of independent agencies in one dimension of regulation interacts with the intervention of politicians at some other dimension. The latter is relevant in decentralized countries when the fixed costs of specialized regulation make it possible to create independent agencies at the national level, but not at the regional or local level (see footnote 24). More generally, the recommendation to create national regulatory agencies with broad powers may conflict with the institutional structure of decentralized countries.

Many theoretical models see the risk of capture as concentrated in the separate regulator in the tradition of Bernstein (1955), mentioned above, whereas the principal is assumed as benevolent. And there is some consensus that specific ex-ante continuous regulation is more prone to capture than generic competition policy. In practice, however, to many scholars and observers, independence is interpreted as introducing expert benevolence in a context of executive non-benevolence. Historically, it was introduced in the US as part of the Progressive Reform in the late XIX century, as explained in Glaeser and Shleifer (2001). More independence is associated to less capture and to a transition from a clientelist model of regulation to a formal one. The positive political theory literature reviewed in Moe (2013), however, mostly based on the experience of the U.S. in the XX century, sees independent regulators as appointees (the alternatives being elected regulators or civil servants) who may be as vulnerable to interest groups as politicians.

Martimort (1999) explicitly models problems that can arise when an independent regulator is captured. In his model, the regulator and the firm interact repeatedly over time and this leads to regulatory ‘drift’ in the sense that it becomes increasingly difficult for Congress to design collusion-proof contracts for the firm with the degree of ‘familiarity’ between firm and regulator increasing over time. One solution to such problems is the separation of regulatory powers between several regulators. Then capture is rendered a less effective policy for firms because they are less able to influence the web of policies by which they are regulated (see also Laffont and Martimort, 1999).

Of course an idealized vision of the independent regulatory commission making reasoned decisions based on an expert assessment of all of the relevant information available often does not match the reality very well, as pointed out by Joskow (2007). This author rightly argues that no regulatory agency can be completely independent of political influences. Commissioners and senior staff members are political appointments and while they cannot be

fired without just cause they are also unlikely to be appointed or reappointed if their general policy views are not acceptable to the executive. Regulatory agencies are also subject to legislative oversight and their behavior may be constrained through the legislative budgetary process, unless they are fully funded by fees. Staffs may be underfunded and weak. Reporting requirements may not be adequate and/or the staff may have inadequate resources properly to analyze data and evaluate reports submitted by the parties to regulatory proceedings. The administrative process may be too slow and cumbersome to allow actions to be taken in a timely way. Under extreme economic conditions (such as exchange rate or financial crises), regulatory principles that evolved to protect investments in regulated enterprises from regulatory expropriation come under great stress, triggering different sources of bias. On the other hand, both the executive branch and the legislature may find it politically attractive to devolve complicated and controversial decisions to agencies.

The sustainability of the regulatory compact

One problem is that delegation does not solve, but it relocates, the commitment problem, which is transformed into one of the government committing to respect regulatory independence, which some countries have found difficult (see Section 4 below). Ultimately, the electorate has to support all the institutions involved in regulation, including independent regulatory agencies and all the units that interact with them. As emphasized by Basu (2015) the law is just a focal point, and respecting it is just one among several possible equilibria in social interactions. Independent agencies are more stable when they enjoy public support and a high reputation (Ackerman, 2007 gives the example of the Federal Electoral Commission in Mexico in the early 2000s), which is paradoxical for an institution that was meant to be insulated from public opinion and political forces.

The instability of regulatory agencies after political changes (well documented at least in Latin America, and more recently for Spain and Denmark) shows that independent regulatory agencies suffer from lack of political support, which means that in practice they are often influenced by political forces. At the same time, as for politicians, regulators' preferences are influenced by the degree of information available to voters at each time. Voter education is necessary, but difficult in dynamic problems, eg climate change. The importance of communication and interpretation is stressed by Schnellenbach and Schubert (2015, p. 407). Social norms, a perception of fairness (see Sen, 2009) and perceived intentions will probably affect the evaluation of authorities. Regulatory authorities have then the additional instrument of trying to influence citizens' preferences shaping the prevailing "cultural story," which may have

an influence on the life cycle and the birth, merger and disappearance of agencies (see Cederman, 2002).

4. Empirical issues and behavioral considerations

The measurement and impact of independent regulation

The literature on the measurement and impact of independent regulators has evolved from simple econometric models where independence was measured by a simple binary variable that reported about the existence or not of a separate regulatory agency (see Trillas, 2010a), to more complex models where there is some measurement of the degree of independence aggregating in different ways a variety of indicators. Initially, these models (for example, Gual and Trillas, 2006) only took into account legal or *de iure* dimensions, but subsequently they also incorporated measures that took into account *de facto* issues, such as the turnover or political vulnerability of the position of independent regulator. For example, Trillas and Montoya (2008) and Montoya and Trillas (2011), analyzing telecommunications regulation in Latin American and Caribbean countries, found that the rankings of independence vary importantly when the political vulnerability (the ability of regulators to survive to political changes) of the regulator is taken into account. A major caveat of vulnerability measures could be that leaving office in front of political change could be a sign of independence, as the regulator does not accept obligations from new aggressive political masters. But the differences in the rankings (see Table 1) obtained with vulnerability are consistent with generalized views of which countries are better able to commit in practice in a variety of fields. Most telecom regulators in Latin America appear to be very vulnerable to political change.

Table 1: comparison of measures of *de iure* and *de facto* independence (IR1 is a measure of *de iure* independence, and the other two add to legal variables information about the vulnerability of regulators to political change, based on Montoya and Trillas' joint work)

#	Country	IR1	Country	LPI1	Country	LPI2
1	Argentina	0.647	Peru	0.581	Peru	0.947
2	Bolivia	0.487	Bolivia	0.577	Jamaica	0.793
3	Panama	0.459	Argentina	0.490	Colombia	0.774
4	El Salvador	0.441	Brazil	0.478	Bolivia	0.710
5	Peru	0.428	Venezuela	0.468	Argentina	0.590
6	Brazil	0.422	Jamaica	0.460	Panama	0.563
7	Paraguay	0.416	Honduras	0.443	Venezuela	0.557
8	Chile	0.400	Mexico	0.415	Belice	0.550
9	Ecuador	0.387	Paraguay	0.408	Paraguay	0.508
10	Nicaragua	0.371	Colombia	0.385	Costa Rica	0.485
11	Costa Rica	0.370	Panama	0.380	Mexico	0.448
12	Venezuela	0.314	Belice	0.350	Brazil	0.411
13	Belice	0.300	Barbados	0.265	Nicaragua	0.385
14	Honduras	0.286	Ecuador	0.260	El Salvador	0.354
15	Colombia	0.281	Trinidad and T	0.240	Trinidad and T	0.340
16	Trinidad and T	0.279	Uruguay	0.227	Chile	0.333
17	Barbados	0.264	El Salvador	0.221	Barbados	0.299
18	Jamaica	0.253	Chile	0.200	Dominican R.	0.258
19	Dominican R.	0.249	Costa Rica	0.185	Uruguay	0.227
20	Mexico	0.229	Nicaragua	0.181	Guatemala	0.225
21	Uruguay	0.187	Dominican R.	0.125	Ecuador	0.193
22	Guatemala	0.183	Guatemala	0.091	Honduras	0.143
23	Surinam	0.047	Surinam	0.023	Surinam	0.023

A common problem of these empirical exercises is that they claim to test the model of strategic delegation. But in this model what is variable is the degree of “conservativeness” of the regulator, and not the degree of independence. Future empirical work can make progress by measuring the degree of “conservativeness” through the professional and personal background of regulators (or perhaps in the future even directly using neuro-scientific evidence).

Concerning the empirical evidence, Trillas (2010a) concludes that overall, once independence is measured taking into account de facto issues and taking into account its potential endogeneity, it has a positive, but arguably small, effect on investment.

More recently, Hauge et al. (2012) test several hypotheses for the electricity sector in the US in the framework of a political agency model of independent regulators. They argue that since incentive pay is not used to control regulators, the possibility of terminating the term of office for regulators is used by political principals to discipline them. They find for example that higher electricity pricing leads to ousting and that regulatory exit is not due mainly to the revolving door. And Cambini and Rondi (2014), analyzing evidence for several European regulated industries, find that independent regulation improves investment, but does not eliminate the negative effect of political interference. A formally independent regulatory authority may not be enough to create a more stable framework, to the extent that politicians retain discretion to intervene or to influence regulatory or related decisions.

The evolution of regulatory systems

In Latin America, as just seen with the example of telecom regulators, the tenure of independent regulators has been far from secure following electoral changes. But it is not only the tenure of individual regulators that is fragile. Although the architecture of federal and state regulatory agencies has remained stable in the US since the early and mid twentieth centuries (see Carlton and Picker, 2007, Troesken, 1997 and Nuechterlein and Weiser, 2007),²⁶ it has experienced numerous changes in other jurisdictions, after the wave of privatization, liberalization and regulatory reform of the last decades of the XXth century. In the recent past, the UK first merged the telecom and broadcasting regulator to create OFCOM, and the gas and electricity regulators to create OFGEM, and later it merged the two competition authorities (the OFT and the CC) in the Competition and Markets Authority (CMA). In continental Europe, Spain and the Netherlands have merged their network regulators with the competition policy agency and in other countries such as in Denmark, the existence of the telecoms regulator has been questioned after political change. The creation of Pan-European regulators after the last package of directives in telecom and energy in Europe adds to an evolving landscape (see Trillas, 2010b). Even in the US, although the main ingredients of institutional architecture have remained stable, there have been tensions between institutions, as it happened around the implementation of the 1996 Telecommunications Acts or the creation of Regional Transmission Operators in electricity. Carlton and Picker (2007, p. 28) argue that the structure of the Federal

²⁶ There is a related controversy in the USA about the effects of the existence of a variety of overlapping special district jurisdictions to manage water, schools and other services. See Berry (2009) and Wallis and Weingast (2009) for opposite views.

Trade Commission (one of the antitrust federal agencies in the US), “raises the issue as to whether a combination of anti-trust and industry-specific regulation in one agency, as occurs today in Australia or Europe for certain functions, is desirable –an issue we leave for future research.” In Australia, the Australian Competition and Consumer Commission (ACCC) is certainly also the telecom regulator. It is not the energy regulatory agency, although it shares staff, resources and facilities with the Australian Energy Regulator (AER).

The decision to potentially merge agencies from different sectors, or agencies with overlapping competition powers, raises incentives issues. The solution to these issues depends on the dimensionality of the agencies’ tasks and the complementarity or substitutability between these tasks. In particular, there are difficulties of accountable delegation, for example to independent regulators, when the number of tasks expands. In network industries, regulation and competition instruments and agencies coexist, and there are different potential ways to organize the interaction.

A project to merge the telecoms and energy regulator with the antitrust authority was introduced in February 2012 by the Spanish government immediately after a general election that resulted in a change of government. It was finally approved in 2013, after some tense feedback with the European Commission that resulted in the creation of two chambers inside the same agency: one for regulation and another one for competition policy.

The reform in Spain was an unusual one: not only are regulatory agencies from different industries merged (something that has precedents, for example in the US state public utility commissions or in Germany), but all these were also merged with the competition policy authority. It is certainly the case that regulation and competition policy have converged in the last decades, and there is overlap and interaction between them. But there are very few cases of a similar degree of consolidation and they come from smaller jurisdictions such as The Netherlands or Slovenia (see Xifré, 2014). In the case of Spain, the proposal took place after an approximately two decade experience with sectoral regulatory agencies and when the competition authority had recently been reformed in 2007 following a broad process of public debate that was absent from the reform introduced in 2013. The regulatory agencies in energy and telecoms had existed since the 1990 and had not been free of controversy, but they provided a formal institutional framework to implement the European liberalizing directives. For example, Rubio (2015) claims that the existence of the Telecom regulator (CMT) is what distinguishes the inefficient chaotic policy to promote cable investment (before the regulator came into existence) and the policies to promote fiber optic investment in broadband.

A source of the availability bias in Spain may be the market for corporate control: contested takeovers project light into an industry (see Trillas, 2001, and García-Rendón and

Trillas, 2012), changing the objective function of regulators (the CNE was given broader responsibilities on takeovers in the middle of the Endesa takeover battle in the early 2000s). The telecommunications sector, as opposed to the energy sector, has not been subject to a takeover wave in Spain through the life of the regulatory agencies. Technological change (speed of capital depreciation) and demand increase also influence both the difficulties of commitment and the objective of containing nominal prices: the political and economic environment has put more pressure on the energy regulator. Very preliminary data collection shows that the telecommunications regulator in Spain (CMT) experienced significantly less dissenting votes than the energy regulator (CNE).²⁷ This is probably just the tip of the iceberg of a deeper difference: that the CNE was a more politically vulnerable agency and at the same time subject to many more pressures.

A common level of (reduced) regulatory independence is then not necessarily appropriate for industries with different characteristics, and although regulation and competition policy interact in liberalizing industries, there is still much to be gained in terms of incentives and accountability from keeping different agencies in network industries, especially in those areas where there are no complementarities. Savings in administrative costs could be achieved by merging the regulators of converging industries requiring complementary effort inputs, such as telecommunications and broadcasting.

Although regulatory reform that increases stability and provides adequate incentives for regulators is needed in Spain and other countries, a full merger between regulatory agencies and competition authority, especially in large jurisdictions, is at the extreme of international practice and academic recommendations. Insofar as the new agency had less independence from government than the previous bodies, it may aggravate some of the problems that characterize regulation in Spain. A single agency facilitates coordination and simplifies institutional architecture, but runs the risk of reducing the quality of specialized expertise and of neglecting important dynamic considerations. Other issues in the Spanish case are related to the bad properties of monopolistic regulators from the point of view of reducing cognitive biases, as pointed out by Choi and Pritchard (2003) in the case of the Securities and Exchange Commission (SEC) in the USA. The organizational culture of an institution single-mindedly focused on promoting competition may neglect attention to other market failures such as dynamic issues or externalities.

Similar institutional architecture issues are being discussed in the field of financial regulation, and its interaction with monetary policy and anti-trust (see Abrams and Taylor, 2000, Cihak and Podpiera, 2006, Garicano and Lastra, 2010, Vives, 2011, and Cukierman,

²⁷ Bianculli et al (2012) and Berkhout and Koop (2012) provide interesting insights on the personal backgrounds and politicization of regulatory agencies.

2012). If the idea of Central Bank independence inspired the idea of regulatory independence, the debate on institutional architecture in monetary and financial economics can also shed light on the parallel debate in the regulation of network industries. About the relationship between regulatory tasks and the degree of independence, Garicano and Lastra (2010) argue that, in the field of monetary policy and financial regulation, although banking supervision and monetary policy interact (as it is widely acknowledged after the global financial crisis), given the difficulty of measuring output on supervisory tasks, the systemic risk supervisor must necessarily be more accountable and less independent than central banks are on their monetary task. And since explicit incentives are not very useful, they must develop a strong culture and ethic, a sense of intrinsic preferences for doing their job well, because little credit is given if things go well, but a great deal of scrutiny and criticism are given if things go badly (specially for some interest groups²⁸). They argue in a footnote (p. 607) that although the literature establishes that a single, large supervisory authority is better able to attract, develop and maintain professional staff expertise, this has not been found to be the case in other domains, where specialized agencies can offer a congenial environment to the experts in that field irrespective of size. Enlarging the focus of regulatory agencies has thus organizational and incentive costs. But as it was seen with the financial crisis (for example with the Northern Rock debacle in the UK), the central bank's absence from supervision has also enormous costs. Garicano and Lastra argue that "the recent consensus points to an intermediate solution, which bundles macro-prudential supervision with monetary policy and segregates micro-prudential supervision. In cases where micro issues tend to affect macro issues, these authors borrow from the literature on organizational economics to propose "Management by Exception", which means that, exceptionally, some issues can be referred to the broader authority.²⁹

The decision to merge the agencies in early 2012 in Spain was taken under enormous pressure to cut the fiscal deficit while other reforms were being delayed in the financial system, the labour market or the pension schemes. The banking bail-out that would take place in July 2012 had not taken place yet, and the government, while delaying painful reforms, needed to show a reformist zeal. A common regulation and competition agency will have a homogeneous level of regulatory independence while different sectors and policy instruments require different degrees of independence. A multi-task agency will find it more difficult to combine

²⁸ Along these lines, see Leaver (2009).

²⁹ For further insights into the structure or coordination of agencies in finance, network regulation and anti-trust, see González (2006), Tirole (1994), Dixit (2002), Shleifer and Vishny (1993), Aoki and Rothwell (2011), Vives (2011), Glachant (2014), Vogelsang (2013 and 2014), Sidak and Spulber (1998), Naert (2009), Vickers (2010b), Carlton and Sider (2009), Baker (2013), Weeds (2004), Geradin and Sidak (2003), Santos (2001), Goodhart and Schoenmaker (1995), Farrell and Weiser (2003), Geradin and Kerf (2001), Hellwig (2009), and Tapia and Mantzari (2012).

accountability and independence. Any benefits must come from better coordination and synergies between the regulation of different industries and between regulation and antitrust.

To the extent that the project to merge the agencies in Spain came immediately after a political change, it may also be interpreted as an attempt to oust commissioners appointed by the previous government from their position via a legislative change. The government thus used the change to renege on the appointment of the previous board members. The reform could also be used to try to reduce the independence of the resulting agency vis a vis government, as suggested by EU Commissioner Kroes in a letter to the Spanish government of February 2013.

One of the main problems of the merger of regulatory agencies is the coincidence in the same body of ex ante and ex post functions. The coexistence of agencies with different objectives (Tirole, 1994) is good for incentives, commitment and accountability, although these benefits must be balanced with the higher administrative costs.

The merger of sectoral regulators in industries with very different technologies does not seem to reap any significant scale or scope economies. On the contrary, a council or chamber supervising at the same time industries such as telecoms, electricity and transportation will hardly have the same high level of knowledge about the three of them.

The merger of agencies has advantages and disadvantages, but it was apparently being used by the Spanish government to try to reduce regulatory independence, at a time where the European Union rules had been requiring more, and not less, regulatory independence. As argued above, regulatory independence itself has also advantages and disadvantages, and there is an optimal degree of regulatory independence that varies across specific industries, depending for example on the magnitude and degree of asset specificity and the need to coordinate regulation with other government policies. Tailoring of independence must be balanced with fixed administrative costs, some of which have already been sunk by agencies that have been in existence for almost two decades. Instead of a government initiative, it would have been better to introduce reforms in the institutions of regulation after a white paper and an open debate that balanced all these issues, as it had been done with the reform of competition policy in 2007.

Although the influence of the decision of separation vs integration on regulatory capture is theoretically ambiguous, in countries with very powerful large firms with national and international champions ambitions, the large firms, as seen in the Spanish case, could have a preference for as few regulators as possible and keeping them as close as possible to the executive powers. The incumbents have long term strategies of political connections and international expansion, and may prefer to have a single agency to lobby no matter its size, and to deal with a government that keeps most of the relevant decisions. In addition to this, different industries and policy instruments require different levels of regulatory independence; and there

is a trade-off between regulatory independence, which requires accountability, and multi-dimensional tasks, which makes this accountability more difficult. Industries that are being partially liberalized should be regulated balancing the trade off between the need to have clear objectives and the economies of scale and scope that come from regulating similar industries.

The Spanish case (see Xifré, 2014) illustrates that independent regulatory agencies are fragile institutions. If this is the case in Spain, a member state of the European Union, what may not happen in countries that are less constrained from an institutional point of view. The EU should reflect about the difficulties experienced, not only in Spain, but also in Denmark and other countries, with *de facto* independence. It apparently seems that the institution of regulatory independence lacks the resilience and public support that, at least until recently, enjoyed central bank independence (now this is to some extent also questioned after the global financial crisis).

There is a broad consensus among scholars and practitioners that institutional quality is important, but it is more difficult to say which specific attributes conducive to institutional quality should be adopted. Many of the relevant attributes are probably difficult to measure and define: credibility, stability, good appointments... Both written and non-written rules matter. Institutions are endogenous and they are not good travellers, in the sense that they must fit and complement the previous institutional endowment (see Levy and Spiller, 1994, and Spiller and Tommasi, 2007).

Failed reforms: Transantiago and California electricity reform

There have been some well know cases of failed reforms in regulated industries. These are cases where the policy parameter p of the model in Section 3 can be generically interpreted as a package of policies that had a huge impact on investment returns. A brief discussion of the behavioral considerations that surrounded the choice of p in these cases illustrates some of the issues raised by the recent literature on behavioral political economy and regulation. Arguably, these issues interact with the transaction costs of policy-making highlighted by Dixit (1996), being difficult to disentangle those issues that arise because of behavioral considerations from those arising purely from transaction costs.

We briefly deal with two such reforms that have been analyzed by the academic literature, one that took place in a centralized country (Chile) and another that took case in a state of a federal country (California, USA).³⁰

³⁰ See also Aoki and Rothwell (2011).

In Chile, an ambitious³¹ reform of the bus system in the capital Santiago (**Transantiago**) was introduced in February 2007, aimed at reducing the negative externalities of the old bus system in terms of accidents and pollution. The new bus lines and vehicles were introduced at once, and the new system was an immediate failure that triggered a huge political crisis as millions of passengers expressed their anger at the increased generic cost of travel in terms of time and inconveniences. The reform, which involved the participation of private operators through an open bidding process, was not accompanied by new legislation that would have been necessary to use public funds or public ownership if it was needed as well as specific regulatory institutions. The technocrats promoting the reform had been over-optimistic in that nothing could go wrong and that the new system could be implemented without public transfers and on time. Although the experts anticipated well the impact that the reform would have on externalities, they failed to anticipate the very negative perception that the users would have of the reformed service. This suggests that in network industries with universal service, it is difficult to disentangle the perceptions of citizens as voters or consumers. The main conclusion of Andrés Gómez-Lobo,³² a transport economist and Minister of Transport since 2013 is that “a global reform of a crucial public service such as public transit cannot be undertaken overnight and just based on theoretical and desktop designs. Irrespective of the quality and technical abilities of the professionals designing such a reform, a “Big Bang” approach to public transport reform is very risky and –as shown in the case of Santiago- can lead to disastrous effects.”

In **California**, a regulatory crisis led to an explosion in wholesale power prices, supply shortages, and utility insolvencies in the electricity sector between May 2000 and June 2001. Joskow (2001) argues that one of the lessons to be learned also has to do with over-confidence: “California focused too much on illusive short-run gains from low-priced power that was available when there was excess capacity, implicitly assumed that the excess capacity situation would prevail for long enough to defer reforming the institutions that support investment, and focused too little on creating sound institutional arrangements to support investments in new generation and transmission facilities.(...) Ongoing market reforms and regulatory mitigation initiatives designed to remedy serious market-performance problems should be an *expected* feature of the process of creating efficient competitive wholesale electricity markets. (...) Both the CPUC and the FERC acted too slowly and ineffectively as the crisis deepened and spent most of their energies pointing fingers of blame at one another rather than working together cooperatively to find a solution.” The need for national regulators to interact with other units is also highlighted by Wolak (2003): “FERC disregarded much of the input from California

³¹ Choi and Pritchard (2003, p. 33): ambitious non-realistic plans are examples of overconfidence.

³² See Gómez-Lobo (2012).

regulators and policymakers and other independent monitoring entities intimately acquainted with the performance of the California market.”

5. Conclusions and paths for future research

Regulatory agencies as institutions and the policies they implement are fragile,³³ and their structure and powers are the outcome of a changing political game. The degree of regulatory independence and the horizontal (such as the number of agencies) and vertical (such as the allocation of responsibilities at federal or state level) structure of agencies is far from stable. They change with technology and demand (in product or in related markets, such as capital markets) and with the outcome of games played between governments, legislatures and the relevant interest groups. Non-optimizing behavior by these agents, expert biases and related de-biasing strategies, and a concern for fairness and process, modify the traditional regulatory game. The main result/message after looking at independent regulation with a behavioral lens is that on the one hand independent regulators are seen as part of a potentially more robust regulatory system, and on the other hand their contribution to this system can be based on a wider range of instruments. One of these instruments is the influence that institutions may have on citizen preferences (see Bowles, 1998).

Agencies need feedback, review and interaction, but they may have an advantage as a commitment device and an ongoing repository of knowledge (Rachlinski and Farina, 2001, p. 579) with an identity of public service. Delegating into an independent potentially biased regulatory agency (see Glaeser et al., 2001, and Posner, 1983) some aspects of the policy vector must be compared to the behavioral issues raised by the alternatives to delegation to alleviate the commitment problem (for example, popular capitalism and rigid legislation may raise significant problems from the point of view of behavioral political economy).

The analysis should be directed at how to make regulation more robust. Levin and Lo (2015) look at the natural world for inspiration on the properties of regulatory systems that are the result of evolution and that reduce the fragility of organisms and their interaction in ecological systems. The analysis of the evolution of complex systems could help in suggesting traits of individuals and interactions that facilitate regulatory stability. Reform proposals should consider a limited and accountable role for experts, perhaps in the context of more realistic models of the behavior of expert technocrats (Basu, 1997, Castañeda, 2011) and how they interact with society. The pretence of knowledge was mentioned by Hayek (1974) as the key limitation of planning systems. After the cold war, a similar argument could be made for the

³³ For the concept of fragility in economics and related disciplines, see Thaleb (2014) and Calomiris and Haber (2014).

limits of expert technocracies. Martimort (2012) argues that in general expert cost benefit analysis fails to take into account the need to provide incentives for those who hold valuable information, which introduces distributional concerns among agents who may hold different cultural values.

In a complex increasingly interconnected society, globalization and federalism should be taken into account in attempts to build more robust regulatory systems. Glaeser (2006, p.21) argues that “small scale experimentation is helpful, and federalism continues to have value in allowing for laboratories of democracy.” Gavil and First (2014) also stress the positive role of institutional diversity in regulation and antitrust. Aspects of regulatory governance that have little to do with technology or demand, but with perceptions, saliency and stability, may determine which is the ideal locus of regulatory authority, as argued by Troesken (1997) when he explains the transfer of regulatory power from municipalities to states in the USA in the early XX century. Similarly European Union supervision and review provides a calmer political arena to resolve some of the contentious issues of regulation at the national levels. The locus of regulation raises issues in terms of the costs of specialized regulation at different levels of government and the corresponding bundling of issues in some cases (with bundling, the majority does not necessarily prevail in individual issues, which may be good for commitment).³⁴ Colomer (2014) suggests that expert agencies at the global level may be working better than national governments and with high levels of accountability. In the global sports businesses, expert specialized agencies such as the World Anti-Doping Agency or the Court for Arbitration for Sport may be providing better governance than non-specialized institutions such as FIFA.

One challenge is to explore ways to inject scientifically sound information into public discourse through trained facilitators or mediators, and to combine better democracy and expertise by means of legitimate commitment mechanisms (see Sánchez-Cuenca, 2009), preserving and improving both. The issue of the virtues and limits (better interest group representation but departure from democratic deliberative ideal) of public and on-line participation is also an important potential path of future research as suggested by de Figueiredo and Stiglitz (2015). This is just the application to the regulatory commitment problem of the difficulties and challenges of achieving a more inclusive and effective democracy. As Kahan et al. (2006) explain, trying to reach decisions by rules that get as close as possible to unanimity is not necessarily incompatible with efficiency, echoing an old idea of Wicksell and Lindahl (see Silvestre, 2003).

³⁴ The subtle issues raised by economic integration, task bundling and capture potential depending on the administrative level of regulation are also analyzed by Marinello et al. (2015).

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