BEHAVIOURAL REGULATORS AND INSTITUTIONAL ARCHITECTURE (PRELIMINARY)

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Abstract

Behavioural economics takes seriously the possibility that not only consumers and firms' agents have bounded rationality, but also regulators and political principals under the influence of voters. All political agents (voters and decision makers) are potentially influenced by behavioural biases. This paper surveys the emerging literature on behavioural regulators and derives implications for the institutional architecture of regulation. Insulated expert agencies are not free from these biases, which should be taken into account when designing delegation into such regulatory agencies. The literature on regulatory independence can be reinterpreted at the light of new developments in behavioural economics. Regulatory federalism and the institutional relationship between competition policy and ex ante regulation are also affected by behavioural considerations.

Key words: behavioral economics, experts, delegation, federalism, institutional architecture.

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."

1.INTRODUCTION

In their classic book on regulatory reform in the UK, Armstrong et al. (1994) argued that the task of regulators would be easy except for the presence of asymmetric information, potential regulatory capture and commitment problems. The evolution of some recent literature on economics suggests a fourth source of difficulty (which is complementary of the others): the behavioural biases of regulators.

However, although there is increasing awareness of the biases of consumers and firms' decision-makers (see for example Spiegler, 2011), the potential for regulators' biases has been

less recognized out of the academic journals. It is encouraging that some regulators with an academic background have started to provide interesting 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 reflects on the differences in the tasks of regulators ("foxes") and central bankers ("hedgehogs"). This distinction is reminiscent of the distinctions in task characteristics that have been observed to trigger different degrees and forms of bounded rationality.[1]

Here I survey work on behavioral biases of regulators and apply it to one particular field: institutional architecture of regulation: federalism, independence, and relations between agencies.

Even if insulated experts were better than the public at avoiding bounded rationality, if they are affected by cognitive biases, it is desirable to seek approaches that minimize their impact. The problem becomes more serious if expert regulators are not even aware of their biases.

To minimize the impact of psychological biases, it is useful to think about the existence of framing effects (described below), which are not necessarily pernicious if they help to "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 compliance[2] 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 come at a cost).

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. 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

[1] 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).
[2] See Hallsworth et al. (2014).

those of anybody else, are contingent on framing effects, and more generally, are endogenous and potentially volatile.

This paper presents an overview of recent advances in behavioral public economics and how they can be applied to regulation. And it suggests avenues of empirical and policy research in this field, especially in the context of the institutional architecture of regulation.

The endogeneity of preferences, and their dependence on framing effects, implies that traditional public economics should reconsider the use of individual preferences both as determinants of decisions and as a metric for social welfare. This relationship between behavioral and public economics is briefly reviewed below, before applying the idea of endogenous preferences to expert regulators themselves.

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 and there are a variety of principals. This makes intrinsic preferences much more important than in the private sector.

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. Several scholars have been involved in debates about the benefits and costs of technocracy, and big discrepancies remain: Kahan et al. (2006) stress the differences in judgement across different experts in risk regulation who hold different cultural values, whereas Sunstein (2006) argues that in most cases discrepancies can be reduced through sound cost-benefit analysis and that as a result experts should "nudge" citizens. However, Martimort (2012) argues that in general 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. Rodrik (2012) believes that the need to hold technocrats accountable is an intrinsic part of a well functioning democracy, 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.

In the canonical model of policy delegation that is reviewed and reinterpreted below, there is an implicit assumption that policy makers have a pool of potential independent regulators with different preferences. But where do the preferences of the independent regulator come from? Salience effects, task characteristics and personal background are crucial in activating the

availability and similar biases, which are a key ingredient in the design of independent regulators and the horizontal (relationship between agencies) and vertical (federal) structure of regulation.

In the rest of this paper, Section 2 presents an overview of research on behavioral public economics and on regulation, with an emphasis on expert bias. Section 3 argues that the difficulties of incentives in the public sector suggest that strategic delegation into independent regulators depends on appointing regulators with the right preferences, but that the endogeneity of these preferences make the exercise a complex one. Section 4 discusses how behavioural considerations affects regulatory federalism and the decisions about merging or not regulatory and anti-trust agencies. Section 5 presents concluding thoughts.

2. AN OVERVIEW OF RESEARCH ON BEHAVIOURAL PUBLIC ECONOMICS AND REGULATION

2.1. BEHAVIORAL PUBLIC ECONOMICS

Modern research in the intersection between economics and psychology (behavioral economics) recognizes the presence of boundedly rational consumers and firms (see Kahneman, 2011 for an overview). This is increasingly being incorporated in Public Economics, for example in the monograph by Munro (2009) and the textbook by Cullis & Jones (2009).[3] The overview presented in this paper takes this as a point of departure and incorporates the possibility that policy makers themselves are boundedly rational.

A useful way to organize thoughts in behavioral economics is to take into account the role of framing effects in individual preferences: the way a decision problem is presented to subjects affects the choices in a manner that suggests preferences differ between different contexts, although they are essentially the same. Examples are status quo concerns, loss aversion and the endowment effect.

For example, $\precsim_{fi}$ indicates a preference relation for individual i in the context of frame f. In traditional consumer theory this preference relation is independent of f.

The consequences of taking this possibility into account are far reaching. Landier and Thesmar (2010) conclude that we should end the myth of the benevolent state (for "public choice" and behavioral reasons) and think seriously about improving democracy as it can realistically be given the overwhelming presence of bounded rationality. Behavioral "anomalies" affect the role

[3] See also Congdon et al. (2011) and Shafir, ed.(2013).

of the state in the economy in numerous ways: framing, endowment effect, endogenous preferences, non-optimizing behavior.

A problem for public policies under a behavioral lens is that individuals may have several selves, eg a short term affective self and a long term deliberative self: preferences may be changing, endogenous, unstable. Bernheim (2009) provides a partial solution: as long as choices have some consistency (basically acyclicity), then we could base analyses on Pareto improvements defined relative to the actual choices.

However, the consistency assumption is often violated too. Stern (2010) argues that "the cases where consistency of choice applies but standard preference theory does not are likely to be fairly narrow." An alternative is to drop preferences or actual choices altogether, and focus only on "capabilities" (Sen, 2009).

If individual preferences are unreliable as an argument of social welfare, merit wants become more important (Munro, 2009). Decisions about them should require high scientific standards (eg calories, physical and mental health, educational level).

Examples of applications of behavioral public economics include framing effects in taxation and Cost-Benefit analysis taking into account the endowment effect. Behavioral Public economics takes into account the possibility of individual "failure" (in addition to market failure and government failure): consumers' bounded rationality (as in Spiegler, 2011), firms' bounded rationality (as in Armstrong and Huck, 2010 and the tradition of Simon, Cyert and March) and regulators' bounded rationality. Expanding individual failure to policy makers and voters, in addition to market participants, gives rise to behavioural political economy or behavioral public choice: see for example Ortoleva and Snowberg (2013) and Schnellenbach and Schubert (2014).

2.2. BEHAVIORAL REGULATION

Several authors have presented empirical and theretical analysis of examples of regulators or other decision makers (civil servants, judges, physicians) that either fail to optimize or present non-standard preferences.

In Leaver (2009), for example, 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 satisficing behaviour considered by Joskow, 1974 –see below, but as an equilibrium outcome). As a result, it may be a bad idea to appoint mid carreer professionals for limited terms. Longer terms in US Public Utility Commissions s are associated with better decisions for consumers that are less generous for firms.

In Pendergast (2007) some bureucrats are biased in favor of their clients (social workers, nurses) and others are biased against their clients (police). This may be desirable when social welfare does not necessarily benefit from treating the clients excessively well.

According to Callander (2007), expertise explains why principals can commit to delegate into policy agents (other rationales for delegation are explained in section 3 below). Expertise can then be 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 the iure aspects of legislation. This informality makes it posible that the agent imposes her idyosincratic preferences.

Stewart et al. (1997) discuss which task characteristics make expert judgement easier: for example weather forecasts are in many cases (when predictability is high, that is, outcome variation is low) good, as opposed to clinical psychologist, because of high predicitability, good available information and the technological existence of models.

Frank (2004) relates Behavioral Economics and Health Economics, showing that the physician-patient relationship is plagued by demand and supply biases. Consumers assess the quality of physicians paying attention to dimensions of quality that are not necessarily the most important ones for their welfare. In this sense, parallels can be made in regulation; for example, consumer/voters may pay more attention to static efficiency issues tan to dynamic efficiency dur 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*.

Evidence has accumulated in a variety of sectors beyond health that experts are vulnerable to making mistakes: for example, Guthrie et al. (2001) and Danziger et al. (2011) find that judges are influenced by availability and other biases (see below), and the literature on the economics of sport has shown that soccer referees are affected by crowds so that they have a high incidence on the home-field advantage (to an extent that depends on incentives and institutions). Choi and Pritchard (2003) and Hirshleifer (2008) document the behavioural biases that affect financial regulators and argue that the combination of monopolistic regulation (having a too powerful regulator such as the Securities and Exchange Commission in the US) and behavioural biases tends to create excessive government intervention. Stasic (2009 and 2013) also argues that behavioral regulators are a reason to reduce the weight of government in the economy. Stiglitz (2013) however, believes that powerful groups in society can exploit the biases of vulnerable sectors of society to impose a laissez-faire agenda.

In the literature on public administration, Rachlinski y Farina (2002) discuss how to design government structures anticipating the behavioural biases of policy makers at different levels, in a US context.

In the field of microeconomic regulation, after Joskow's PhD thesis ("A Behavioral Theory of Public Utility Regulation") in the early 1970s there hasn't been any 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), to my knowledge.

Joskow (1972) argued that "Commissions appear to have the most rudimentary understanding of the relationship between the return is 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, 2003) and their status 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.

When an equilibrium with the environment breaks down, agencies enter into innovation mode. In the US since World War II, the primary concern of regulatory commissions 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, or as mechanisms to alleviate information asymmetries. They were assumed to behave rationally, according to some objective function or monetary reward.

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 as argued before they are not free from empirically documented biases:

-fear of ostracism (conformity),

-oveconfidence (confirmation bias, cultural views),

-availability (giving more importance to examples that leave a vivid impression in memory),

-narrow frames.

"System II" reasoning (slow, deliberative, see Kahneman, 2011) is also vulnerable to biases: experts are usually personalities that attach a lot of importance to reputation and that have a high opinion of themselves, and tend to deploy "defense motivation", ie deliberate, calculating and methodical analysis to support beliefs taken a priori (confirmation bias).

Narrow frames yield inconsistencies derived from uncoordinated regulation. Kahneman (2011): 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, professsions (eg Central Bankers), food (parole judges in Israel tend to deny parole when they are hungry, Danziger et al., 2011). Some personal characteristics of experts determine the extent to which they make mistakes (Tetlock: "foxes" better than "hedgehogs"; it is also plausible that age and experience have an influence on the style of regulation).

Next, I present and discuss a simplified version of the model by Cooper and Kovacic (2012), because it can be best related to the literature on independent regulators that is discussed in next section.

The regulator's Objective Function is:

$$U = S - \frac{\theta}{2}(\pi_i - \pi^*)^2 - \frac{(1-\theta)}{2}\phi(\pi^{os} - \pi_i^R)^2$$

where π_i^R is the regulator's decision, π^* is the optimal long run decision as perceived by the regulator and π^{os} is the politically expedient (populist) policy desired by political principals that cater to public opinion.

$\phi(\cdot)$ translates distance from the politically expedient policy into some sort of punishment.

S is the level of utility that would be realized if $\pi_i = \pi^* = \pi^{os}$.

Solving the First Order Condition:

$$\pi_i^R = \lambda(\theta\pi^* + (1-\theta)\phi\pi^{os})$$

where $\lambda = \frac{1}{\theta+(1-\theta)\phi}$.

The regulator will adopt the optimal policy if either she places no weight on political rewards (θ=1) or if the politician is unable to translate public opinion discontent into punishment for the regulator.

If regulators suffer from the biases that plague consumers, they are likely to use flawed heuristics -or mental shortcuts- to estimate the optimal long-run policy choice.

Examples of flawed heuristics include availability (being overinfluenced by recent salient events), representativeness (ignore baseline probabilities and sample sizes and be carried away by stereotypes).

Flawed heuristics and myopia likely to be in favor of more politically expedient policies, i.e. $\hat{\pi}^* = \alpha\pi^*$ with $\alpha \geq 1$.

Consequently, the regulator chooses

$$\tilde{\pi}_i^R = \lambda(\theta\hat{\pi}^* + (1-\theta)\phi\pi^{os})$$

Individuals tend to become irrationally wedded to early impressions leading to overconfidence.

A regulator may misread the extent to which his preferred policy deviates from the optimal long-run policy.

The regulator knows π^{os} with certainty.

The regulator updates his beliefs about π^* as he collects more information, and chooses between π_A^* and π_B^* given a stream of information $\varepsilon_t \in \{\alpha, \beta\}$, which provides evidence that the optimal long-run policy choice is either A or B, respectively.

A rational unbiased regulator who perceives a signal of α calculates the odds of A being the optimal policy as:

$$\Lambda = \frac{\mathrm{P}\left(\pi^* = \pi_{\mathrm{A}}^* \right) \mid \alpha}{\mathrm{P}\left(\pi^* = \pi_{\mathrm{B}}^* \right) \mid \alpha} = \frac{\sigma}{1-\sigma}$$

where $\sigma = P(\varepsilon = \alpha \mid \pi_{\mathrm{A}}^*)$, or the strength of signal α. If $\Lambda > 1$, the regulator adopts π_{A}^*, and adopts π_{B}^* otherwise.

A regulator who suffers from confirmation bias, however, will anchor his belief about which policy is optimal based on the first observed piece of evidence. For instance, if the first piece of evidence is *a*, with some probability q > 0, the regulator erroneously will perceive a subsequent β as evidence in favour of π_{A}^*.

Suppose the regulator who has collected two pieces of evidence perceives two α's. In this case, the biased regulator will calculate the following likelihood function:

$$\widehat{\Lambda} = \frac{\sigma^2}{(1-\sigma)^2}$$

But a regulator (or objective observer) aware of this bias would calculate the true likelihood ratio as

$$\Lambda = \frac{q(1-\sigma)^2 + (1-q)\sigma^2}{(1-\sigma)^2} < \frac{\sigma^2}{(1-\sigma)^2}$$

The inequality holds as long as σ > ½, ie as long as signals are more likely to be indicators of the true state of the world than not.

Thus a biased regulator will be overconfident in his belief that π_{A}^* is the correct policy.

Theoretically, there is no way to identify the direction of the bias. In practice it is likely that the first piece of information is a call to action in the direction of politically expedient policies. Confirmation bias also can reinforce preferences for short-sighted decisions that derive from flawed heuristics and myopia.

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 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 opportuniy for learning.

Incidentally, this list fits better with utility regulators (foxes) rather than with central bankers (hedgehogs, at least until recently) according to the comparison made by John Vickers (competition regulator, central banker and academic).

Similarly, Cooper and Kovacic: 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 that of the firm. A regulator who systematically produces welfare reducing outcomes may still enjoy his position or even better ones if he produces outputs (cases, rules) that are politically expedient.

Regulatory competition, to the extent that it occurs, is on outputs (cases on high profile companies) rather than outcomes.

As a result, regulators with a short term bias are likely to be over-represented in the population of regulators.

Possible de-biasing mechanisms:

-Experience, more careful selection (from a pool of professional “certified” regulators) and training.

-Adversarial internal review.

-Greater Accountability: Focus on outcomes rather than outputs (eg number of high profile mergers stopped).

-Ex post analysis of decisions.

There is a mostly empirical literature on the importance of intrinsic motivation or "stles" in the preferences of regulators and decision makers. Göhlmann and Vaubel (2007) present evidence on the professional and educational backgrounds of central bankers (council members) for the euro area and eleven countries since 1973, stating that insiders are more hawkish than outsiders. Specifically, their most robust result is that former members of the central bank staff prefer significantly lower inflation rates than former politicians do. Educational backgrounds have a lower influence than occupational backgrounds. Economists who have worked in a central bank prefer a significantly lower inflation rate than economists from academia.

Several papers analyze the determinants of dissent voting behavior in central banks. The literature on dissents in the US Federal Reserve (see for example Belden, 1989, and Havrilesky and Schweitzer, 1990) establishes a prominent role in determining voting behavior to career backgrounds (external or internal council members), channel of appointment and unobserved heterogeneity. Harris et al. (2011) however find that in the UK most of the explanatory power in concentrated in members' individual fixed effects. The attribute the difference between the US and the UK to the fact that the potential democratic deficit in the UK is mitigated through the choice by government of an inflation target, and not by politicians' influence on the members of the monetary policy committee.

Garside et al. (2012) use a data set of companies investigated under UK competition law, and find very strong "experience effects." That is, more experienced regulators in competition policy tend to be tougher on companies potentially abusing their monopolistic position. Specifically, they find that replacing an inexperienced chairman of an investigation with one of average experience increases the probability of a "guilty" outcome by approximately 30%. The authors interpret this as evidence that regulators are motivated by factors other than efficiency, although they do not provide details on the channels and underlying motivations of the experience effect.

Montoya and Trillas (2011) show that the institution of regulatory independence is politically very vulnerable, by looking at the difficulties that Latin American face at sustaining independence in times of political change. However, there is wide variation in the vulnerability across countries. The next stage in their research is to find the determinants of this variation and in particular the relationship between vulnerability and the professional and educational backgrounds of regulators.

Very preliminary data collection (not shown here but available upon request) shows that the telecommunications regulator in Spain (CMT) has experienced significantly less dissenting

votes than the energy regulator (CNE).[4] 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 (for example, in the middle of a takeover wave, the government changed the rules of the CNE to give it powers to stop takeovers).

A source of the availability bias in Spain may be the market for corporate control: contested takeovers project light into an industry, changing the objective function of regulators (the energy regulator was given broader responsibilities on takeovers in the middle of the Endesa takeover battle). 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.

Overall, there are two potential interpretations of all this evidence: i) that many regulators do not easily apply efficient welfare enhancing decisions, but the most politically expedient ones, or ii) that they have biases that come from different cultural views and not from different sources of information as experts, as argued by social pshychologist Slovic and his co-authors. Perhaps both interpretations can be reconciled by the fact that behavioral biases 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 an appropriate context when strategic delegation is necessary. However, a precise knowledge of the preferences of regulators is needed.

3. Reinterpreting independent regulators

3.1. INCENTIVES IN THE PUBLIC SECTOR

The difficulties of introducing monetary incentives in the public sector suggests that strategic delegation in independent regulators depends on appointing regulators with the right preferences.

To see why introducing monetary incentives in the public sector is difficult, focus first on a benchmark where a "principal" chooses an optimal incentive contract $y(x) = F + mx$, where x is observed by the principal. The observed variable is such that $x = e + \varepsilon$, where e is the effort by

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

the "agent" and ε is a random variable with mean 0 and variance ν. The cost of effort for the agent is C(e) = $\frac{1}{2}ce^2$.

With one principal and one dimension of effort (Dixit, 2003), the optimal power of incentives with linear contracts (choosing F and m to maximize E(x -y (x)) subject to the incentive and participation constraints of the agent) is simply $m = 1 + \frac{1}{1+cr\nu}$.

However, with multiple dimensions, eg i = 1, 2 with equal variance ν, then

C(e_1, e_2) = c[$e_1^2 + ke_1e_2 + e_2^2$], $x_i = e_i + \varepsilon_i$, y ($x_1$, x_2) = F + m_1x_1 + m_2x_2

In this case, the optimal power of incentives is:

m_1= m_2=1/(1 + (1 + k)rcν)

Interpretation:

- k > 0 (substitutes): lower power.
- k < 0 (complements): higher power.

And with multiple principals the optimal power is m =1/(1 + nrcν) where n is the number of principals. The higher the number of principals, the lower the power, because each tries to diminish the incentives to work for the others. Monetary incentives are thus not very effective in the public sector, characterized by multiple substitute dimensions of effort and multiple principals. The preferences of agents, then, matter more than in the private sector. A case in point is precisely the preferences of appointed regulators.

3.2. THE INDEPENDENCE SOLUTION TO COMMITMENT PROBLEMS

Regulated agencies are typical public sector agencies with several tasks and a variety of principals, more so than central banks, although after the economic crises also central banks are being burdened with more tasks. As it is well known, a key issue for regulatory agencies in infrastructure industries is to alleviate the time inconsistency problem in the face of sunk investments.

Despite the wide variety, the logic and the appeal of ways to alleviate under-investment that are not based on delegation into a discretionary regulatory institutuion (such as rules, rigid legislation or contracts), some discretion remains necessary, for which as argued above monetary incentives will not be very useful. There will be contingencies not contemplated in initial contracts. Some even argue that credibility may require some discretion, and not completely rigid rules, because the latter will have to be changed any way, 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.

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. One must distinguish between decision makers that are motivated by re-election concerns (politicians) and decision makers that are motivated by career or idyosincratic concerns (bureaucrats or judges). The former are better at making decisions when the policy has far reaching redistributive implications so that compensation of losers is important; criteria of aggregate efficiency do not easily pin down the optimal policy; and if there are interactions across different policy domains so that policy packaging or evaluating controversial trade-offs is required to build consensus or achieve efficiency. The latter are better when the electorate is poorly informed; feedback about the quality of decisions is slow so that there is a time-inconsistency problem; the majority's preferences are likely to inflict large negative externalities on the minority; the criteria for good performance can be easily described ex ante and are stable over time; the legal system is strong; the policy consequences touch narrowly defined interest groups. It seems clear that among all these criteria, the one that most uncontroversially fits all network industries is the presence of a time inconsistency problem. It is more debatable whether the other criteria apply to regulation, and they will be discussed below, when some qualifications are introduced to the independence solution.

In regulation and other fields, delegation is not the only solution, as seen above. 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, has been for governments to delegate the operation of some elements of the policy vector to authorities with powers of discretion. A second-best solution to the credibility problem involves delegation into a central banker that is more inflation averse than government. Delegating into a regulator that is more pro-industry than a representative government equally alleviates time inconsistency. The solution is actually more necessary and more difficult to achieve at the same time in regulation, 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. 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 indepenence, which some countries have found difficult. Another problem is that it is assumed that the government can choose a regulator with the appropriate, optimally pro-industry regulator, 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 optimally pro-industry 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.

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) discretional 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.

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 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.

An issue related to specialized regulators is the possible proximity to the industry and its interests. It is not unusual that in new regulatory agencies a fair proportion of the staff and officials come from the historically incumbent firm (and additionally, regulators may value future employment in the industry). However, that is precisely one of the objectives of strategic delegation: to take into account the rents of the industry. But an independent regulator must not value excessively industry rents, because that would yield too high prices, possibly getting close to monopoly prices, thereby reducing consumer welfare. That is, there is a socially optimal level of weight that the regulator must attach to industry rents, as there is a socially optimal level of "conservatism" in the independent central banker.

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. Policy reforms which are not perceived as imposed from abroad, and that involve local investors, tend to benefit from higher political legitimacy than those that are seen as "foreign" solutions.

3.3. QUALIFICATIONS TO THE INDEPENDENCE SOLUTION

Some practical problems with independent regulators have already been mentioned: the problem to know and choose the person with the right preferences, and the problem to committing to respect independence.[5] But even if these problems were solved, some more substantial issues have been raised for a long time.

Bernstein (1955) provides an early criticism of the institution based on the following arguments:

-A specialized regulator raises the risk of capture, because the specialists come from the same places as the firm's managers and staff, and because they will be in a repeated relationship with firms without many other parties involved. Discretion and insulation may make regulators less accountable.

-A separate regulator who sees as one of his or her most important missions to preserve his or her autonomy will be reluctant to coordinate with government even though regulatory decisions interact with the rest of public interventions. This is usually answered as saying that regulators take day to day decisions on a few policy variables and policy is set by elected politicians choosing among a variety of long run options (such as fuel decisions, ownership decisions, financing decisions). But some policies such as many on structural regulation (vertical integration, number of firms, mergers and acquisitions) affect both the long and the short run and the distinction between polciy or regulation becomes then blurred.

[5] Problems of regulatory capacity and inequality (fiscal capacity) put a lot of pressure on independent regulators in developing countries.

-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 building the necessary alliances. Politicians that anticipate that regulators will be insulated and in the job for many years will be reluctant to appoint regulators with strong political skills. Classic regulators such as Alfred Kahn in the US and Stephen Littlechild in the UK were probably political enterpreneurs as much as good regulators, but their stature has revealed as hard to replicate. Notice that the problem is not fixed just by having regulators that are pedagogic and that spend resources educating the public opinion. 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) 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 principal (the voters, the politicians). Incentive contracts are theoretically possible, but problematic in practice as seen above.

It could be argued that regulation of public utilities or of specific industries are 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 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 hyerarchy). However, in many cases things are less clear cut concerning regulation. Regulatory decisions often have important redistributive implications, especially in developing countries; 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. 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 that the electorate is often too informed for commitment purposes, see Evans et al, 2008). 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.

On the commitment benefits of some degree of capture, ‘revolving door’ arrangements may be important. Regulators can expect employment within the regulated industry upon completion of their terms of office. The model assumes that regulators (not firms) make effort

choices (they can improve their industry-specific knowledge) and the prospects of subsequent employment are shown to enhance these.

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. 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. 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. On the other hand, both the executive branch and the legislature may find it politically attractive to devolve complicated and controversial decisions to agencies that are both expert and arguably independent.

3.4. THE APPLICATION OF GROSSMAN AND HELPMAN TO REGULATION

Evans et al. (2008) apply the Grossman and Helpman (1996) model of lobbying contingent on the electorate's information to regulation. The information of the electorate here can be interpreted, at the light of the recent behavioural literature, as a frame that influences the preferences of the regulator, for example due to availability.

In this application, there are two parties, say 'Left' (L) and 'Right' (R). The regulated company is the only organized interest group or lobby in this economy. In period 1 the firm, in anticipation of the regulated phase in period 2, as well as investing to lower fixed costs, spends resources to capture the policy platforms of two competing parties although it does not have a prior preference for any of these two. A fixed proportion of voters are informed and vote for a party strictly on the basis of the effect of its policy on their utility. The rest of the voters are uninformed and their support for a party depends on the intensity of its campaign. This, in turn, depends on contributions from the lobby. The details of the rest of the set-up are as follows.

3.4.1. The firm

In period 1 the firm can devote an amount $s^j \geq 0$, j = L, R to lobby party j which sets pricing policy p^j in period 2. As well as devoting resources to lobbying, the firm can invest in period 1 to lower costs in period 2. In period 2 the firm produces a quantity $q^j = \psi(p^j)$ of a homogeneous good at a marginal cost c where $\psi(\cdot)$ is the inverse demand curve. The profits in periods 1 and 2 are

(1) $\Pi_1 = \Pi_1(i, S^L, S^R) = -k - i - S^L - S^R$

(2) $\Pi_2 = \Pi_2(p^j, i) = (p^j - c)\psi(p^j) - k + f(i)$; j = L, R.

respectively, depending in the second period on which party is elected, where k are fixed costs in the first period, i is monetary investment in period 1 which leads to a lowering of fixed cost of $f(i)$ in period 2. We assume $f' > 0$, $f'' < 0$ and $f'(0) = \infty$.

The firm in period 1 maximizes the expected discounted sum of two-period profits. Suppose first that the elected party has previously rejected the firm's lobby; then in period 2, given i, it chooses p to maximize consumers' net surplus $W(p)$, subject to the firm's second-period participation constraint $\Pi_2(p,i) \geq 0$. The standard result of this optimization problem is that the constraint binds, so that $\Pi_2(p,i) = 0$ which determines $p = p(i)$ and output $q = \psi(p(i)) = q(i)$. Then, since there is no incentive to invest, we must have that $i = 0$ is chosen by the firm in period 1. This should be compared with the *first-best* investment outcome. Irrespective of the price regime which determines the distribution of benefits between the firm and consumer, the first-best investment must minimize discounted fixed costs $k - i + \delta f(i)$ at a level satisfying the first-order condition

(3) $\delta f'(i) = 1$

where δ is the discount factor. Denote the first-best investment level by $i = i^{FB}$.

3.4.2. The voters

There are two types of voters: informed and uninformed. Informed voters, who are a proportion θ of the population, are agents who know and understand the parties' positions on regulatory policy. When they vote, they know that parties commit to their electoral platforms, which they have previously agreed with the lobby (the firm): elections take place after parties accept or reject lobbying contracts. *Informed voters* derive utility

(4) $u^i(p^j) = dW(p^j) + \phi(j)\omega^i$ for $j = L, R$

where $W(p^j)$ is the net consumer surplus from pricing policy p^j, and we define the function $\phi(\cdot)$ by $\phi(\mathrm{L}) = 0$ and $\phi(\mathrm{R}) = 1$. In Equation 4, $d > 0$ denotes a measure of the importance of regulatory policy for the voters' decisions and ω^i, unknown to the parties, denotes the *ex ante* bias of an informed individual for party R before the electoral campaign and before the policy announcement. In other words, ω^i reflects the informed voters' preferences for the immutable characteristics and program of the parties.

The parties cannot observe the *ex ante* proclivities of any particular voter, although they presume these to be drawn from a known cumulative distribution $F(\omega^i)$. In particular, the party bias is distributed according to a uniform distribution in the interval $[-1/2 - a, 1/2 - a]$, where a reflects an *a priori* advantage for party L. Any one of these informed voters votes for party L or R taking into account the difference in the utility she derives from p^{L} and p^{R} and taking into account her *a priori* preferences for one of the parties. It follows from equation 4 that an informed voter prefers party L if $\mathrm{d}[W(p^{\mathrm{L}}) - W(p^{\mathrm{R}})] > \omega^i$. This defines the critical value $\tilde{\omega}$ as:

(5) $\tilde{\omega} = d[W(p^L) - W(p^R)]$

Then all informed voters with values of $\omega^i < \tilde{\omega}$ will vote for party L, and all the rest for party R. Thus from the parties' point of view there is a probability

(6) $F[\tilde{\omega}] = \int_{-\frac{1}{2}-a}^{\tilde{\omega}} di = \frac{1}{2} + a + d[W(p^L) - W(p^R)]$

that the informed individual i will vote for party L. Thus the expected proportion of the electorate that is informed and votes for party L is given by $\theta[1/2 + a + \mathrm{d}(W(p^{\mathrm{L}}) - W(p^R)]$.

Now consider *uninformed voters*, constituting a proportion $(1 - \theta)$ of the population, who do not know about the regulatory policy platforms of any of the parties. Let ω^{un}, unknown to the parties, describe the *ex ante* preferences of an uninformed voter for party R before the electoral campaign. These individuals decide their votes according to the impression that they get from the intensity or quality of the electoral campaigns. In this sense, the electoral campaigns are not informative. The intensity/quality h^j of party j's campaign depends on the firm's support to this party in the following form: $h^j(s^j) = bs^j$, j = L, R. A typical uninformed voter derives utility

(7) $u^{un}(h^j) = bs^j + \zeta(j)\omega^{un}$ for $j = L, R$

where we define the function $\zeta(\cdot)$ by $\zeta(\mathrm{L}) = 0$ and $\zeta(\mathrm{R}) = 1$. As for the informed voters, they vote for party L if $u^{\mathrm{un}}(h^{\mathrm{L}}) - u^{\mathrm{un}}(h^{\mathrm{R}}) > \omega^{\mathrm{un}}$. Assuming ω^{un} has the same distribution as ω^i, the expected proportion of the voters that are uninformed and that vote for party L is given by $(1 - \theta)$ $[1/2 + a + b(s^{\mathrm{L}} - s^{\mathrm{R}})]$.

3.4.3. The parties and the government

The Parliament is elected with proportional representation. Parties are assumed to carry out their electoral mandate. This is the underlying commitment mechanism that solves or at least alleviates the hold-up problem in the political equilibrium. To explain commitment to electoral platforms as a self-enforcing equilibrium requires us to go beyond the 2-stage game and think again in terms of a reputational equilibrium in which parties build up a reputation for commitment in general. The difference now is that the reputation-building is with the electorate, not the firm, and the punishment is a loss of votes, not a withdrawal of investments. Reputational equilibria based on loss of votes are more viable than the latter because punishment from loss of reputation is immediate (you lose the next election). Also the electoral gains from not implementing any particular platform, such as regulatory policy as in this paper, are likely to be small as this is a small part of the party's overall policies, but the damage with respect to a loss of reputation for commitment may be substantial because they extend to all areas of policy.

Parties have no ideological preferences and simply seek to maximize their vote share, or equivalently its representation in the Parliament, which with the maintained assumptions for party L is:

(8) $P^L = \frac{1}{2} + a + \theta\, d[W(p^L) - W(p^R)] + (1-\theta)b(s^L - s^R)$

and for party R is $P^R = 1 - P^L$, given the nature of the two party system. It implies that incumbent L party has an advantage ($a > 0$), and raising the consumer surplus of informed voters under policy L relative to R (the second term) and the relative lobbying of L (the third term) increases the chances of winning.

The firm anticipates that the legislature adopts the regulatory policy p^L with probability $v(P^L)$ and the regulatory policy p^R with probability $1 - v(P^L)$. The *ex ante*, two-period objective function of the firm now becomes

(9) $\Theta = \Pi_1(i, S^L, S^R) + \delta[v(P^L)\Pi_2(p^L, i) + (1 - v(P^L))\Pi_2(p^R, i)]$

Although parties endeavor to carry out their regulatory mandate, we introduce a degree of implementation uncertainty, captured by the function $v(P^L)$, for which we make the following assumptions:

1) $v' > 0$

2) $v(1/2) = 1/2$

3) $v'' > 0$ for all $P^L < 1/2$ and $v(0) = 0$.

4) $v'' < 0$ for all $P^L > 1/2$ and $v(P^L) \to 1$ as $P^L \to \infty$.

Properties 1) and 2) are obvious requirements, while 3) and 4) ensure that v can be interpreted as a probability. Having a continuous $v(\cdot)$ function allows us to keep the possibility of the two parties being lobbied, which is quite realistic (many big regulated firms contribute to the two big parties in the US, the UK, and many other countries). It could alternatively be assumed that $v = 1$ if $P^L > P^R$. Then if $a > 0$ only the leftist party is lobbied, since the analysis of stage 2 below establishes that $P^L = 1/2 + a$. The rightist party captures less than half of the vote and the legislature has zero probability of adopting the policy of party R. Conversely, if $a < 0$, then only the rightist party is lobbied. If $a = 0$, then $P^L = P^R = 1/2$, and therefore $v(1/2) = 1/2$.

Another possibility would be to assume that the parties instead of maximizing their vote share (as we assume), behave as to maximize their probability of winning, reflecting a system of strict majority rule. In the appendix of Grossman and Helpman (1996) it is shown that the equilibrium policy in such a scenario is the same as when parties maximize their vote share, in the symmetric case where neither party has an a priori advantage (here, in the case $a = 0$). These authors describe this situation as follows: "With equal popularity, the platform that emerges in a symmetric equilibrium when the legislature operates by strict majority rule and parties maximize their chances of winning a majority is the same as the platform that emerges in a symmetric equilibrium when parties maximize their representation in the legislature and a minority platform has some chance of being implemented."

3.4.4. The political equilibrium

Reflecting the observation that investment projects cover a longer period than parliaments, we assume that the investment decision is chosen before the price and political donation agreements between the firm and the parties. The timing of events is then as follows:

1. At the beginning of period 1, the firm inherits a capital stock with per period fixed costs k.
2. The firm chooses investment i.
3. The firm offers price and donation contracts, (p^j, s^j), to parties j = L, R.
4. The parties independently accept or refuse offers. By the end of this stage either no contract, or only one contract with the incumbent L-party, or contracts with both parties have been agreed.

5. The election takes place.
6. In period 2, the legislature either implements $p = p^j$ decided at event 4 with probability $v(P^j)$, for j = L, R, or $p = p(i)$, where $p(i)$ is a solution to $\Pi_2(p, i) = 0$, if the elected party refused a contract. Output is produced at marginal cost c and fixed cost $k - f(i)$, where $f(0) = 0$, to satisfy demand $\psi(p^j)$ or $\psi(p)$ depending on the existence of a contract.

In this dynamic game of full information, the appropriate equilibrium concept is a backward induction equilibrium,

Proposition (Evans et al., IJIO 2006). *There are three possible equilibria, depending on how well-informed the voters are. In equilibrium A, a well-informed democracy, there are no lobbies and parties choose the regulated price to maximize consumer surplus. Rent is forced to zero and no investment occurs. In equilibrium B with a moderately informed electorate, only the incumbent party is lobbied resulting in a higher regulated price and positive rent if that party is elected. Investment can now be positive, but is below the first-best. In equilibrium C with a poorly informed electorate, the opposition is also lobbied and implements a regulated price with positive rent, though both are less than that offered by the incumbent. Investment can now reach its first-best.*

The intuition for this result is as follows: the central feature of the model is the division of voters into those who are well-informed in the sense that they understand the government's regulators policy and the remaining voters who make their voting decision based on the general impression of the parties' qualities gleaned during the election campaign.

With only well-informed voters we have a standard hold-up problem resulting in underinvestment. The voting decision of badly informed voters depends on the relative size of the parties' election funds and it is this feature that creates incentives for the parties and firm to agree to implicit contracts linking political donations to an electoral mandate on the regulated price. An important assumption in this model and others of its genre is that parties attempt to carry out their mandate (though there is a degree of implementation uncertainty). This is the underlying commitment mechanism that enables the hold-up problem to be solved whilst giving the parties the discretion to change the price regime in response to a changing environment at each election.

The political donations must be sufficient to compensate the political parties for a loss of votes arising from a high regulatory price relative to the ‘opportunist’ price that just satisfies the firm's current participation constraint. But donations must not be so large as to discourage the firm, who is seeking to prevent hold-up, from entering into them in the first place. The existence of a

political equilibrium that raises investment depends on the existence of some political donation that lies between these bounds. If a high proportion of votes are well-informed such a political donation does not exist and the hold-up problem cannot be resolved by an election contract. As we withdraw information we arrive at an equilibrium with the less costly contract for the firm, which is one with the incumbent L-party that is assumed to have an advantage in our set-up. Because of implementation uncertainty the firm cannot assume that the L-party mandate will be carried out and there is still a possibility of hold-up if the R-party's policy actually prevails. The firm takes this into account and investment is above the pure hold-up level of zero but below the first-best. As voter information falls further it then becomes advantageous for the firm to form contracts with both parties. Then whatever parties' policies are implemented in the elected assembly, hold-up is prevented. Anticipating this eventuality, the firm chooses the first-best investment level.

The information of the electorate can then be interpreted as a frame that conditions the preferences of the regulator. 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, their preferences are influenced by the degree of information available to voters at each time. Parameter θ can then be interpreted as a source of availability bias, which is a source of instability in volatile environments. Independent agencies are more stable when they enjoy public support and a high reputation (see Ackerman, 2007, on 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 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, preserving and improving both.

4. BEHAVIOURAL ECONOMICS AND THE HORIZONTAL AND VERTICAL STRUCTURE OF REGULATION (TO BE EXPANDED)

Regulatory Federalism. The literature on fiscal federalism emphasizes the idea that policy instruments should be tailored to the geographic scope of the market failure, to an extent that is limited by the fixed cost of administration. In regulation, this fixed cost constrains the degree to which specialized delegation is possible. Therefore, local regulators will be less specialized, but then the internalization of policy externalities becomes easier. For example, a local policy maker may use its objective to promote broadband in industrial policy as a commitment device

to sustain pro-investment regulation. There is then a trade-off between internalizing territorial externalities and internalizing policy externalities. However, taking into account the importance of salience in the objective function of regulators and their political principals, one can conjecture that the salience of public utility prices is higher at the local level rather than at a federal level.

The merger of agencies. Merging several sectoral regulators or the sectoral regulators with the anti-trust authority (as it has been done in Spain and The Netherlands) raises issues in terms of one regulator being better than two. Using again insights from the literature on incentives, the solution depends on whether the tasks are complements or substitutes. There are also issues of combining the static efficiency concerns of competition policy with the dynamic efficiency concerns of utilities' regulation. But then again salience effects interfere: one can conjecture that salience will be higher for static efficiency rather than for dynamic efficiency problems. A single regulator will be then dominated by the salience of static efficiency concerns, whereas keeping a high profile regulator focused on dynamic efficiency may have better properties in terms of commitment.

5. CONCLUSIONS AND FUTURE RESEARCH

This paper provides an introductory survey to the topic of behavioural regulation. Much more needs to be done in terms of theoretical and empirical research.

At a positive level, the challenge is to clarify under which conditions we shoud expect regulators to depart from full rationality.

At a normative level, the challenge is to device institutional frames that nudge decision makers in the direction that is best for society.

Unfortunately, institutions that work well cannot always be easily described and copied. The nature of tasks in regulatory agencies is such that monetary incentives are difficult to implement or must have low power, and therefore the preferences of the regulators become crucial. Experts are needed but are not free from biases.

In modern democracies, issues to be resolved remain in the optimal allocation of tasks between party politicians (in Spain, 28% of board members of the 64 largest companies are former politicians), experts and lay citizens. Insulated expert agencies run the risk of being unaccountable and sometimes amount to a shortcut to better politics. 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 as the key limitation of planning systems. After the cold war, a similar argument could be made for the limits of expert technocracies.

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