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CAPTURE AND REGULATORY COMPLEXITY: THE CHALLENGE OF THE BRAZILIAN UNION BETWEEN TECHNICAL AUTONOMY AND REGULATION

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Abstract: This article investigates various types of regulatory capture in Brazil, developing theory (both classical and contemporary) and describing how political, economic, cognitive, and institutional elements shape the behavior of regulatory agencies. Based on the analysis perspectives of ANEEL, ANTT, ANATEL, and ANS, capture goes beyond being an isolated event and is rooted in the systemic nature of institutional fragility, budgetary dependence, market concentration, and informational asymmetry. It is evident that the formal autonomy of these institutions is often strained by interference from the executive branch, pressure from the regulated sector, and internal technical limitations. From this perspective, the research highlights underlying obstacles to regulatory governance and outlines corrective measures that emphasize improving transparency, enhancing technical capabilities, social participation, and administrative shielding. It concludes that the consolidation of a regulatory model oriented toward the public interest requires profound and continuous institutional reforms.

Keywords: Regulatory capture; Regulatory agencies; Public governance; Institutional autonomy.

Introduction

The capture of public officials is one of the most complex and familiar issues in the economics of regulation and administrative law today. The broad idea describes the phenomenon in which regulatory agencies, formed to make the public interest their goal, end up under the influence of private or political interests, which can weaken the regulatory agency's role in its objectivity and effectiveness (STIGLER, 1971; MA-

JONE, 1996) and, at the very least, render its function irrelevant and susceptible to manipulation by private or political leaders. Since its first theoretical formulations in the mid-20th century, capture has been understood as an institutional deviation and a structural risk within the functioning of the regulatory state. Its incidence is a consequence of location and behavioral culture, but more importantly, it is a failure of regulatory instruments.

The issue of capture in the Brazilian context took on particular significance due to the integration of the model of autonomous and independent regulatory agencies in the 1990s, following institutional reforms and increased private sector participation in infrastructure, public services, and critical utilities (ARAGÃO, 2003; MARQUES NETO, 2002). Institutions such as ANEEL, ANATEL, ANTT, and ANS were formed to ensure institutional stability, predictability, and technical independence, which are vital foundations for modern regulatory governance of the economy (MAJONE, 1996). In other words, everything was done in the name of ensuring the preservation of the economic and monetary balance of contracts. However, given the national experience, we have seen structural weaknesses and risks of political interference in practice: the budgetary dependence of agencies, cognitive capture by regulated sectors, and the fragility of accountability mechanisms (BAGATIN, 2010; GUERRA, 2017). This has a significant impact on the proper functioning of the regulation of concession services.

With this understanding in mind, a problem question follows the current study: how do the various classical and contemporary theories of capture provide

explanations for the constraints on the autonomy and neutrality of regulatory agencies in the Brazilian context? Based on this central question, this study attempts to comparatively examine the various primary theoretical formulations of the phenomenon of capture, beginning with the classical analyses of Marver Bernstein (1955) and George Stigler (1971), up to modern theories that consider institutional, cognitive, and systemic factors (TIROLE, 1994; KWAK, 2013; BAGATIN, 2010). In this sense, the article attempts to uncover not only the process of economic power, but also the symbolic and structural mechanisms that undermine regulatory autonomy. Here, of course, a well-known proverb applies: “the owner’s eye fattens the cattle.”

The objective of this research is to expand this theoretical and empirical discussion on the limits of state regulation in an environment characterized by a close relationship between the public and private sectors. In a country like Brazil, where the agency model is still immature, the debate on capture is not limited to individual deviations, but also extends to the political and administrative system of the state (FARIA, 1993; MARQUES NETO, 2002). A closer examination of the state of affairs can only suggest that regulators exist more to ensure governability than to regulate the interests of regulated entities. According to national literature, the risk of capture is layered: it can arise from economic and financial pressure, political pressure, or more subtle forms of cognitive and epistemic capture that involve the process of regulatory officials adopting the worldviews and values of their function (KWAK, 2013; CARPENTER, 2014). Therefore, understanding these dynamics is crucial to seeking ways to impro-

ve and strengthen democratic control and transparency in regulatory decision-making, as a condition for improving the public process and the sustainability of the legitimacy of the regulatory state. In addition, the research is defended under the consideration of interdisciplinary contributions by expressing ideas from economics, law, and sociology in the analysis of regulatory power. This way of thinking allows us to situate the capture process not only as a technical issue to be addressed, but as a political and structural challenge for modern democracies, with the tension between autonomy and control as an ongoing conflict (MAJONE, 1996; LUHMANN, 1997). The study employs a qualitative, exploratory, and analytical research approach, informed by bibliographic and documentary resources. Here, the method of analysis is deductive and comparative, which allows for an evaluation of various ideas of capture and their applicability to the Brazilian context. The first part systematically reviews the foreign literature against the classical formulations of Bernstein (1955) and Stigler (1971), reformulations proposed by Peltzman (1976), Becker (1983), and Tirole (1994). Subsequently, modern, cognitive, institutional, political, epistemic, and systemic perspectives are presented, citing Majone (1996), Kwak (2013), Carpenter (2014), and Bagatin (2010). The analytical research is based on the documentary and comparative analysis of reports, studies, and cases of Brazilian actors (e.g., ANTT, ANEEL, ANATEL) and outlines the forms of vulnerability and interference associated with the phenomenon of capture. The analysis is also complemented by a hermeneutic and systemic reading of the , informed by Niklas Luhmann’s (1997) concept of regulation as a link between autonomous, political, economic, and legal sys-

tems, whose interpretations produce risks of capture. Theories of Capture Politics

The issue of regulatory agency capture has been central to regulation theory since the mid-20th century, when the first efforts emerged to answer the question of why these institutions, which have a mandate to protect the general public, serve private interests. Simply put, the regulation triangle, as represented in the figure below, seeks to define behaviors linked to regulatory agents. Regulatory capture is defined in relation to a new trend of regulated agents controlling regulation to a greater extent than intended, leading to greater distortion of state decisions and undermining self-governance (STIGLER, 1971; PELTZMAN, 1976; TIERROLE, 1994).

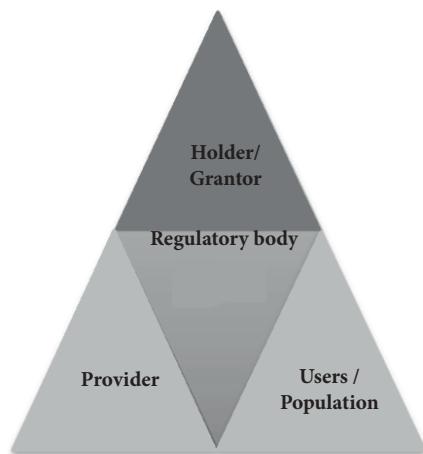


Figure 1: Function of the regulatory entity

The service provider, recognized as the granting authority, creates a regulator whose mandate is not only to protect users but also to ensure the economic and financial balance of contracts. The only problem absent from

the literature is any case of regulatory capture by users. However, at the heart of every scandal exposed, there is no shortage of promiscuous relationships between providers/concessionaires and regulators. This goes beyond the executive branch and extends to the other legislative and judicial branches. In general, we can divide two main theoretical traditions: the life cycle theory of regulatory agencies, which is institutional and historical in nature, and the economic theory of capture, which originated in neoclassical political economy and public choice. Based on these formulations, the debate has broadened to include cognitive, institutional, and systemic interpretations; it has opened up to structural elements and symbolic dimensions in which the phenomenon has developed (MAJONE, 1996; KWAK, 2013; BAGATIN, 2010).

The Life Cycle Theory of Regulatory Agencies

Marver Bernstein (1955) theorized the life cycle of regulatory bodies, as developed by Samuel Huntington (1952) and others, arguing that all regulatory bodies in any form do not exist in one sphere for a long period and, therefore, must emerge from the first round and go through a set of different cycles in this phase (creation, consolidation, maturity, and decline). They are formed by behavioral patterns and organizational culture, in which degrees of interest in the welfare of society are embedded. In the beginning, agencies are created with a very high reformist commitment to correct market failures and serve the greater good. However, over time, they become subject to bureaucratization and political accommodation, becoming weaker to the political

will of the regulated sectors, and their image of regulation is seriously compromised. As Bernstein (1955) argues, capture is a consequence of the institutional process of degeneration, whereby, as the regulatory process consolidates, the regulatory authority loses the technical and political vigor for which it was originally constituted, building dependence and reciprocity as part of its relationship with the sector under its control. This account is influenced by American institutionalist thinking, which understands capture not as a result of corruption or individual moral failure, but as an evolutionary process. In a Brazilian example, the leadership of regulatory agencies for each sector has demonstrated an inability to regulate the sectors entrusted to them.

The life cycle theory provides a relevant explanatory framework in the Brazilian context for understanding the evolution of entities such as ANEEL and ANTT: after the initial phases of autonomy and innovation, processes of political and budgetary exhaustion occurred, leaving these entities vulnerable to state and corporate influence (ARAGÃO, 2003; GUERRA, 2017). Brazilian regulatory entities have become negotiations for governability. They form relationships of interdependence and reciprocity with the economic intermediaries of regulation. Thus, the cycle described by Bernstein helps to clarify not only the declining power of regulation but also the growing exposure of these institutions to all the different types of capture seen in the Brazilian regulatory regime.

The Economic Theory of Capture

The two other central elements of the theoretical framework on regulation are represented in the second classical strand, the

economic theory of capture (Stigler, 1971; Peltzman, 1976; Becker, 1983). Set in a context of public choice, this theory is based on methodological individualism and the idea that each agency, whether public or private, acts according to the rational principle of maximizing its own interests. For Stigler (1971), regulation is, in fact, “acquired by industry and operated for its benefit,” as well as an instrument of political redistribution. In this model, the state is a political market, not a neutral arbiter, where interests compete for privileges. This is further supported by Peltzman (1976), who argues that the regulator wants to promote political interest and balance political concessions from consumers and producers; and Becker (1983) offers an analysis of the balance between pressure groups, proposing a regulatory outcome that reflects the relative strength of the organization and the weight of these pressures. This perspective had the effect of shifting the normative discourse from the oppressive state to the positive, according to the incentives and interests of groups/individuals invested in the field of Regulatory Economics. However, this approach has been criticized for its economic reduction of political behavior and for ignoring the institutional and cultural factors that guide the behavior of agencies (MAJONE, 1996; TIROLE, 1994). The hiring and firing of agents by regulatory agencies is a major issue.

Contemporary Approaches to Capture

Since the 1990s, new theoretical approaches have begun to question the economic reductionism of classical theories, introducing institutional, cognitive, and systemic variables into the analysis of captu-

re. Among these approaches, cognitive, institutional, political, epistemic, and systemic theories stand out.

Cognitive or Cultural Capture

This theory of capture, known as cultural capture, introduced by James Kwak (2013) and Daniel Carpenter (2014), argues that capture does not result solely from the material pressure of the regulated group in terms of lobbying or economic incentives, but comes from the less overt and indirect internalization of values, beliefs, and narratives produced by the sector. Here, capture emerges as idealational in a more fundamental sense: regulators begin to collectively share assumptions, worldviews, and interpretive frameworks through which they come to understand the market, the problems and solutions at hand, and the types that need to be legitimized. Cognitive capture is explained by the tendency of professionals, such as professional proximity, the circulation of technical personnel between companies and regulatory bodies, being informed and socialized among epistemic communities of participants in the regulatory industry. This proximity helps to build an atmosphere in which the hegemonic corporate discourse, usually based on the rhetoric of efficiency, innovation, and self-regulation, is constructed as neutral, technical, and inevitable, which minimizes the likelihood of alternative or dissenting perspectives. One consequence is that regulatory choices that may appear purely technical are in fact deeply embedded with pro-market values, despite conscious or unconscious bias toward private interests. Furthermore, cognitive capture occurs through mechanisms of naturalization: some assumptions become so well known that they become unquestiona-

ble, in the case of something like flexibility in regulation leading to efficiency or that state intervention should remain minimal. As Kwak (2013) points out, this mode of capture is even stronger in highly technical domains, where regulators rely heavily on technical know-how. In contrast, Carpenter (2014) demonstrates that the professional legitimacy of regulators can be developed incrementally according to standards of legitimacy embedded in the market environment, rather than a public advocate. In Brazil, cognitive capture has manifested itself explicitly in supplementary health (ANS), telecommunications (ANATEL), and electricity (ANEEL), where technical reports, legal rationalizations, and policy opinions are generally constructed using the same inferences and language as the regulated businesses. In these cases, the influence is not external imposition, but symbolic convergence, making this type of capture much less obvious, much more difficult to identify, and more difficult to combat.

Institutional and Political Capture

In contrast, writers such as Giandomenico Majone (1996), Jean Tirole (1994), and Alexandre Aragão (2003) have argued for the concept of institutional capture, where the risks of undue influence arise not only from external pressures but also from the institutional design of a regulatory model. It adopts an approach that eliminates the aspect of “bad actors” from the action and instead focuses on the incentive structure, organizational links, and limitations of agency actions. From this perspective, capture arises when the institutional architecture faces defects that undermine the agency, for example, budgetary dependence on the executive branch, volatility of leadership mandates,

politicization of appointment processes, and a general absence of institutional safeguards against government and business intrusion. Majone (1996) argues that regulatory credibility depends on mechanisms of formal and material independence, which include stable sources of funding, clearly defined limits on executive interference, and a stable set of leadership terms. With such weak mechanisms, agencies become subject to the cycle of election results and short-term political disputes, which in turn reduces their ability to develop consistent regulatory programs. Tirole (1994), in turn, argues that without incentives such as professional technical careers, operational stability, and strengthened accountability systems, systematic political intervention can occur, especially in industries heavily affected by macroeconomic developments. Institutional capture is not the result of corruption or direct co-optation, but of a structural imbalance in political and economic interests to the detriment of the public interest. This theoretical thread is especially relevant in Brazil. Research conducted by Marques Neto (2002) and Guerra (2017) shows that the formal autonomy of Brazilian regulatory organizations, as guaranteed by the laws that created them, may not always lead to real independence in decision-making. Political appointments without technical criteria and the absence of effective institutional safeguards create a regulatory environment vulnerable to government interference and economic power. This becomes even more urgent at a time of budgetary dependence on the executive branch and frequent interruptions of mandates. ANEEL, ANATEL, ANTT, and ANS are prime examples of this: despite being built on the rhetoric of technical neutrality, the daily functioning of such institutions is influenced by fragile

institutional arrangements that make autonomous decision-making very difficult, further deepening the many aspects of capture.

Epistemic Capture

Based on the investigations of Sheila Jasanoff (2012) and Bagatin (2010), epistemic capture insists that regulatory power depends fundamentally on the unequal distribution of technical knowledge between the state and the market. In sectors where technology is highly complex, such as electricity, telecommunications, transportation, and supplementary health care, the accumulation of knowledge tends to lean toward regulated companies, which have better teams, more exclusive databases, predictive models, and analytical capacity than public structures. This asymmetry produces a situation in which the state is structurally dependent on information generated by the same economic actors it must address. There, capture emerges not from mere pressure, but from a process of cognitive dependence, whereby, in order to meaningfully understand the functioning of the markets it regulates, the state must rely on the technical expertise of companies that become discursively privileged. Thus, mastery of the theoretical repertoire and specialized arguments becomes epistemic power, which directs the agenda, diagnoses, problems, and solutions interpreted as technical, but often at odds with the interests of the regulated sector. As Jasanoff (2012) shows, in technocratic societies, scientific and technical knowledge functions as a tool for political legitimization, conferring neutrality on actions that are, in practice, sensitive to values. Epistemic capture, therefore, does not occur through direct imposition, but through the naturalization of particular regimes of truth, in

which only certain technical-scientific narratives are recognized as legitimate. Bagatin (2010) goes a step further to demonstrate that the Brazilian context, where there are few technical staff, high turnover of leaders, and a lack of continuous investment in regulatory intelligence, increases the risk of this type of capture. Thus, the regulator comes to inhabit a limited frame of reference, shaped by the information channels fed by companies. This diminishes their critical capacity, thus limiting their ability to develop autonomous public policies, particularly to the extent that knowledge is not simply an instrument, but a strategy with which the state plays. Epistemic capture, then, suggests that expertise is a form of power and that, with little or no state capacity, regulation is conducted primarily by agents who have a monopoly on technical capacity.

Systemic Capture

The systemic theory of capture, developed from the sociological work of Niklas Luhmann (1997) and applied to the field of regulation by Andreia Cristina Bagatin (2010), understands capture not as a specific failure, but rather as a structurally dangerous consequence of the way modern societies are organized. For Luhmann, modernity takes on a functional form by being composed of relatively independent structures—namely, political, economic, and legal—that behave according to certain binary codes (power/no power; payment/no payment; legal/illegal). These are functionally closed but cognitively open systems that establish various relationships of reciprocal influence between themselves, called interpenetrations. Transposing this framework to the issue of regulation, Bagatin (2010) argues that regulatory action can be considered a “structural cou-

pling” between different systems: it is a state function that connects the economic system (which sustains the logic of profit), the political system, which depends on the production of power and legitimacy, and the legal system (which sustains the code of legality). As regulation is therefore caught between systems, external influences act particularly on regulators because they must translate the demands of each system into their own language. Capture is not, in this sense, considered a moral failure or economic or political pressure. It is the end product of communication between systems. The more intense the interdependence, whether due to the need for economic information, budgetary dependence on the executive branch, or legal adequacy of norms, the greater the risk that the regulatory system will absorb rationalities quite different from those for which it was designed, where the public interest shifts to the strategic interests of the systems to which the regulatory system is coupled. Thus, capture is simultaneous with the colonization of law by economic logic, which puts market efficiency first, and colonization by political logic, which makes regulatory decision-making subject to electoral cycles and partisan disputes. This approach broadens the classical conception of capture by demonstrating that regulatory vulnerability involves more than the intentional acts of economic or political groups, but rather the structural nature of contemporary society, and that this structure requires constant mediation between heterogeneous rationalities. Regulation, therefore, emerges as a place of constant friction between distinct codes, and capture incorporates the constant threat that one code, particularly the economic or political one, may obscure the functional autonomy of law and the state,

undermining the neutrality and credibility of regulatory outcomes.

Comparative Synthesis and Analytical Implications

The convergence of classical theories and contemporary approaches to capture in relation to the distortion of public interest toward private, corporate, or sectoral interests. This consensus, however, does not directly translate into theoretical stability, as we note that the roots of each strand differ, explaining the phenomenon through different causal mechanisms. In classical models (including those of Stigler (1971), Peltzman (1976), and Bernstein (1955)), capture was seen primarily as the result of economic incentives, organizational pressures, and rational behavior by interest groups seeking regulatory benefits. They highlight the strategic positions of individuals or groups seeking to change regulations through lobbying, political bargaining, financial influence, or bureaucratic accommodation. Contemporary theories, on the other hand, turn the explanatory lens to institutional, cognitive, epistemic, and systemic dimensions, with capture being represented by the structural, multidirectional, and multidimensional aspects of being captured, rather than simply passive opportunism. Authors such as Majone (1996) emphasize how institutional characteristics of agencies (such as their dependence on the budget, appointment of leaders, fragility of mandates, lack of legislative protection) constitute fixed risks to be compromised by political interference. Kwak (2013) and Carpenter (2014) both emphasize cognitive capture, in which regulators accept market values and narratives. Jasanoff (2012) argues for the importance

of epistemic communities and informational dependence; Bagatin (2010), influenced by Luhmann (1997), posits that capture can arise from the fusion of social systems and demonstrates how economic and political rationalities can colonize the regulatory space. In short, the phenomenon is no longer an episodic failure or moral transgression, as some have been inclined to consider, through traditional understandings, and makes sense in modern times, to become a fundamental and permanent danger to the regulatory governance of complex societies that are rich in power, law, economics, and politics, especially when the relationship between political, economic, and legal systems becomes closely intertwined. This new approach provides a broader analytical horizon and helps explain why capture occurs and persists after institutional reforms, even if these reforms focus on strengthening it. The multidimensional perspective is highly relevant to the analysis of the Brazilian reality, including the simultaneous presence of profound economic pressures, recurrent political interference, persistent institutional deficiencies, and high technical dependence on state-regulated sectors (). These elements are expressed, constructing an environment in which different forms of capture—economic, cognitive, institutional, systemic—coexist and reinforce each other. According to this view, by conceptualizing capture as a structural characteristic, more effective and comprehensive prevention and control mechanisms can be developed (in addition to reducing or preventing the failure of specific practices).

The following mechanisms emerge from this:

- Strengthening internal and external accountability structures;

Strengthening internal and external accountability mechanisms is a key strategy for reducing the risk of regulatory capture and consolidating governance oriented toward the public interest. Internally, they contribute to transparency and reduce the space for abuse by introducing permanent audits, active inspectorates, compliance systems, and periodic performance evaluations that drive internal technical decision-making. From an external perspective, the adoption and improvement of accountability tools (e.g., legislative oversight, involvement of the court of auditors, scrutiny by the public prosecutor's office, active transparency, and qualified social participation) act as a counterweight to political and economic influence, improving public monitoring and the legitimacy of regulatory actions. The articulation of these two types of accountability is important not only for identifying and correcting anomalies, but also for preventing practices that compromise decision-making autonomy, which in turn can make regulation resilient to the various types of capture that exist in fragile institutional environments.

- Professionalization and technical rotation, with a prohibition on revolving doors and transparent appointment criteria;

Mechanisms for professionalization and technical rotation, together with a prohibition on revolving doors and transparent appointment criteria, are essential tools for improving the autonomy and integrity of regulatory agencies. Professionalization consists of hiring well-qualified permanent

staff based on technical criteria and offering institutional conditions that reduce vulnerability to external pressures. Technical rotation, on the other hand, aims to prevent employees from remaining in sensitive areas for long periods of time in order to reduce cognitive proximity and relational dependence on regulated sectors. By prohibiting the revolving door through quarantine periods and preventing former leaders or former employees of regulated companies from occupying strategic positions, the goal is to avoid conflicts of interest and undue flows between the public and private sectors. Finally, the creation of transparent criteria for appointment to leadership positions increases the legitimacy of the decision-making process by restricting the influence of political agreements and ensuring that leaders have adequate technical qualifications. Together, these mechanisms work to reduce multiple forms of regulatory capture, strengthen agencies' commitment to the public interest, and improve the quality of regulatory governance.

- Increased transparency in decision-making, particularly in tariffs, inspection, and regulatory drafting;

With regard to increasing transparency in regulatory decision-making, especially in the process of setting tariffs, supervision, and regulatory development, transparency is crucial to reducing information asymmetries and increasing public confidence in regulatory agencies. Full disclosure of tariff methods, economic assumptions used, inspection reports, and technical and legal justifications for each decision limits the scope for undue influence by political and economic actors and allows for qualified oversight by society, the regulated sector, and external supervisory bodies. The introduction of

substantive public consultations and hearings and well-reasoned responses to contributions received help validate the deliberation behind the regulatory decision and serve well to protect against information capture practices. In addition, active transparency mechanisms, such as open data, regulatory impact reports, and systematic disclosure of meeting agendas with private actors, improve the potential for social monitoring and reduce opacity in decision-making processes. As a result, transparency ceases to be a formal requirement and becomes a structuring mechanism for institutional integrity that increases the predictability, neutrality, and technical quality of regulatory policies.

- Institutionalization of permanent participation and social control systems capable of counteracting organized economic power.

The institutionalization of permanent systems of participation and social control is a strategic dimension for containing the disproportionate influence of organized economic power in the regulatory process. Instruments such as pluralistic advisory councils, deliberative public hearings, ongoing regulatory consultations, strengthened ombudsman offices, and open digital participation platforms allow diverse social segments, users, consumers, workers, civil society organizations, and researchers to challenge and shape the regulatory agenda on a more balanced basis. The institutionalized existence of these channels reduces the discursive monopoly of regulated companies, broadening the diversity of perspectives and restricting attempts to capture them through technical, informational, or political pressure. In addition, permanent social control allows for public monitoring of decisions, increases the legitimacy of regulatory policies, and

strengthens external accountability, making it difficult to adopt measures that favor private interests over the public interest. Thus, social participation ceases to be an episodic formal procedure and becomes a structuring mechanism for democratizing the regulatory process, capable of straining, balancing, and, whenever deemed necessary, thwarting the coordinated action of economic power over regulatory agencies.

Thus, by thinking of capture as a complex and structural phenomenon, it is possible to develop more robust and lasting regulatory responses that can consolidate the legitimacy, autonomy, and effectiveness of regulatory authorities.

Theoretical Convergence and Relevance to the Brazilian Context

Classical and contemporary theories arrive at this understanding when they recognize an underlying structural tension between the claim by regulatory agencies that they are technically autonomous, on the one hand, and the continuous pressure exerted by political and economic actors, on the other, who seek to influence regulatory processes with their own objectives in mind. However, this tension in the Brazilian context takes on an even more complicated form, resulting from the confluence of historical institutional fragility, reflected in budgetary dependence on the executive branch, political interference in appointment processes, and uncertain/unstable terms of office; the politicization of leadership positions that are often filled based on criteria unrelated to technical competence; profound informational asymmetry, making agencies inherently cognitively dependent

on the companies they regulate; and structural economic dependence, which conditions the formation of regulatory policies to the dynamics of the markets they seek to regulate. The consequence can then be described as this capture not being seen as an exceptional or deviant event, but rather as embedded in the regulatory state, which requires a continuous approach to monitoring the process, a review of procedures, and an exacerbation of accountability and social control capacities. The critical consideration of these techniques is that, to overcome, or at least reduce, capture, we need a radical repositioning of regulatory governance, informed by transparency, institutional integrity, and democratic participation. This includes raising the profile of decision-making processes, improving public consultation and hearings, providing more rigorous regulatory impact reports, and enhancing ombudsman offices that function as effective forms of social control. At the same time, there are challenges related to the professionalization of leadership careers; establishing clear and technical criteria for appointment and quarantine periods and for the prevention of conflicts of interest as specified in the official legislation of the agencies (BRAZIL, 2016). Research in recent years proves that more stable and technically structured institutional arrangements are imperative to limit agencies' susceptibility to political and economic influence (REZENDE; PIMENTA, 2020), thus playing a vital role in building more independent and transparent regulation oriented toward the public interest.

The Brazilian experience of independent regulation, formed in the second half of the 1990s, arose from a series of administrative reforms, including the New Public Management paradigm, which aimed

to modernize the state, increase efficiency in service delivery, and provide institutional insulation from short-term political interference. Inspired by the American model of independent regulatory commissions, combined with various neoliberal regulatory reforms in OECD countries, Brazilian regulatory agencies were developed to ensure independence in decision-making, technical neutrality, and institutional stability, which are central to the credibility and predictability of public policies (ARAGÃO, 2003; MARQUES NETO, 2002). The formulation of these entities in legislation involved various mechanisms in the form of institutional protection, such as fixed terms, relatively independent budgetary space, and formal appointment and confirmation, all of which served to reinforce the idea that decision-making organizations were being created to moderate economic power and serve the public interest. Formal independence, however, proved insufficient in institutional practice to isolate these agencies from the various political, economic, cognitive, and institutional captures that permeate the Brazilian regulatory system. The influence of the executive branch over appointments, funding needs, rapid turnover of leaders, the precariousness of technical careers, and extreme information asymmetry in challenging industries have severely limited the real autonomy of these bodies. In addition, organized economic power is generally sophisticated and subtle, using technical lobbying, legal battles, mobilization of specialized knowledge, and influence over the regulatory agenda to ensure that, even as the political process unfolds privately, its interests are still on the table and continue to shape political outcomes. This is accompanied by structural aspects of the Brazilian state: the low professionalization of the bureaucracy,

the politicization of strategic roles, and the inadequate institutionalization of processes of participation and social control. Thus, the Brazilian experience makes it clear that the model of independent regulation based on robust normative expectations encounters serious difficulties in resisting external forces and emphasizes that regulatory autonomy is always conditional, contested, and precarious in institutional environments with high political and economic permeability.

In this sense, the Brazilian regulatory environment has a kind of structural paradox: while regulatory agencies were created to limit political interference, ensure institutional stability, and improve the predictability of the economic environment, in practice, they remain under the control of mechanisms of dependence and control that limit their substantive autonomy. Established as actors in a process of state modernization, these organizations were anticipated to be technical intermediaries between the public and private sectors, establishing solid rules and technically valid decision-making. However, Guerra (2017) points out that the agency's autonomy to make decisions is conditioned and compromised by three key factors: (a) budgetary dependence on the executive branch, which facilitates financing as pressure; (b) appointment through political nominations, often with little reference to transparent technical criteria; and (c) deficiencies in robust mechanisms of horizontal and social accountability, which undermines the capacity for external control and limits the democratic responsiveness of regulatory choices. This institutional configuration supports Bagatini's (2010) phenomenon of systemic capture. Based on Luhmann's theory of social systems, the author demonstrates that the

overlap of codes from the political system (power), the economic system (profit), and the legal system (legality) allows regulation to operate in a field of interdependence in which its original functions can be distorted. This makes the regulatory agency susceptible not only to external pressure, but also to an environment structurally embedded with contradictory rationalities that influence its decision-making and functional autonomy. These agencies, therefore, far from being neutral environments for technical decision-making, become spaces characterized by a continuous confrontation between individual private interests, political pressures, and public expectations, one that is often accompanied by institutional mechanisms that are inadequate to isolate action and maintain regulatory impartiality. The normative value of autonomy, then, is permanently undermined by the constraints of institutional practice: thus, regulation is regulated in a nuanced way, susceptible to economic influences and interests, and cannot escape central political logics. This structural discomfort shows that the promise of regulatory independence cannot be explained in terms of a mere legal formality of legal certainty: it requires an investigation of its material conditions, institutional protection mechanisms, and the State's efforts to make a legal commitment not only to maintain regulatory independence in this era of economic power, but also to maintain its position of regulatory independence through and beyond the exercise of its political power and short-term political relations.

ANEEL – and capture in the energy sector

In the literature, the National Electric Energy Agency (ANEEL) is often highligh-

ted as one of the Brazilian regulatory institutions with the highest technical reputation, but this reputation does not immunize it from recurring forms of economic, political, and cognitive capture. Since its creation, the agency has functioned and operated in an environment of extraordinary technological complexity, strong business concentration, and strong macroeconomic influence, resulting in high levels of information asymmetry and interdependence between the regulator and regulated actors. Data from the agency's management reports (BRAZIL, 2016) describe how the composition of its boards, the tariff-setting process, and the oversight agenda are subject to pressure from entities in the electricity sector, as well as from the executive branch, particularly in the context of water crises, exchange rate volatility, or the need to contain tariffs for good economic stability. This vulnerability is exacerbated by the usefulness of tariffs as an economic policy tool, an idea analyzed by Rezende and Pimenta (2020). Throughout the episodes, the tariff control phase that existed in the country during the Dilma Rousseff administration; the notable adjustments that occurred with hydrological shocks, tariff decisions were influenced not so much by technical rules of marginal costs, but by macroeconomic objectives, such as containing inflation or cushioning distributive pressures. This trend represents what Majone (1996) refers to as political capture through institutional dependence: despite its formal independence, ANEEL is embedded in an institutional context in which budgetary dependence and regulatory subordination to the Ministry of Mines and Energy exert pressure to align strategic interests with government priorities. Along with political capture, there is also a serious case of cognitive capture in the electricity

sector, which is perpetuated by revolving door activities. Research such as that published by Almeida (2019) has shown that this informal and frequent flow of directors, technicians, and consultants between ANEEL, ONS (National System Operator), EPE, and Generation, Transmission, and Distribution companies results in a uniform technical-epistemic community with similar values, beliefs, and paradigms. This conceptual proximity, with its symbolic proximity, reduces the distance necessary for the regulator to control, increases the regulator's informational dependence, and imposes obstacles to the ability to strictly regulate the responsible agents, especially in natural monopoly markets such as the transmission and distribution field. In an area where technical expertise is a highly concentrated strategic resource, this proximity results in structural vulnerability, facilitating the influence of institutions on decisions that are in the public interest. Thus, ANEEL's report shows how economic, political, and cognitive capture can be articulated in the same institutional relationship, supporting the thesis: the autonomy of a Brazilian regulatory mechanism is conditioned by a structural dimension, one beyond the dimension of formal independence.

ANTT and Political Capture at its Maximum

The ANTT represents an example of high-risk political and institutional capture arising from the political integration of the decision-making process, the electoral cycle, and the strategic mandates of the federal executive branch. Land transportation is not a highly technical sector, unlike some sectors such as energy and telecommunications, and direct political interests related to na-

tional logistics, the tariff impact on the productive sector, and the electoral visibility of works and concessions are present in it. This structural proximity encourages systematic intervention in the regulatory program and diminishes the perceived technical neutrality that should inform the agency's behavior. Pinto Jr. and Pereira (2019) demonstrated that decisions on tariff changes and the modeling of road and rail concessions were modulated at times depending on the current strategy of the federal government. In periods of inflationary pressure, there was a tendency to delay or soften tariff increases to suppress the effect on price indices; pre-election adjustments were accelerated and/or adjusted for positive political effects, even when there was evidence pointing to risks or inconsistencies, because this was technically possible. Such interference confirms the literature on political capture, offering a sense that the public interest is being replaced by short-term rationales and ultimately undermining the effectiveness and sustainability of the regulatory process. ANTT is even more prone to instability and dependence due to the fact that it lacks stable mandates and weak technical criteria in the appointment of directors, leading to instability in decision-making and political dependence. When leaders are quickly replaced, largely based on partisan considerations, there is no long-term regulatory agenda, institutional memory is eroded, and the agency is likely to be highly vulnerable to government intervention. This condition confirms Tirole's (1994) argument that the formal independence of agencies becomes only symbolic autonomy where strong institutional processes (impositions, for example, fixed terms, quarantines, budgetary shielding, and transparent appointment rules) do not protect the regulatory process from political

interference. Thus, ANTT operates within a framework characterized by the overlap of political and economic rationality, and electoral logic overrides technical criteria and the long-term objectives of transportation policy. Such an institutional configuration leads to a kind of institutionalized capture, where the regulatory structure serves as an instrument to implement policies, thereby undermining the legitimacy and effectiveness of the regulatory functions assigned to the agency.

ANATEL and economic capture through market concentration

The National Telecommunications Agency (ANATEL) faces a distinct type of capture, related to the concentrated structure of the sector and the high degree of technical dependence of regulated companies. Since its creation in 1997, ANATEL has sought to balance the interests of consumers, companies, and the state. However, the telecommunications sector in Brazil is characterized by oligopolies with great bargaining power, which makes regulation vulnerable to subtle forms of economic and cognitive capture (GUERRA, 2017). In addition to direct pressure from operators, there is significant informational dependence: the technical data and cost studies used in the formulation of regulatory policies are often provided by the regulated companies themselves. This constitutes a form of epistemic capture, in which the dominance of specialized technical knowledge reinforces the asymmetry between the regulator and the regulated (CARPENTER, 2014; KWAK, 2013). In recent years, discussions on net neutrality and universalization of services have shown how cognitive capture turns into strategic dependence, limiting

the state's ability to impose public interest obligations on concessionaires.

ANS and the regulation of supplementary health in cognitive capture.

The National Supplementary Health Agency (ANS) is one of the most evident cases of cognitive capture in the Brazilian regulatory environment, which, as Carvalho and Tonella (2021) argue, has become an instrument of such capture in the Brazilian regulatory system. Instead of relying on direct economic pressures or explicit political interference, as in classic forms of capture, cognitive capture occurs through the internalization of values, discourses, and rationalities relevant to the regulated sector throughout the agency's decision-making process. Over the years, ANS has developed an institutional culture that values the economic and financial sustainability of health plan operators, to the detriment of mechanisms designed to protect people, foster transparency, or promote health citizenship; it is no exception. This trend becomes even more pronounced considering that the regulation of supplementary health care depends heavily on specific technical expertise, such as actuarial assessment, risk assessment, epidemiological research, financial modeling, and complex performance evaluations. Health plan operators, with their strong technical teams, substantial financial capital, and great capacity to develop opinions and data, therefore play an important role in shaping the information needed for the policy process. Thus, the ANS always feels dependent on information, creating space for indirectly informed influence and, within the agency, legitimizing itself as a worldview that prioritizes economic rather than social interests.

Based on Luhmann's systems theory, Bagatin (2010) highlights this as a case study of systemic capture, in which the lines between the private and public domains become blurred, and rational economic principles begin to guide decisions that should be focused on the common good. This makes indicators of solvency, sustainability, and financial predictability central norms at the same time; the dimensions of equity, access, quality of care, and user empowerment are often relativized or subordinated to market viability criteria. Thus, cognitive capture not only defines problems and solutions, but also shapes the regulatory perspective, limiting alternatives and legitimizing decisions associated with the regulated sector. The vulnerability of the ANS is also intensified due to the composition of its technical staff and its budgetary and administrative connection to the Ministry of Health, which leads to the dilution of institutional autonomy and relationships of dependence on political and economic support. This includes a turnover of directors, professionals with mainly commercial experience in the private sector, and the lack of a strong regulatory career that reproduces an institutional culture that negotiates more with sectoral interests than with broad social demand. Under this structure, it is difficult to include views on consumer protection—for example, on transparency regarding contracting rights, regulation of abusive adjustments, expansion of insurance, or increased social control. Therefore, the case of ANS demonstrates how cognitive and systemic capture can manifest itself in a profound and silent way. It not only shapes individual decisions, but also how the agency constructs its own public function and regulatory priorities. It represents a typical illustration of how, under intense information asymmetry and in an economic-inten-

sive context, regulation can be increasingly shaped by market rationality, undermining the effectiveness of user protection and weakening the role of the state as guardian of the public interest in supplementary health care.

Imperatives and mechanisms to combat capture

The cases of ANEEL, ANTT, ANATEL, and ANS reveal that regulatory capture in Brazil is not a singular, episodic phenomenon or an individual governance failure that is not inherent to Brazilian regulatory agencies, but rather a systemic governance issue, deeply related to the institutional architecture of the agencies and the history of the Brazilian regulatory state. Institutional fragility, operational political dependence, and the concentration of economic power in regulated sectors create an environment conducive to the penetration of various forms of economic, political, cognitive, epistemic, and systemic capture. Such conditions not only undermine formal autonomy, but particularly the substantive autonomy of agencies, and substantive autonomy, in this case, is the extent to which they can make technical decisions in the public interest. Four central axes can be used to organize the problems faced by agencies and include:

Budgetary and administrative ties to the executive branch; a source of weakened independence in decision-making by allowing the government to exploit financial and administrative apparatus as alternative political tools. Dependence on annual funding, without permanent sources of funding and administratively connected to sectoral ministries, weakens agencies' ability to withstand cyclical forces, especially during elections such as the upcoming one and

when facing fiscal crises. Political appointments without clear technical criteria and the lack of stable mandates undermine the sustainability and consistency of regulatory agendas. Both the politicization of appointments and the potential strategic succession of leadership amplify the political cyclical of many agencies, which undermines the legal certainty of long-term regulatory policies. This is a situation that, as pointed out by Tirole (1994), transforms formal autonomy into mere nominal independence. The persistent asymmetry of information between regulators and regulated bodies, particularly in areas of high technical complexity, which depend on data, methodologies, and analyses from regulated companies. Such asymmetry fosters types of cognitive and epistemic capture that make it difficult for the state to build its own analytical capacity and, therefore, to open itself up to the discursive and methodological practices of the private sector. Lack of social participation and weakness of democratic control mechanisms, which restrict public review of highly technical decisions to interaction between regulator and regulated entity. Often, consultations or public hearings emerge as a formal procedure with limited practical impact, and long-term social control mechanisms are simply not engaged and have no normative weight or impact. These difficulties show that minimizing capture will require not merely procedural adjustments, but rather a restructuring of the regulatory governance system that can reinforce governance powers by strengthening state capacity and expanding democratic safeguards. Options include the provision of permanent and reliable budgetary resources for agencies; objectively established criteria for the appointment of leaders with mandatory quarantine and no revolving door; continuous invest-

ment in technical-legal know-how and the development of permanent technical careers; significant new levels of transparency in decision-making activities, especially in the area of tariffs and inspections; and the institutionalization of robust forms of social participation that will help offset the dominance exercised by organized economic power. Therefore, making the regulatory environment less vulnerable to capture will depend on a long-term institutional project, based on the defense of the public interest, technical integrity, and democratization of regulation, to develop a regulatory environment less susceptible to compromises. Only by simultaneously strengthening these combined measures will it be possible to reduce the permeability of agencies and solidify an effective, transparent, and socially legitimate regulatory model.

To mitigate the risks of regulatory capture, a set of institutional reforms is needed in the Brazilian context that has the potential to provide substantive autonomy to agencies and build a solid decision-making environment based on the public interest. The specialized literature argues that among the first important measures is the evaluation of the appointment process and confirmation hearings for leaders, which include objective technical criteria, professional trajectories compatible with the regulated sectors, and the need for a good and proven track record of regulation. In addition, it is suggested that the terms of office of directors should not coincide with the political-electoral cycle, to avoid strategic replacements or alignment with political parties. This is a step toward improved institutional stability and minimizing any degree of interference by the executive branch in regulatory decisions that are, at least in theory, technical.

At the heart of the recommendation is the strengthening of social and institutional accountability with user councils at the base of the institutional process, pluralistic participation, comprehensive public hearings, and permanent channels for active transparency. These instruments allow the public to question more about tariff procedures, inspection decisions, and regulatory drafting in a more democratic context, giving greater legitimacy to the agency's decisions. The literature shows that participation channels, if functional and consultative or deliberative in nature, can serve as a check on organized economic power, reducing policy opacity and expanding external authority to influence decisions based on high levels of information asymmetry. The third key measure consists of continuous investment in technical competence and regulatory intelligence, an essential requirement for reducing the regulatory state's dependence on information from regulated companies. This capital investment means strengthening specific regulatory careers, for example, by providing ongoing training in economic analysis, inspection, behavioral economics, regulatory modeling, and risk management, as well as generating proprietary databases and comprehensive analytical methodologies for the development of independent analyses. As demonstrated by Rezende and Pimenta (2020), only institutions with strong cognitive power can develop coherent policies, adapt to external pressure, and maintain technically competent decisions. Finally, the literature insists that, to avoid budget cuts or administrative interference, agencies must be protected both budgetarily and administratively to ensure continuous funding, freedom in resource allocation, and limitation of susceptibility to budget blocks, contingencies, and administrative

interference (ARAGÃO, 2003). If financial independence is an essential condition for agencies to maintain regular technical staff, conduct ongoing inspections, develop independent investigations, and make long-term regulatory decisions—all critical measures to curb regulatory capture. Thus, addressing capture requires comprehensive and integrated reforms that can enhance the technical capacity, institutional cohesion, and democratic engagement of regulatory institutions. Without this cohesive package of actions, formal independence will be very limited, and agencies will remain exposed to the various types of capture that structure Brazil's regulatory environment.

Final Considerations

When studying the cases of ANEEL, ANTT, ANATEL, and ANS in light of a variety of capture theories (classical, institutional, cognitive, epistemic, and systemic), it becomes clear that regulatory capture in Brazil is a structural phenomenon, embedded in the institutional configuration of the regulatory state. Far from being episodic or resulting from individual aberrations, capture results from the interdependence between political powers, oligopolistic economic structures, informational asymmetries, and the organizational capacities of agencies. The literature reviewed suggests that regulatory autonomy is conditionally contingent: it depends on the state producing its own knowledge, institutional stability, transparent appointment processes, and the presence of continuous social control mechanisms. In this sense, research has found that the fragility of Brazilian regulatory institutions is linked to budgetary and administrative dependence on the executive branch, the politicization of appointments

to decision-making positions, a lack of regulatory intelligence, and weak social participation in decision-making. These vulnerabilities support the simultaneous capture of the political, economic, cognitive, and systemic domains, which prevents the agency from imposing regulatory discipline in strategic and highly concentrated sectors. The hypotheses analyzed further converge on the need for a complete reform of the Brazilian regulatory model, with the aim of increasing the substantive autonomy of agencies. That is, changes in appointment and confirmation procedures, design of mandates not synchronized with electoral cycles, budgetary protection, development of specialized technical careers, increased transparency of decisions, and institutionalization of strong mechanisms for social participation and control. Only through an institutional arrangement that combines technical capacity, organizational integrity, and democratic scrutiny can the risks of capture be reduced and the regulatory environment, successfully regulated based on the public interest, be reestablished. It follows, therefore, that reducing regulatory capture by the state should not be sought only through procedural change, but also through a structural transformation of state governance. Building an effective, autonomous, and responsive regulatory state is the result of a multi-year program, one that depends on the expression and articulation of institutional reform, the strengthening of civil society, an absolute commitment to transparency, and an ongoing commitment to public integrity.

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