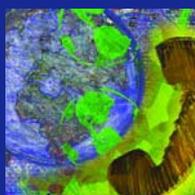36306

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ELIMINATE POVERTY
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INVOLVEMENT IN
INFRASTRUCTURE

Regulatory Governance in Infrastructure Industries

Assessment and Measurement of Brazilian Regulators

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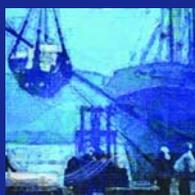
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FOREWORD

With more than US$100 billion in private investments during the 1990s, the success of infrastructure reforms in Brazil seemed inevitable. Currently, however, prospects for private participation in infrastructure are far less optimistic, and regulatory risk, or at least its perception among private investors, appears to have increased.

Regulatory governance, broadly understood as the conditions for the enforcement of laws and contracts by regulators, is an important component of regulatory risk. Market-friendly legislation and well-designed contracts may be innocuous if regulators are poorly equipped or face the wrong incentives for appropriate enforcement. Between 1997 and 2005, at least 28 regulatory agencies were established in Brazil either at the federal or the state level. Yet, only limited assessment of the state of regulatory governance in Brazil is available so far.

The objective of this report is twofold: to provide a comprehensive assessment of the state of regulatory governance in infrastructure industries in Brazil and to suggest possible indicators for future monitoring. After the introduction, Section 2 sets up the analytical framework for the report, identifying key components of regulatory governance, namely, autonomy (political and financial), procedures for decision making, "instruments" (including personnel), and accountability. Section 3 assesses each of these components in practice, reporting the results of a survey with 21 regulatory agencies in Brazil, which was designed and implemented by the research team in 2005. Section 4 measures regulatory governance based on three related indexes, ranks the Brazilian regulators among themselves, and compares the proposed indexes with two other indicators available in the literature. Section 5 presents the conclusions.

In reading the report, it is important to keep in mind that it is not an evaluation of regulatory outcome. It is not the performance of Brazilian regulators that is being assessed and compared, but rather their access to regulatory "inputs." As it is known, access to the appropriate set of inputs—incentives included—only increases the probability of an adequate regulatory outcome. Poorly equipped regulators may still produce good results despite poor endowments and vice versa.

As a second caveat, it should be mentioned that we are not analyzing the overall institutional environment for infrastructure investments in Brazil either. Rather, we focus on the narrower issue of the institutional conditions for good regulatory enforcement, regardless of its scope, its consistency with the country's overall institutional environment, and other related issues.

Overall, it is expected that this report will add to a better understanding of the appropriate conditions for sound regulatory enforcement in Brazil.

Main conclusions are as follows:
- **Autonomy:** for almost every surveyed agency, power delegation is appropriate. However, one-third of the directors did not complete their terms; most agencies complain about the impact that budget impoundments have on their financial autonomy; in 13 agencies, ministries or state governments have interfered in the agency's decision-making process (with a higher incidence among state agencies); and 6 state agencies have no legal restrictions for dismissing directors.
- **Decision-Making:** 18 out of the 21 surveyed agencies are legally required to formally document the decision-making process, detailing the actions of each actor involved. However, only 8 regulators are required to cite jurisprudence in support of their decisions, weakening the consistency of regulatory decision-making over time. In addition, formal documentation of the decision-making process is legally required and must contain every legal action of those actors directly involved in the process. Also important, only in the case of 6 regulators, decisions are taken without previous communication and discussion among board members. In addition, only in 3 (out of 18) agencies, a legal apparatus prohibits

informal meetings of directors with stakeholders. Participation, however, is substantial: in 17 agencies, external actors and those affected by the agencies' decisions are entitled to take part in the decision-making process, and such participation has led to changes in their decisions in the case of 15 agencies.

- **Decision Tools:** five out of the 8 regulatory instruments presented by the survey (e.g., methodology for tariff revision and instruments for quality monitoring) were available for at least 13 agencies. More sophisticated instruments, especially those related to economic regulation (as opposed to technical regulation) were less available. Almost all surveyed agencies considered themselves to have the power and legal means to secure compliance with their decisions. However, one-fifth of the agencies' personnel was admitted by public exams (this share was higher for older agencies than for the newer ones)—with this share being 26 percent and 18 percent among federal and state agencies, respectively. Approximately 95 percent of the agencies' staff had undertaken short-term courses. Staff also present low turnover rates. Nonetheless, low salaries are the norm, which lead to a workforce with a "medium" degree of motivation. Out of 14 agencies, 9 employed personnel with master's degrees (4 percent of their staff) and 6 agencies had employees with PhDs (2 percent of their staff).

- **Accountability:** Congress and state legislatures exert some control over 17 agencies, which include (a) public hearings, (b) summoning directors, and (c) making official requests for explanations. In one-forth of the agencies, at least one case has been settled by the Supreme Court. Public hearings do affect agencies' decisions, as they have caused changes in decisions at least once in 15 agencies.

- **The Governance Ranking:** overall, ANATEL, ANEEL, and ANP are the three best-ranked agencies in terms of regulatory governance (RGI-83 and RGI-43). On the other hand, three state agencies (ARSEP-RN, AAGISA, and ARTESP) presented the lowest scores. RGI-83 and RGI-43 distributions show small dispersion with a clear cleavage between federal (with higher scores) and state agencies. One caveat to this result is that when RGI-28 was computed ANEEL, ARSEP-MA, and ARPE were the three best-ranked agencies, suggesting that the difference between having governance attributes and implementing them may be significant.

- **RGI Components:** in a [0, 1] scale, the means for each component were 0.53 for autonomy, 0.68 for decision making, 0.54 for decision tools, and 0.46 for accountability. Thus, only the decision-making component presents a mean that is higher than the mean of the RGI-83 index value. The decision tools and the accountability components present the largest variations (i.e., standard deviations), while decision making presents the lowest. Moreover, it was found that federal agencies have scores in the autonomy, decision-making, and decision tools components of the RGI-83 22 percent, 25 percent, and 26 percent higher, respectively, than state agencies. Similarly, older agencies present scores in the decision tools and accountability dimensions of the RGI-83 23 percent and 24 percent higher, respectively, than younger agencies.

- **International Comparison:** when the RGI-83 was compared to the ADB/NERA (Holder and Stern 1999), it was found that, on average, Brazilian agencies presented higher ADB/NERA index scores, with a smaller dispersion, than Asian regulators. The cleavage between federal and state regulatory agencies persisted and the three top-ranked agencies using the ADB/NERA methodology were the federal agencies ANATEL, ANEEL, and ANTT, and the three agencies with the lowest scores were the same as the ones using the RGI-83 methodology. The correlation between the replicated ADB/NERA index and the RGI-83 was 0.872. In addition, survey data were used to replicate the methodology developed by Gutierrez (2003). Major changes occurred in the index rank, with ANATEL, ANTT, AGEPAN, and AGER presenting the highest possible score (1.00) and AGEEL, ANA, and ARSEP-RN ranked in the three lowest positions. The correlation between the replicated Gutierrez (2003) index and the RGI-83 was 0.350.

In summary, this report concludes that (a) the level of regulatory governance is relatively similar among the 21 Brazilian regulators surveyed, (b) there is a clear cleavage between federal and state regulatory agencies, (c) formal attributes do not always translate into effective governance (even though the data suggest that agencies improve over time), and (d) independence and accountability attributes are more developed than regulatory means and instruments (particularly qualified personnel and regulatory tools) and decision-making procedures (particularly with respect to those mechanisms that can guarantee consistency of decisions and reduce arbitrariness).

ABBREVIATIONS AND ACRONYMS

AAGISA	Agência de Águas, Irrigação e Saneamento do Estado da Paraíba	Water, Irrigation and Sewerage Agency of Paraíba State
ABAR	Associação Brasileira de Agências de Regulação	Brazilian Association of Agencies
ADB	Banco de Desenvolvimento Asiático	Asian Development Bank
ADIN	Ação Direta de Inconstitucionalidade	Action for Declaration of Unconstitutionality
AGEAC	Agência Reguladora dos Serviços Públicos do Estado do Acre	Public Services Regulatory Agency of Acre State
AGEEL	Agência Estadual de Energia da Paraíba	Energy Agency of Paraíba State
AGENERSA	Agência Reguladora de Energia e Saneamento Básico do Estado do Rio de Janeiro	Energy and Sewerage Regulatory Agency of Rio de Janeiro State
AGEPAN	Agência Estadual de Regulação de Serviços Públicos do Mato Grosso do Sul	Public Services Regulatory Agency of Mato Grosso do Sul State
AGER	Agência Estadual de Regulação dos Serviços Públicos Delegados do Estado do Mato Grosso	Public Services Regulatory Agency of Mato Grosso State
AGERBA	Agência Estadual de Regulação de Serviços Públicos de Energia, Transportes e Comunicações da Bahia	Regulatory Agency for Energy, Transport and Communications of Bahia State
AGERGS	Agência Estadual de Regulação dos Serviços Públicos Delegados do Rio Grande do Sul	Public Services Regulatory Agency of Rio Grande do Sul State
AGERSA	Agência Municipal de Regulação de Serviços de Saneamento de Cachoeiro do Itapemirim	Sewerage Agency of the Municipality Cachoeiro do Itapemirim
AGETRANSP	Agência Reguladora de Serviços Públicos Concedidos de Transportes Aquaviários, Ferroviários, Metroviários e de Rodovias do Estado do Rio de Janeiro	Water and Ground Transportation Regulatory Agency of Rio de Janeiro State
AGR	Agência Goiana de Regulação, Controle e Fiscalização de Serviços Públicos	Public Services Regulatory Agency of Goiás State
AMCHAM	Câmara Americana de Comércio American	Chamber of Commerce

ANA	Agência Nacional das Águas	Brazilian Federal Water Agency
ANATEL	Agência Nacional de Telecomunicações	Brazilian Federal Telecommunications Agency
ANCINE	Agência Nacional do Cinema Brazilian	Federal Movies Agency
ANEEL	Agencia Nacional de Energia Elétrica	Brazilian Federal Electricity Agency
ANP	Agência Nacional do Petróleo Brazilian	Federal Petroleum Agency
ANS	Agência Nacional de Saúde	Brazilian Federal Health Agency
ANTAQ	Agência Nacional de. Transportes Aquaviários	Brazilian Federal Water Transportation Agency
ANTT	Agência Nacional de Transportes Terrestres Brazilian	Federal Ground Transportation Agency
ANVISA	Agência Nacional de Vigilância Sanitária	Brazilian Federal Sanitary Surveillance Agency
ARCE	Agência Reguladora dos Serviços Públicos do Ceará	Public Services Regulatory Agency of Ceará State
ARCO	Agência Catarinense de Regulação e Controle Santa Catarina	State Agency for Regulation and Control
ARCON	Agência Estadual de Regulação e Controle de Serviços Públicos	Public Services Regulatory Agency of Pará State
ARPE	Agência de Regulação dos Serviços Delegados do Estado de Pernambuco	Public Services Regulatory Agency of Pernambuco State
ARSAL	Agência Reguladora de Serviços Públicos do Estado de Alagoas	Public Services Regulatory Agency of Alagoas State
ARSAM	Agência Reguladora dos Serviços Públicos do Amazonas	Public Services Regulatory Agency of Amazonas State
ARSEMG	Agência Reguladora de Serviços Públicos do Estado de Minas Gerais	Public Services Regulatory Agency of Minas Gerais State
ARSEP	Agência Reguladora de Serviços Públicos do Rio Grande do Norte	Public Services Regulatory Agency of Rio Grande do Norte State
ARTESP	Agência Reguladora de Serviços Públicos Delegados de Transporte do Estado de São Paulo	Transportation Agency of São Paulo State
ASEP	Agência Reguladora de Serviços Públicos Concedidos do Estado do Rio de Janeiro	Public Services Regulatory Agency of Rio de Janeiro State
ASES	Agência Reguladora dos Serviços Concedidos do Estado de Sergipe	Public Services Regulatory Agency of Sergipe State
CEER	Conselho dos Reguladores Europeus de Energia	Council of European Energy Regulators
CNPE	Conselho Nacional de Política Energética	National Council for Energy Policy
CSEP	Comissão de Serviços Públicos de Energia do Estado de São Paulo	Energy Services Commission of São Paulo State

ECPR	Consórcio Europeu para a Pesquisa Política	European Consortium for Political Research
IADB	Banco Interamecano para o Desenvolvimento	Inter-American Development Bank
IDEC	Instituto de Defesa do Consumidor	Consumer Rights Institute
IMF	Fundo Monetário Internacional	International Monetary Fund
LAC	América Latina e Caribe	Latin American and the Caribbean
NERA	Associados Pesquisa Economica Nacional	National Economic Research Associates
PRAF	Programa de Reestruturação e Ajuste Fiscal dos Estados	Program for Restructuring and Fiscal Adjustment of Brazilian States
TELEBRÁS	Telecomunicações Brasileiras S.A.	Brazilian Telecommunications S.A.

1.

INTRODUCTION

In the 1990s, increased capital mobility competition in the global markets, combined with important domestic fiscal crises, led countries in the Latin American and Caribbean (LAC) region to embark on the so-called first generation of reforms. These reforms involved widespread privatization, deregulation, and restructuring of the energy, water, telecommunications, and transport industries.

The privatization process in particular was more intense. Not only were the privatization episodes in the region far more numerous than in other parts of the world, but also the changes in the role of the state were unsurpassed elsewhere. The privatization process led to the setting up of numerous independent regulatory institutions in LAC. After almost a decade of experimentation with private markets in the infrastructure industries, new investors now look more reluctant .The strongly optimistic view that viable and effective regulatory arrangements could be established gave away to skepticism about developing countries' capacity to implement sound regulatory institutions.

This recent downward trend in infrastructure investments in developing and transition economies is associated, at least in part, with the poor regulatory governance in those sectors (Henisz and Zelner 2001; Henisz 2002; Pargal 2003; and Stern and Cubbin 2003). Market-friendly legislation and well-designed contracts may be innocuous if regulators are poorly equipped or face the wrong incentives for appropriate enforcement. And privatization—as basic asset transfer—may generate very little welfare improvements if not combined with robust legal framework, appropriate contracts, and good regulatory governance, broadly understood as the conditions for the enforcement of laws and contracts by regulators.

Multilateral institutions and donors encouraged LAC countries to privatize state-owned enterprises and reform the sector framework, part of the so-called first-

generation reforms. These measures that could be achieved with the stroke of a pen and were expected to generate structural impacts on the welfare and growth potential were considered first time priorities. The development of a more detailed—day-to-day—management/engineering of the regulatory process, part of the so-called second-generation reforms, was postponed to a later phase. There is a growing understanding, however, that some reforms present a high degree of complementarities and that sometimes second-generation reforms are a pre-condition for structural reforms to generate their expected benefits (IMF 2004; IADB 2005; and, Campos and Correa 2005).

Brazil is not an exception to this case. The country was the major beneficiary of private investments in the 1990s, with projects with private participation totaling more than China, Indonesia, and the Philippines combined. Its privatization program was one of the largest in the world, involving the sales of assets valued in excess of US$80 billion. Privatization of TELEBRÁS—the former state-owned telecommunications enterprise—yielded some US$29 billion (including debt transfers). Between 1995 and 2000, almost all Brazilian states privatized their electricity distributors. The entire railway system has been privatized, roughly 2,500 kilometers of roads have been conceded, and most port terminals have private operators.

To attract private investment, both federal and state-level administrations delegated regulatory authority to relatively independent institutions. Federal and state-level regulators were created almost at the same time and with very similar designs. Between 1997 and 2005, federal regulators were created in electricity (ANEEL),

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[1] Jordana and Levi-Faur (2003) have documented the creation of more than 130 regulatory institutions in 12 sectors, including electricity, natural gas, railways, roads, telecommunications, transport, and water.

Table 1. Brazilian State Regulatory Agencies

State (abbreviation)	Regulatory agency	Date of creation	Description
Acre (AC)	AGEAC	April 2004	E, G, S, Tr
Alagoas (AL)	ARSAL	September 2001	E, G, S, Tr
Amazonas (AM)	ARSAM	November 1999	E, G, S, Tr
Amapá (AP)	None	n.a.	n.a.
Bahia (BA)	AGERBA	May 1998	E, G, R, Tr
Ceará (CE)	ARCE	December 1997	E, G, S, Tr
Distrito Federal (DF)	None	n.a.	n.a.
Espírito Santo (ES)	AGERSA	August 1998	S, W
Goiás (GO)	AGR	November 1999	E, S, Tr, W
Maranhão (MA)	ARSEP-MA	April 2002	E, S, Tr
Mato Grosso (MT)	AGER	January 1999	E, G, S, Tr
Mato Grosso do Sul (MS)	AGEPAN	December 2001	E, G, Tr
Minas Gerais (MG)	ARSEMG	July 1998	E, G, S, Tr
Pará (PA)	ARCON	December 1997	E, G, S, Tr
Paraíba (PB)	AAGISA	November 2001	I, S, W
Paraíba (PB)	AGEEL	November 2001	E, G
Paraná (PR)	None	n.a.	n.a.
Pernambuco (PE)	ARPE	January 2000	E, G, Tr, W
Piauí (PI)	None	n.a.	n.a.
Rio de Janeiro (RJ)	ASEP	February 1997	G, R, S, Tr
Rio Grande do Norte (RN)	ARSEP-RN	December 1999	E, G
Rio Grande do Sul (RS)	AGERGS	January 1997	E, R, Tr
Rondônia (RO)	None	n.a.	n.a.
Roraima (RR)	None	n.a.	n.a.
Santa Catarina (SC)	ARCO	January 2000	E, G, S, Tr
São Paulo (SP)	CSEP	October 1997	E, G
São Paulo (SP)	ARTESP	January 2002	Tr
Sergipe (SE)	ASES	June 1998	E, G, S, Tr
Tocantins (TO)	None	n.a.	n.a.

Notes: n.a. = not applicable. Data for all privatized companies are for the electricity sector, except for the state of Amazonas (AM), for which data refer to the water sector. E = electricity, G = natural gas, GTr = ground transportation, I = irrigation, P = petroleum, R = railroads, S = sewerage, Tel = telecommunications, Tr = general transportation, W = water, and WTr = water transportation.

Source: Authors' compilations.

ground transportation (ANTT), petroleum (ANP), telecommunications (ANATEL), water (ANA), and water transportation (ANTAQ), while 22 agencies were created in 19 of Brazil's 27 states.[2] Eighteen states set up multi-sector institutions (that is, they cover more than one industry) whereas three states (Paraíba, Rio de Janeiro, and São Paulo) created two sector-specific agencies.[3] Seven states did not create regulatory agencies (Table 1).[4]

All federal agencies are sector-specific while the design of state-level regulators varies across states: the state of Pernambuco, for example, has one multi-sector regulator; while the state of Paraíba has two sector-specific agencies. Interestingly, pioneer states—like São

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[2] The names given for agencies throughout this paper are the abbreviations or acronyms used in Portuguese.

[3] The government of Paraíba set up two different agencies for electricity (AGEEL) and water and sanitation (AAGISA). The government of Rio de Janeiro created, in June 2005, AGENERSA to deal exclusively with electricity and sewerage matters and AGETRANSP to regulate the transportation sector. The government of São Paulo created two agencies: one for electricity (CSPE) and another for inter-municipal transportation (ARTESP).

[4] The states that did not create regulatory agencies are Amapá, Distrito Federal, Paraná, Piauí, Rondônia, Roraima, and Tocantins.

Paulo and Rio de Janeiro are moving from the design of a single multi-sector regulator towards a sector-specific approach. The areas involved at the state-level regulation include public transportation (e.g., inter-municipal transportation and water transportation), water and sanitation, natural gas, telecommunications, electricity and. Except for transportation, none of those sectors is under the exclusive jurisdiction of states.

The objective of this report is to evaluate the regulatory governance of the infrastructure sector in Brazil at both federal and state levels.[5] This goal is accomplished by considering the following dimensions of regulatory governance: (a) autonomy, (b) decision-making processes, (c) tools for making effective decisions (legal and regulatory instruments), and (d) accountability.[6] The specific objectives include (a) preparing a diagnosis of regulatory governance in the area of infrastructure in Brazil, and (b) building a synthetic index capable of measuring the quality of regulatory governance.

The main focus of this report is neither, as is most commonly the case, about regulatory outcomes. Although in some cases the assessment of regulatory governance helps explaining the reasons for an agency's poor performance, the purpose of this study is not to evaluate the performance of either the agencies or the regulated sector.[7] We are interested in assessing the overall quality of regulatory governance; in other words, we focus on the "inputs" for regulation of infrastructure industries in Brazil. We are not looking at the overall institutional environment for infrastructure investments in Brazil either. Rather, we focus on the narrower issue of the institutional conditions for regulation regardless of its scope, its consistency with the country's overall institutional environment, and other related issues (as those discussed by Levy and Spiller 1994).[8]

Currently, little empirical research exists on regulatory governance and regulators' capacities in the infrastructure sector in Brazil. Because of the lack of a systematic multi-sector study on regulatory institutions, not much is known about the state of regulatory governance in the infrastructure sector as a whole (Pires and Goldstein 2001; Brown and de Paula 2004; and Mattos and Coutinho 2005). Nevertheless, other evaluations have provided insights on the perception by consumer and market agents of regulatory activities. They include the American Chamber of Commerce's reports on ANATEL, ANEEL, and ANVISA (the food and drug agency).[9] These studies provide comprehensive information on the perception of key actors of two infrastructure regulatory agencies (ANATEL and ANEEL) and the food and drug agency (ANVISA). Similar efforts targeted at the evaluation of the agencies were carried out by the independent consumers association emphasizing consumer satisfaction (IDEC 2002).[10] This report builds on these two important pieces and is complementary to other initiatives aimed at building governance indexes.[11]

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[5] This research aims at providing an analytical investigation of regulatory governance through a comprehensive survey applied to 21 infrastructure regulatory agencies in Brazil. These agencies include six federal agencies: ANEEL, ANATEL, ANTAQ, ANTT, ANP, and ANA. In addition, we analyzed the following 15 multi- and single-sector state-level regulators: ARSAL (Alagoas), AGERBA (Bahia), ARCE (Ceará), AGR (Goiás), ARSEP-MA (Maranhão), AGEPAN (Mato Grosso do Sul), AGERMT (Mato Grosso), AGEEL and AGISA (Paraíba), ARPE (Pernambuco), ASEP (Rio de Janeiro), ARSEP-RN (Rio Grande do Norte), AGERGS (Rio Grande do Sul), and ARTESP and CSPE (São Paulo).

[6] Recent work on regulatory governance has defined it in different but largely complementary ways. Levy and Spiller (1996) define it as the mechanisms that society uses to constrain discretion and to resolve conflicts that arise in relation to those constraints. For Gutierrez (2003), regulatory governance involves the creation of a transparent and predictable regulatory system that can be sustained over time for utilities in different sectors.

[7] For an example of a comprehensive regulatory benchmarking report, see CEER (2004).

[8] Our focus is on regulatory governance, but we acknowledge that to adequately assess the effectiveness of regulation we need a broader understanding of the regulatory process. For example, in the absence of training of judges, courts dealing with appeals may be a source of instability and unpredictability regardless of the quality of regulatory governance. In this sense, the report is limited to only part of the elements that affect the overall regulatory outcome—a part to which not sufficient attention has been dedicated. One exception is the study for the energy sector by Brown and de Paula (2004).

[9] See AMCHAM (2003a, 2003b, 2004a, 2004b, 2005a, 2005b, and 2005c).

[10] See IDEC, the Brazilian Consumer Rights Institute, at http://www.idec.org.

[11] For an extensive survey of similar indexes, see http://www1.worldbank.org/publicsector/indicators.htm.

2.

DELEGATION, GOVERNANCE, AND REGULATORY EFFECTIVENESS

Why Is Delegation Needed?

Investments in infrastructure industries have large sunk costs and a high degree of asset specificity (that is, their assets cannot be easily transferred to other lines of business [Williamson 1985]). Important economies of scale are an issue, and a high political content exists because infrastructure investments involve large numbers of consumers, stakeholders, and voters. Because investments are sunk and politically sensitive, politicians may see a chance to act opportunistically by requiring new targets or by imposing extra costs on regulated firms after investments are made.

Given that assets are not easily transferred to alternative activities, investors imperfectly adjust to this new business environment, and the new conditions translate into lower returns to investment or, simply put, into capital expropriations. Faced with the risk of administrative expropriation by future governments, firms are discouraged from participating in the privatization process in new markets, they lower their bids in concession audits, or they delay technological modernization in existing markets (Henisz and Zelner 2001; Henisz 2002).[12]

Governments, thus, have to solve the problem of credibly committing to secure property rights over time, and one solution to this dilemma involves delegating authority to independent regulators. By delegating powers to independent regulatory agencies, the executive assures private investors that it will not be able to arbitrarily intervene in the market and expropriate rents after investments are sunk (lowering interest rates or administratively expropriating investors after privatization through lower tariffs).

Delegation is, therefore, a solution for an inter-temporal problem: by relinquishing short-term interests, political actors can minimize the risk of expropriation

(regulatory risk) and its effects on cost and availability of private capital, thus benefiting in the long run. Stability of rules and credibility are key ingredients of this environment. The degree of delegation reflects the degree to which the executive, the legislature, or both seek to bind their hands in order to acquire credibility (Levy and Spiller 1996; Spiller and Tiller 1997; Gilardi 2002; Vogt and Salberger 2002).

What Should Be Delegated?

The contents of delegation are embedded in sector laws and concession contracts. Contracts or sector laws should delegate to regulators the management of those attributes that directly affect returns to investments or the cost of capital. One clear attribute is the management of tariff setting and tariff readjustment, even though such management should be done according to guidelines provided by sector laws or concession contracts. The management of technical standards and quality norms tends also to be delegated because they normally affect operational costs—and, therefore, the returns to investment.

Not all attributes need to be delegated. Sector policies, such as rural electrification, are usually recognized as attributes that should be administered directly by the

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[12] For extensive theoretical and empirical treatment of how institutional variables, particularly political stability, affect investors' decisions in the infrastructure sector, see Henisz and Zelner (2001) and Henisz (2002). For econometric tests and informed discussion on the role of governance institutions in economic outcomes, see Knack and Keefer (1995) and Keefer and Knack (1997). For recent research on regulation that shows how the features of the institutional design of regulators and the broader institutional environment in which they operate influence the quality of regulatory outcomes, see Levy and Spiller (1996), Holder and Stern (1999), Henisz (2002), and Wallsten (2004).

government because they do not affect sectors' profitability and could, therefore, be subject to short-term scrutiny by voters. But boundaries between regulation and policy issues are not always clear—as in the case of entry regulation and market rivalry, where dual jurisdiction is common between the regulatory agency and the direct administration, in the former case, and between the regulatory agency and the competition agency in the latter. Regardless of its scope, delegation of powers (that is, the attributes delegated to regulators) should always be definite and clear. Effects of cumbersome regulation in which the mandate over key issues is not defined may be more deleterious than imperfect delegation because—although imperfect delegation increases the risk of political manipulation—unclear attributes raise transaction costs through indefinite administrative judicial and extrajudicial disputes.

How Should Delegation Be Managed?

Appropriate legal or contractual delegation is not enough to secure effective regulation. The content of regulatory action is important, but the key issue is enforcement if the objective is to guarantee regulatory credibility and stability. How should delegation be managed? The solution to this thorny issue involves credible commitments with predefined inter-temporal distribution of property rights. Some flexibility is also inevitable and desirable.

Not all contingencies can be anticipated and the use of sound regulatory reasoning is necessary. But this flexibility entails a number of requirements in terms of institutional design. After delegation of appropriate attributes is in place, effective management of concession contracts and sector laws will require some preconditions to be met. We call those preconditions the structure of regulatory governance. We conceptualize them as inputs to the regulatory process, not as the output. How those things are related to regulatory effectiveness and ultimately to the risk of expropriation will be discussed in the next section.

Earlier discussions of institutional design and regulatory governance have emphasized a number of features, such as the regulator's autonomy and the clarity of its roles and objectives; decision-making processes, transparency, and predictability; decision tools and personnel; and participation and accountability. Other dimensions to describe regulatory governance have been suggested in the literature (Stern and Cubbin 2003). Holder and Stern (1999) have suggested six critical dimensions:

(a) accountability, (b) autonomy, (c) clarity of roles, (d) participation, (e) predictability, and (f) transparency. The rationale for this choice according to Holder and Stern (1999) was that (a), (b), and (c) were identified as indications of formal accountability, whereas (d), (e), and (f) were seen as measures of informal accountability. Those criteria were proposed to capture the practical operations of regulatory practices and processes. In turn, Noll (2001) proposed the following critical dimensions: accountability, capacity, coherence, independence, predictability, and transparency.

In this report, we have opted for merging a number of features that are closely linked and that work with a smaller set of dimensions. Some of the dimensions used in the mentioned studies are not directly connected to regulatory governance as conceptualized in this paper (for example, capacity) because they are closely related to organizational rather than institutional aspects. Others, such as predictability or coherence, may be conceptualized as attributes of a set of rules and arrangements rather than as dimensions of good governance. Therefore, we have decided to focus on four of the dimensions mentioned: (a) autonomy; (b) decision tools; (c) decision making; and (d) accountability. In the following sections, we discuss the main objectives of good governance and the elements of institutional design that have proved to influence the attainment of those objectives in some institutional contexts.

The Structure of Regulatory Governance

Autonomy

Autonomy refers to different objects: the first is autonomy vis-à-vis governments, and the second is autonomy vis-à-vis the regulated industry interests. Political autonomy represents the degree of insulation of regulators from the political market. The appropriate delegation of legal attributes would be irrelevant if enforcement was not isolated from short-term political influence. By granting formal and de facto autonomy to regulatory agencies, governments seek to reduce the regulatory risk for investors. Autonomy is, therefore, the core instrument of delegation. It is of primary importance because of its direct effect on regulatory risk. Insulation from private sector interests, however, also plays a role because decisions by captured regulators tend to be unsustainable over time.

Four devices are essential for political autonomy of the regulatory agency: (a) tenure and staggered terms

for regulators (not coincident with that of the executive), (b) legal means to enforce its decisions, (c) financial autonomy, and (d) appeals that are made to the judiciary (rather than to any executive body). Autonomy requires that the agency's funds are not subject to impounding or appropriation for other purposes (Smith 1997a).

Institutional design should include mechanisms for appeal of decisions that are neither excessively disruptive of the regulatory process (that is, when there are too many opportunities for appeal by non-specialized agents) nor weak and ineffective. An appeal through the executive branch—presidents, line ministries governors—represents interference in the regulator's autonomy and should be prohibited. Appeals should normally be made on grounds of procedure (not statutory or evidentiary grounds) and should involve only the agency and the relevant judicial institutions. The latter should have developed expertise in regulation and should use designated courts for dealing with regulatory matters.

Other features may be added. Barring politicians from being appointed to executive or consultative positions in regulatory agencies is another way of insulating the regulatory process from electoral pressures. Limiting judicial review to procedural aspects, not the content of decisions, is another. Manipulation by the executive, however, can curtail political autonomy—either through informal constraints and meddling or through cuts in the agency's budget.[13] This possibility, in turn, illustrates why assessments of regulatory governance need to go beyond formal attributes and to deal with actual functioning and effectiveness of rules.

Autonomy also refers to mechanisms that insulate regulators from the interests of the regulated industry (Smith 1997b). The requirements of institutional design for preventing regulatory capture include special prerequisites for appointing directors, such as technical qualifications and conflict-of-interest clauses (for example, the lack of previous links with business associations or possession of shares in the regulated industries, or the quarantine provisions for former board members of regulatory agencies).

Decision Making

One element of the decision-making process that affects the management of regulation is the degree to which administrative procedures are adopted. The adoption of administrative procedures induces compliance with existing rules and regulations (for example, compliance with the mandate of the institution [McCubbins, Noll,

and Weingast 1987, 1989]). Compliance with due process also reduces the risk that regulators' decisions will be reversed in court, thereby increasing the sustainability of the regulatory system (Berg 2000).

Because some level of arbitrariness is inherent in regulatory decisions, procedural requirements limit the range of viable choices available for the regulators, thus protecting private investors from abuse and misuse of discretionary power (Smith 1997b). Administrative procedures also induce deliberative rationality and strengthen the coherence and predictability of law and contract enforcement, which are important outputs of the regulatory process (Holder and Stern 1999; Noll 2001).

Regulatory decisions are unlikely to be first-best solutions in a context of asymmetric information (Baron 1989; Guasch and Spiller 1999). Win-win solutions are also rare, the possibility of adopting compensatory schemes is scarce, and regulatory decisions will always involve some degree of frustration. In this context, it is important that the decision-making process is considered "fair or legitimate" by all parties involved if the objective is to increase sustainability of decisions and to reduce the regulatory risk. Although the rules established by standard administrative processes are a source of such procedural legitimacy, the involvement of stakeholders is also an important source of legitimacy and public acceptability for regulatory agencies (Berg 1998).

As one assesses the decision-making process, both the decision-making rules and participation aspects should be taken into account. Among the decision-making rules, how decisions are reached—majority rule or consensus—is a key aspect (Smith 1997c). Precedent of decisions to bind future ones, which helps anchor investors' expectations, is also important (Berg 1998). Equally relevant is the extent to which decisions are required to be explained in written documents, which helps establishing a record that sets a foundation for consistent implementation of the law (Guasch and Spiller 1999).[14] On the issue of participation of the stakeholders (and also fairness), the existence of formal provision for their participation, provisions for taking

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[13] Laffont and Meleu (2001) review contributions that have modeled the value of separation of powers. They argue that the separation of powers acts as a safeguard against regulatory capture. It is more beneficial when inter-temporal commitment is limited and helps provide powerful reputation incentives. For an analysis of the Brazilian case, see Melo and Pereira (2004).

[14] We recognize, however, that excessive rigidity may be counterproductive (Tenenbaum 1996).

submitted opinions into consideration, and equitable access by the parties to the decision makers are instrumental factors.

Decision Tools

Information is the most valuable resource in the regulatory process. Regulators normally lack information on cost and demand structure, and regulated firms have little incentive to reveal what they know (Guasch and Spiller 1999). Incomplete information and limited ability to observe on the part of the regulator are intrinsic properties of the regulatory process and create opportunities for strategic behavior on the part of both the regulator and the regulated firms (Baron 1989). The informational problem is aggravated by rapidly evolving market structures and technological progress (Lafont and Tirole 2000). Access to information and resources to obtain and process it are, therefore, essential inputs to the regulatory process; they are also important means of reducing the risk of contract mismanagement or ineffective regulation (Smith 1997c; and Noll 2001).

Four groups of inputs are extremely important for good management of the regulatory process: (a) legal means to collect information, (b) appropriate budget to manage and process this information, (c) qualified personnel, and (d) regulatory tools. Regulators need not only the right to request information but also the effective legal power to implement the request, which usually requires the capacity to issue warnings and impose fines. The regulator's technical staff members should ideally have competitive pay scales and benefits, some degree of job stability, and access to training programs. Selection of personnel should occur mainly through competitive exams, thus avoiding problems related to conflicts of interest or political influence. Regulatory tools include regulatory accounting systems, methodologies for tariff setting, and instruments for monitoring quality.

Accountability

After regulation has been delegated, a legitimate question is who regulates the regulator? When regulators have a monopoly over regulation, how can society protect itself from the risks of a monopoly—notably inefficient output and excessive costs? If delegation is supposed to be sustainable, it should not represent a blank check from the principals (the executive or legislative bodies) to their agents (the regulators). Autonomy needs to be reconciled with measures to ensure that the regulator is accountable for its actions. Checks and balances are required to ensure that the regulator does not stray

from its mandate, engage in corruption, or simply become inefficient (Smith 1997b).

One important accountability device is providing effective arrangements for appealing the regulator's decision. Appeals should normally be made on the grounds of procedure (not statutory or evidentiary grounds) and should involve only the regulatory agency and the relevant judicial institutions (not the executive branch).

Another factor is oversight mechanisms: agencies should be subjected to legislative oversight by specific legislative commissions and should be required to provide periodic reports on the effects of regulation; and agencies should also be monitored by the public prosecutor's office and the corresponding accounting office.

An additional important device of accountability is transparency, including open decision making (Smith 1997b). Transparency requires publishing decisions and meetings by disclosing relevant information, announcing in advance the schedule of meetings and their respective agendas, and making available to third parties the minutes of meetings held.

Regulatory Governance and Effectiveness: Two Caveats

Two cautionary remarks are in order. First, the features of institutional design do not correlate monotonically to regulatory outputs. Better tools for decisions (for example, budget and personnel) do not have a linear effect on regulatory outcomes. Larger budgets could lead to more and unnecessary regulations.

For effective regulatory governance, a good match between the institutional capacity of a country and the structure of regulatory governance is crucial to build a credible and stable regulatory regime that ensures respect for property rights and that reduces the risk of expropriation (Levy and Spiller 1994; Berg 2001; Stern and Cubbin 2003).[15] There are no universal rules for institutional design, but rather objectives that should be sought, especially considering the institutional environment. The analysis of good governance, therefore, goes beyond the consideration of strict features of the institutional design and involves taking stock of the

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[15] Institutional capacity refers to the constitutional rules of a country and their actual functioning, including the formal and actual mechanisms of separation of powers, rule of law, and independence of the judiciary, as well as informal norms governing the interaction between institutions of governments and political and institutional actors, such as the bureaucracy (Levy and Spiller 1996).

Figure 1. The Regulatory Process
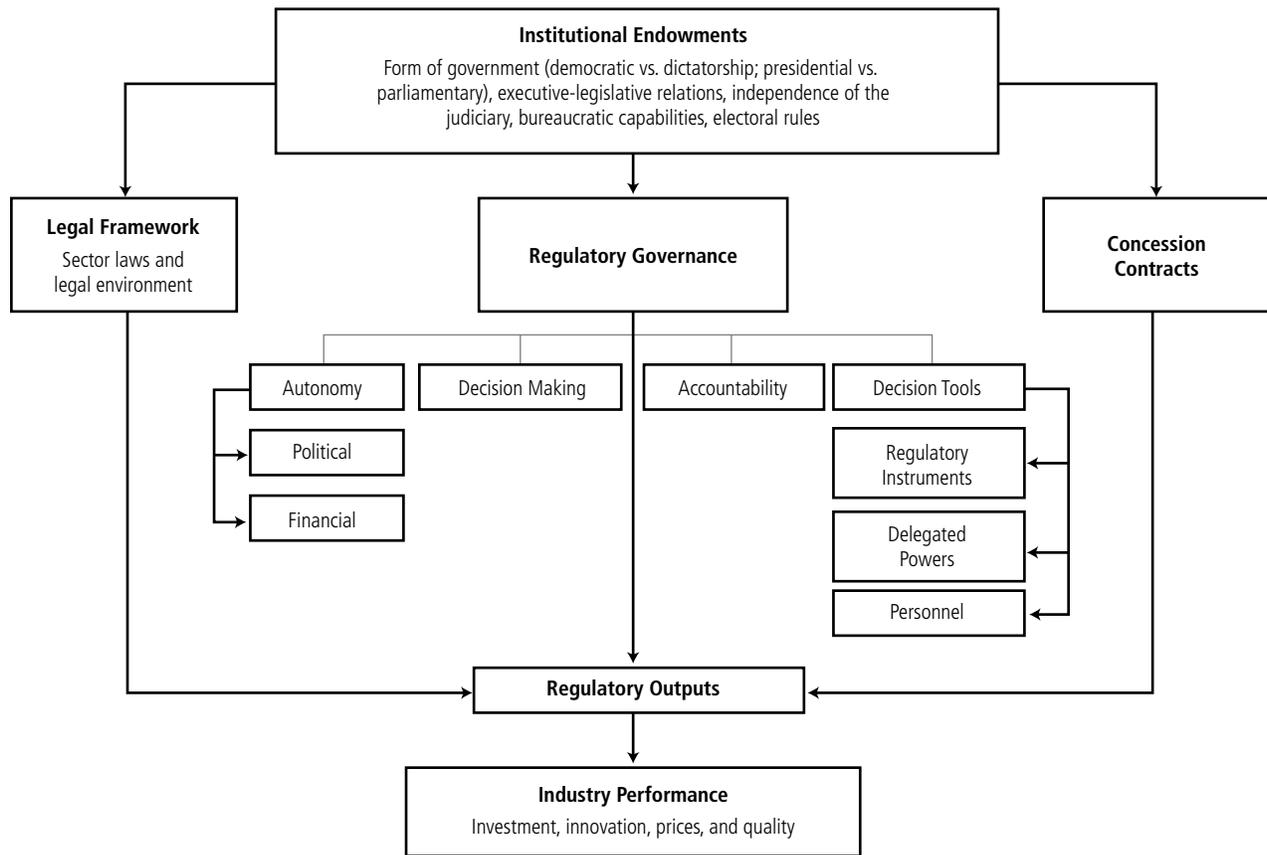
broader institutional capacity as well as of the actual practices and processes of the regulatory process rather than the legal or formal rules.

Best administrative arrangements may not be credible in the context of previous administrative expropriation by governments. Sector characteristics also matter. Furthermore, capabilities are a function of the regulatory tasks at hand: price caps require regulatory capacities of a type different from yardstick regulation, for example.[16] The informational requirements needed for the regulation of technologically advanced sectors, such as telecommunications, are much more demanding than in sectors that typically use traditional technologies, such as sanitation.

Yet, a poorly staffed and budgeted regulator can reach appropriate regulatory decisions despite its inappropriate resources. Indeed, taken individually, the variables presented are neither necessary nor sufficient conditions. But we believe that, taken jointly, those

components strongly increase the likelihood of effective enforcement of sector laws and contracts.[17]

Summing Up

Figure 1 describes the regulatory process as a whole and shows how the structure of regulatory governance is related to the broader institutional structure and to the regulatory instruments. Regulatory governance is also conditional on the country's institutional endowments

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[16] Because information asymmetries between regulators and the regulated industry are large, the corresponding information and expertise needed vary. An agency that does not have a highly educated and well-trained staff cannot and should not try to implement complex regulatory rules that are necessary to deal with the natural information asymmetries that are involved in regulation. Those asymmetries imply that regulators will rarely be able to achieve first-best outcomes. However, second-best outcomes can be reached through regulation that takes into account moral hazard and adverse selection problems.

[17] For further details, see Haggarty, Shirley, and Wallsten (2003).

(Levy and Spiller 1996). This report is based on the perception that the regulation that emerges as the output of the regulatory process—and consequently its effect on a country's economic performance—is crucially determined by regulatory governance.

The main difference between them is that institutional endowments vary slowly over time and cannot be seen as choice variables for policy makers—that is, one would not expect a country to change its electoral rules as part of its regulatory policy. Regulatory governance, conversely, includes rules and restrictions that are choice-variables for policy makers and that consequently establish the environment under which the actual regulatory engineering will operate.

Figure 1 emphasizes that the choice of regulatory instruments—and ultimately the effect of regulation on economic performance—is conditional on both the institutional endowments and regulatory governance. Because the institutional endowments must be taken as given, the choice of regulatory governance is limited to forms that are compatible with that endowment. For example, a country that does not have an independent judiciary will not be able to successfully use concession contracts. As another example, a country with strong presidential powers, such as Brazil, may find it necessary to provide regulatory agencies with significant levels of autonomy as a credible commitment against opportunistic behavior (Mueller 2000). In this study, we focus on a single country; therefore, we are in a position to control for the effects of the broader institutional endowment.

3.

GOVERNANCE IN PRACTICE

The Survey

In this section, we describe the survey and its results to assess the distribution of the attributes of regulatory governance among 21 regulatory agencies in Brazil. The survey questionnaire and its responses are organized around four selected dimensions of regulatory governance: (a) autonomy, (b) decision making, (c) decision tools, and (d) accountability, as discussed in Section 2.

The 18-page questionnaire used in the survey was composed of 106 questions divided into the four subsections of autonomy, decision making, decision tools, and accountability.[18] The correspondence between the conceptual framework presented in Section 2 and the questionnaire is illustrated in Figure 2. This wealth of information is greater than that used by previous studies to created governance indexes, such as those created by Holder and Stern (1999), who used 32 questions, and Gutierrez (2003), who used 8 factors.[19] It was substantially enriched by the analysis provided by IDEC (2002), AMCHAM (2003a, 2003b, 2004a, 2004b, 2005a, 2005b, and 2005c), and Brown and de Paula (2004).

The questionnaires were often applied by the same two research team members during visits to the agencies or during the 2005 Conference of Brazilian Regulatory Agencies in Manaus. Only four state regulatory agencies sent their answers by e-mail. High-level officials, most often either the president or directors, answered the survey.[20] Also, all of the questionnaires were applied during the same time period (from April to June 2005). A total of 21 agencies are represented in our sample—6 federal-level and 15 state-level. All of these conditions are important for the quality (completeness and consistency) of the information provided.

The approach to data collection represents an improvement if compared with surveys realized through the mail or by Internet or carried out by hired interviewers—who may not be able to capture many of the subtleties in the answers provided and to differentiate the more important information from pure "noise." Also, the personal contact with the agencies' authorities, in what was typically a three-hour interview, provided a rich interaction that contributed to enhancing our understanding of the agencies' universe, thus improving our ability to understand and interpret the data collected.

The Results

Autonomy

Table 2 details questions in the survey regarding agencies' autonomy. The issues are subdivided according to three attributes: (a) political autonomy (tenure of the directors), (b) the clarity of rules (degree of delegation), and (c) the financial autonomy. Also assessed were whether these formal attributes were enough and the effect of age on the agency's autonomy.

Political Autonomy

Results indicate that in one-third of the surveyed agencies (7 out of 21) directors can be dismissed for a vague reason such as "threatening the agency's integrity or autonomy." In the majority of cases, therefore, directors' positions are tenured. Comparing federal and state agencies in terms of this attribute, results show strong limitations for the dismissal of directors in federal agencies, whereas the same is true for 10 out of 15 state

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[18] Some questions were not used in the index to avoid duplication of information. In the final index, 83 questions from the survey were used.

[19] It should be noted that the index of Gutierrez (2003) has the advantage of being a time-series, covering the period from 1980 to 2001. The tradeoff is that less information had to be included in it because of data limitation over such a long period for several countries.

[20] The two senior researchers who applied the questionnaire were Carlos Pereira and Marcus Melo.

Figure 2. Mapping between Regulatory Governance Dimensions and the Survey Questionnaire

Component	Subcomponent	Survey
Autonomy	Political Autonomy	Question 20: In which circumstances can a director be fired? Question 13: Do directors' terms coincide with the executive's?
	Degree of Delegation	Question 1: Does the legistation clearly define the duties and responsibilities of the regulatory agency? Question 2: Does the legislation that created the agency define the roles of other institutions in the regulatory process?
	Financial Autonomy	Question 9: Does the agency hve autonomy to determine its expenses? Question 10: Have the agency's resources been impounded by the executive?
Decision Making		Question 6: Is a qualified quorum necessary for the board of directors to be able to deliberate and decide? Questions 10, 11: Is the decision-making process of agency's decisions formally documented? Is this documentation legally required? If so, does it have to contain the action of all agents directly involved and does it have to cite jurisprudence?
Decision Tools	Regulatory Instruments	Question 1: Which regulatory instruments are available to the agency? Question 14: Does the agency have the power and legal means to guarantee adherence to its decisions by regulated entitites?
	Delegated Powers	Question 7: Does the agency have power to promote competition in the market? Question 14: Does the agency have sufficient legal powers and means to secure compliance with its decisions?
	Personnel	Question 15: Which percentage of the agency's staff is admitted by public exams? Question 16: What is the average length of employment of technical staff?
Accountability		Question 1: To which institutions can affected parties appeal a decision made by the agency? Questions 2, 4, 5: What is the number of legal suits against the agency? What have been the results of these legal suits? Has any case reached the Supreme Court? Question 12: Are public hearings held by the agency?

agencies. In almost half of the agencies, there is no legal restriction against politicians being appointed for agency positions during their term of office. In most agencies (18 out of 21), directors' terms do not coincide with that of the executive; the exception is three state agencies (AGERBA, ARCE, and ARPE).

In addition, 13 surveyed agencies need legislative approval for appointing their board members. This is the case of all six federal agencies and seven state agencies. In the case of five agencies, previous experience in the sector/field is not required for the appointment of directors. Seven agencies experienced directors who did not complete their terms. No federal-state distinction exists in our sample in the probability of a director being removed; such an event has occurred in two federal and five state agencies.

Degree of Delegation
The survey contains questions regarding which powers have been delegated to the agencies. Fifteen agencies acknowledged having been delegated the power to set and change tariffs.[21] All but one (ANA) have been delegated the power to set quality standards. Similarly, all but two agencies (one federal and one state) have been delegated the power to arbitrate conflicts between rivals in the regulated market. Only two agencies state that they do not have the power to impose fines.

In terms of the clarity of rules, 16 agencies considered that the legislation is clear on their mandates and

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[21] See Table 4.

Table 2. Autonomy: Descriptive Results of Selected Questions

Issue	Results			
Political autonomy	**Yes**	**No**	**Total**	**Other**
The circumstances in which a director can be fired are:	—	—	21	*Ad nutum* (1); under vague justification of "threatening the integrity and independence of the agency" (7); only in the case of specific crimes stipulated by law (13).
Directors' terms coincide with the executive's (president or governor)	18	3	21	—
The agency's presidential appointee has to be approved by congress (or state legislature):	—	—	21	Executive takes unilateral decision (7); if executive's choice is not approved in three votes, it prevails (1); legislative approval is required (13).
At least one director has not completed her/his term	7	14	21	—
To be appointed as a director, the individual must have experience in the sector	16	5	21	—
It is forbidden for directors to hold:	—	—	21	An elected position before the term at the agency (3); an elected position during the term at the agency (8); there is no prohibition (10).
Degree of delegation	**Yes**	**No**	**Total**	**Other**
The duties and responsibilities of the regulator are clearly defined by the legislation	16	5	21	If No, the level of ambiguity is: very high (1); high (1); medium (2); low (1); very low (0).
The roles of other institutions in the regulatory process are defined by the legislation that created the agency	13	8	21	If Yes, which institutions: ministry/state secretariat (10); congress/state legislature (9); governor (6); judiciary (4); general accounting offices (4); attorney general (3); mayor (1); political parties (0); congressmen (0); other (4).
Instruments available for the ministry or state government to exert control over the agency are:	—	—	21	Budget increase/decrease (12); substitution of directors (6); nominating new directors (12); changing sequence of projects to be analyzed (3).
The efficacy of instruments available for the ministry or state government to exert control over the agency is:	—	—	21	Very high (12); high (1); medium (2); low (3); very low (3).
The ministry or governor has formally or informally interfered in the agency's policy-making process	13	8	21	—
Financial autonomy	**Yes**	**No**	**Total**	**Other**
The source of the agency's budget is:	—	—	21	Entire budget from the government (2); part from the government and part from other sources (e.g., fines and fees) (10); all from other sources (9).
The agency has financial autonomy to determine its own expenses	17	4	21	—
Agency's resources have been impounded (contingenciados) by the executive	13	8	21	—
The effect of this impoundments was:	—	—	13	Very high (6); high (4); medium (1); low (1); very low (1).

Notes: Total number of agencies = 21. Number in parentheses indicates the total number of agencies that gave a particular answer.

Source: Survey questionnaire.

powers.[22] Only two agencies rated the legislation's ambiguity as "very high" or "high." A total of 13 agencies concurred with the fact that their enabling legislation defines the roles of other institutions participating in the regulatory process. The most cited institutions were the ministry or the state secretariat (10 agencies), the congress or the state legislature (9 agencies), the governor (6 agencies), and the judiciary (4 agencies).

Financial Autonomy
The survey shows that 17 agencies declared they had financial autonomy to control their own expenses throughout the year. No significant difference was found between federal and state agencies. In general, Brazilian regulatory agencies' budget revenues come from either several sources, such as fees and fines (nine agencies). In only 2 of the 21 surveyed agencies, the government was the single source of revenues. However, 13 out of the 21 sampled agencies reported having their revenues impounded (*contingenciados*) by the executive. Although the budget suggested by each regulatory agency and approved by Congress is normally considered sufficient, the continuous impounding of agencies' budgets has undermined their abilities to operate: according to the survey, only 3 agencies (out of 13) affirmed that the impact of this impounding was not significant (medium to very low).

Were These Formal Attributes Enough?
The existence of formal attributes for autonomy does not prevent other government bodies from attempting to influence regulatory decisions. The three most-common mechanisms used by ministries or state governments to try to influence were increasing or decreasing the budget (12 agencies), nominating new directors (12 agencies), and substituting directors (6 agencies). We found that 13 agencies classified those mechanisms as either "very highly" or "highly" effective. The same number of agencies (12 agencies) affirmed that ministries or state governments have formally or informally tried to exert influence in the agency's policy-making process. When asked if the ministry or governor has ever actually directly intervened in the agency, eight agencies (two federal and six state) replied positively. A comparison of the replies of the state and federal agencies regarding the use and efficacy of those means of control indicates a higher and statistically significant incidence of this type of interference over state agencies.[23] In other words, state governments seem to have a higher propensity to intervene in regulatory agencies than the federal government.

Despite the legal protection of director tenure in most agencies, 7 of 21 agencies reported that at least one director had not completed his or her term. The motivation behind those cases varied. Nine cases were voluntary dismissals, and four were dismissals caused by external pressure. The director was fired in three cases, one case was motivated by ill health, and the director was promoted in one case to another position outside the agency. No systematic pattern was apparent in those motivations either for federal or state regulators.

Despite the existence of legal attributes providing for autonomy, the survey indicated that the executive and legislative powers have attempted to influence—and sometimes successfully done so—the regulatory decision-making process. This is hardly a specific phenomenon to Brazil. The important issue is making

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[22] In tables 2 through 5, numbers indicate the absolute number of agencies in the sample of 21 regulators that gave a particular answer. In some questions, the respondent could choose several options from a list so that numbers presented show the total number of agencies choosing each item, and the sum of all items does not have to add up to 21.

[23] *P*-value for the difference in means was 0.05.

sure that it reduces over time, as regulators' reputations improve.

Does Autonomy Improve Over Time?

To determine whether agencies' autonomy varied according to agencies' age, we divided the sample into two subsamples and performed difference of means tests on all autonomy-related questions: 9 regulators were grouped as the "older" regulators while 12 agencies constituted the set of "younger" regulators.[24, 25] Of the 23 questions in the autonomy section, only 2 showed statistically significant different means: the set "older" regulators had an statistically significant higher number of agencies affirming they had the autonomy to determine their own expenses; however, a statistically larger number of agencies within the "older" group reported having their resources subjected to impoundments.[26]

We were able to find very little evidence, therefore, that autonomy of regulators improves over time and that regulators' reputation is enhancing. Not surprisingly, in the single case for which evidence shows progress—in the regulator's autonomy to define its own budget—regulators were also more likely to have their resources impounded by the executive.[27] Although these impoundments were not always motivated by the attempt to control the regulatory process—in the case of the federal government, every administration is subjected to the same process—it does send the wrong signals to private investors and may eventually hurt the regulator's capability.

Decision Making

Table 3 shows the results related to the decision-making process of regulatory agencies in Brazil. These results are analyzed in two parts: (a) decision-making rules, and (b) public participation. Moreover, the age effect on the decision-making process was also considered.

Decision-Making Rules

Regulatory decisions are taken by the agencies' boards—a collegiate composed of directors or commissions. In only 18 agencies, decision does not require a qualified quorum. In all the remaining regulators (three agencies), limitations exist on the number of directors who must be present. No significant difference exists in this regard between state and federal agencies. The main voting rule used to make a decision is simple majority. Only two agencies (ANATEL and ARTESP) rely mostly on qualified majority, while two other agencies (AGEPAN and CSPE) use both rules for different types of decisions. Directors have veto power over the board's decisions in only two cases. Also, only in two cases

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24 The "older" group was composed of AGER, AGERBA, AGERGS, ANATEL, ANEEL, ANP, ARCE, ASEP, and CSEP. The "younger" group was AAGISA, AGEEL, AGEPAN, AGR, ANA, ANTAQ, ANTT, ARPE, ARSAL, ARSEP, ARSEP, and ARTESP.

25 This choice was made by graphing agencies according to age and by choosing two groups of relatively the same size but keeping like-aged agencies together.

26 *P*-value of 0.03.

27 *P*-value of 0.02.

neither a director nor the president can obstruct a case, once it has been assigned to a given director. In both cases, the agencies are state regulators.

Only nine surveyed agencies affirmed to distribute cases among directors in a random basis. Most agencies allocate cases among their directors on the basis of either their areas of specialization (14 agencies) or the decision of the director-general (7 agencies). All of the latter cases are in state agencies, except for some decisions by ANA.

For 18 agencies, formal documentation of the decision making is legally required and must contain every legal action of those actors directly involved in the process. For 17 of the surveyed agencies, board action must be documented in writing, but in 3 agencies an oral discussion is sufficient.[28] In our sample of 21 Brazilian regulators, 18 require decisions made in the board meetings to be supported by technical analysis. Interestingly, among the 18 agencies that are formally required to document their final decisions, only 7 regulators are additionally required to cite jurisprudence. In a related issue, only 9 agencies are legally required to cite jurisprudence in support of their decisions. The difference between federal and state regulators is statistically significant, indicating a smaller number of state agencies with such requirement.[29]

Also importantly, only in the case of six regulators, decisions are taken without previous communication and discussion among board members. In addition, only in 3 (out of 18) agencies, a legal apparatus prohibits informal meetings of directors with stakeholders. To quantify the extent to which agencies operate with sound procedures for decision making, we created a summary index that is the sum of the answers to the following four questions: (a) Is the decision-making process behind the agency's decisions formally documented? (b) Is there a requirement to cite jurisprudence to support a decision? (c) Is there a requirement to provide technical analysis to support a decision? (d) Must the document explicitly address the formal arguments of the parties affected by a decision?

Because a positive answer has a value of 1 and a negative answer has a value of 0, the index varies from 0 (poor procedures for decision making) to 4 (good procedures for decision making). The average value of this index was 3.2, with seven agencies reaching a value of 4, indicating that at least formally the requirements for documenting and justifying a decision are stringent. The difference between federal and state agencies was statistically significant at 1 percent, with the average for federal agencies at 3.7 and that of state agencies at 3.0.

Public Participation

With respect to the participation-related aspects of the governance of Brazilian regulatory agencies, in 17 agencies, external actors and those affected by the agencies'

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[28] Note that some of the questions refer to the legal requirement of certain actions, and others refer to actual behavior. The gap between the formal (de jure) rules and the actual (de facto) behaviors is addressed in section 4.

[29] P-value for the difference in means was 0.10.

Table 3. Decision-making: Descriptive Results of Selected Questions

Issue	Yes	No	Total	Other
			Results	
The decision-making process can be defined as:	—	—	21	Very decentralized (1); decentralized (7); medium (7); centralized (5); very centralized (1).
The division of work among directors takes the following form:	—	—	21	By area of specialization (14); by decision of the director-general (7); by a random mechanism (9); other (2).
Once a case has been assigned to a director, another director or the president of the agency can block the case	2	19	21	—
Any director has the power to veto a decision made by the board of directors	2	19	21	—
For the board of directors to deliberate and decide a qualified quorum is necessary	3	18	21	—
The board's decisions on most issues are based on:	—	—	21	Simple majority (19); qualified majority (2).
The decision-making process behind the agency's decisions is formally documented	20	1	21	—
And this documentation is legally required	18	3	21	—
If legally required, the document has to contain the action of all agents directly involved in the process	18	—	18	—
The document has to cite jurisprudence	7	3	18	Not necessarily (8).
Discussion and decisions of the directors are taken only within the board meetings without previous communication among directors	6	15	21	—
Informal meetings among directors and shareholders directly involved in issues being considered by the agency are legally prohibited	3	18	21	—
There is a legal authority for informal meetings among directors and shareholders directly involved in issues being considered by the agency	5	16	21	—
All information exchanged among directors and shareholders interested on a decision to be taken by the agency is formally documented	17	4	21	—
Citing jurisprudence to support a decision is required	9	12	21	—
Providing technical analysis to support a decision is required	17	4	21	—
Either a written brief or an oral discussion is necessary for a decision to be taken by the agency	14	3	18	Does not apply (1).
The issues to be discussed in board meetings are publicly announced ahead of the meeting	9	12	21	—
Board meetings are publicly announced ahead of time	8	13	21	—
Board meetings are opened to participation of shareholders affected by the decisions to be taken	10	11	21	—
Board meetings are opened to other entities and external organizations	10	11	21	—

Notes: Total number of agencies = 21. Number in parentheses indicates the total number of agencies that gave a particular answer.

Source: Survey questionnaire.

decisions are entitled to participate in the decision-making process. Participation varies: consumers, competitors, civil society, regulated firms, and other actors, all actively take part. This participation is legally ensured in a majority of the agencies, mostly by the enabling regulation and by internal rules. This participation takes place mostly in public hearings (12 agencies) but also in board meetings (8 agencies) and in the case of technical analyses (7 agencies).[30] As an indication of effectiveness, for 15 regulators such participation has led to changes in the agencies' decisions, which is positive from the governance perspective—because the participation is institutionalized and transparent.

With respect to the interaction between the regulator and the public, nine agencies make the issues to be discussed in the board meetings known to the public in advance. However, a smaller share (8 out of 21 agencies) publicly announces its board meetings before they take place, and 3 regulators allow both those affected by the decisions to be made and other entities and external organizations to join the board meetings.

Does Decision Making Improve over Time?
Of the 21 questions in the decision-making section, only 2 exhibited a statistically significant difference between "older" and "younger" agencies.[31] The first was the fact that "older" agencies tended to use a qualified quorum for board decisions more frequently than the "younger" agencies. The second was a greater share of "older" agencies that publicly announce the issues to be discussed in board meetings.

The first result seems to indicate that less attention has been given to the decision-making rules when new agencies have been created. This is, however, an important issue as the rule of decision making helps to strengthen technical coherence over time, consistency, and legitimacy. The second result may be interpreted as an indication that, over time, pressure to increase public participation in regulatory decisions—with obvious improvements in transparency—have generated positive outcomes.

Decision Tools
Survey results for the section on decision tools are shown in Table 4. The results are divided into four subsections: (a) the regulatory instruments, (b) legal means, (c) personnel, and (d) effect of the agency's age on agencies' decision tools.

Regulatory Instruments
Of the 8 regulatory instruments considered, 5 were available for more than 13 agencies: (a) methodology for annual tariff readjustment was available for 19

BOX 4

The Tyranny of Vested Interests

A key question is to what extent the public hearings allow for the incorporation of public participation regarding proposals and to what extent the process allows for "true" participation as opposed to organized (vested) interest. Public hearings for the Universalization Law lead by ANATEL between February and March 2003 provides a good illustration.[a] Data show that corporate interests offered the majority of both participation in public hearings and the effective suggestions made in the final text (two-thirds), of which roughly 24 percent were included. The overall conclusion from this case study was that participation by consumers in the regulatory process is still low. The sheer number of proposals made by business interests points not only to the higher organizational capacity of business but also to the fact that other diverse interests are inherently weak in competing with organized business in this pluralistic environment. To compensate for this imbalance, public funds should be made available to consumer associations and watchdogs.

This is hardly a specific problem of the Brazilian institutional environment, but rather a well-documented fact of the collective action problem. The case study, however, illustrates the need for a framework that takes into account the unfavorable conditions for public participation if the process is to offer a more balanced outcome.

a. Article 81 of law number 9472/1997.
Source: Based on Mattos (2004).

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agencies, (b) methodology for tariff revision was established in 17 regulators, (c) instruments for monitoring quality were developed by 14 agencies, (d) databases for regulatory accounting were available in 14 cases, and (e) instruments for monitoring technical standards were used by 13 regulators. More sophisticated instruments specially related to economic regulation—as opposed to technical regulation—were less available: (a) a methodology for five-year tariff revision was available only for 9 agencies, (b) benchmarking instruments were available in only 7 agencies, and (c) a methodology for defining interconnection tariffs was present in 3 agencies.[32]

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[30] Note that these percentages need not add to 100 percent because more than one kind of participation occurs in some agencies.

[31] See footnote 24.

[32] With respect to the methodology for "defining interconnection tariffs," it is important to take into account that not every agency regulates sectors in which interconnection is an issue.

Table 4. Decision Tools: Descriptive Results of Selected Questions

Issue	Results			
Regulatory Instruments	**Yes**	**No**	**Total**	**Other**
Regulatory instruments available to the agency are:	—	—	21	Database for regulatory accounting (14); methodology for tariff revision (17); methodology for annual tariff readjustment (19); instruments for monitoring quality (14); instruments for monitoring technical standards (13); methodology for defining interconnection tariffs (3); benchmarking (7); five-year revision (9).
The agency has the power and legal means to guarantee adherence to its decisions by the regulated entities	19	2	21	If Yes, those means are effective: yes: (18); no (1).
Legal means				
The agency has the power to resolve conflicts between existing firms and potential entrants	14	4	21	Does not apply (3).
The agency has the power to promote competition in the regulated market	15	6	21	—
The agency has the power to establish consumers' rights legislation in the regulated market	14	7	21	—
The agency has the power to financially punish actors in the regulated market for not complying with contracts	19	2	21	—
The agency has sufficient legal power and means to secure compliance with its decisions	19	2	21	If Yes, these means are effective: yes (17); no (2).
Personnel				
The share of the agency's staff admitted by public exams is:	—	—	21	20.7 percent (average).
The average length of employment of technical staff in the agency is:	—	—	21	Less than 6 months (0); between 6 months and 1 year (1); between 1 and 2 years (2); more than 2 years (18).
Technical staff has received training:	20	1	21	—
For the main technical and management positions, the initial salary (relative to the salary of the salary of the attorney general or secretary of finance) is:	—	—	21	Much higher (25% or more) (0); higher (between 25% and 10%) (0); about the same (2); lower (between 10% and 25%) (7); much lower (25% or less) (12).

Notes: Total number of agencies = 21. Number in parentheses indicates the total number of agencies that gave a particular answer.
Source: Survey questionnaire.

This result may be partially related to the supervisory role of several state agencies.

Legal Means
After consideration of regulatory instruments, it is important to check whether agencies have the legal means (such as warning concessionaires, issuing fines, and canceling concessions) to guarantee compliance with their decisions. The large majority (19 regula-

tors) has this legal apparatus available of which 17 agencies classify those means as "effective."[33] In addition, two-thirds of the surveyed agencies have the power to solve conflicts between existing firms and potential entrants and to establish consumers' rights

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[33] Other regulatory instruments are examined in table 3, such as the ability to impose fines, the power to set tariffs, and the power to arbitrate disputes, were not repeated in this section.

legislation in the regulated market.[34] Moreover, power was delegated to 15 agencies so that they promote competition in the regulated markets. Finally, 19 out of the 21 surveyed agencies have the power to financially punish the actors in the regulated market that do not comply with contracts.

Personnel

By mid-2005, approximately only 20.7 percent of the agencies' workforce had been admitted by public examinations.[35] A difference exists between the average percentage of civil servants admitted through public examinations in federal and state agencies: 26 percent in the former and 18 percent in the latter.[36] Salaries offered by agencies for top technical and managerial positions were considered to be much lower (at least 25 percent lower) than the salary of the attorney general or the state finance secretary—used as benchmarks—by 12 of the 21 surveyed agencies.[37] In 18 agencies, the average employment time of technical staff was superior to two years, indicating a relatively low turnover. Nonetheless, low salaries are the norm, which leads to a workforce with a "medium" degree of motivation.

In terms of technical qualifications, of the 14 agencies that provided data on this issue, 9 employed personnel with master's degrees, in which case they represented, on average, 4 percent of the staff members in that category. Only 6 agencies had employees with PhDs, representing 2 percent of their staff. Approximately 95 percent of the agencies' staff had undertaken short-term courses. On average, federal agencies have a better educated staff than state agencies.

Do Regulatory Agencies Acquire Better Decision Tools over Time?

The same test that was performed on autonomy-related questions to determine the effect of the agency's age was performed with the questions in this section. Three questions related to decision tools showed a statistically significant difference between the group of "older" and the group of "younger" agencies. "Older" agencies had a higher number of employees admitted by public examinations, they had a higher probability of having a specific position created for the agency linked to public examinations, and their employees tended to remain on the job for longer periods—that is, lower turnover of employees.[38] Although low labor turnover may be interpreted as a sign of mature labor relations, in the case of regulatory agencies and considering that salaries are, in general, not competitive, it may also indicate results of adverse selection.

Accountability

Table 5 provides some insights on the performance of Brazilian regulatory agencies' governance in terms of control and accountability. As for the other components, we analyze the age effect on agencies' accountability.

From a long list of institutions to which affected parties can appeal a decision by a regulatory agency, the two main ones are the agency itself (for 20 agencies) and the judiciary (for 18 agencies). This result indicates that, in practice, appeals are made in the first instance to the agency itself; if it does not result in a satisfactory solution, the judiciary is resorted to.

In five agencies, a case has reached the Supreme Court, which may not be such a small number if one considers the short period of existence of most agencies and the relative probability of such an event. Three of those cases were related to federal agencies: ANATEL, ANTAQ, and ANP; and three were related to state agencies: AGER, and AGR.

The results indicate that the General Attorney Office (*Ministério Público*) and General Accounting Offices (*Tribuniais de Conta da União/Estado*) do not play a significant role in the control of agencies, although they may have a deterrent effect against opportunistic behavior by the agencies that—because it is effective—results in little need for interference. The legislatures, in contrast, exert some control over 17 out of the 21 surveyed agencies. The three types of control considered were (a) holding public hearings, (b) summoning the directors, and (c) making requests for explanations. The agencies were asked to state whether each of those forms of control existed and what their efficiency was. To quantify the responses, we gave 3 points for a "very high," 2 points for a "high," 1 point for a "medium," and 0 point for "low" or "very low." Making requests for explanations scored highest with 17 points. Summoning the directors came second, with 16 points, and holding public hearings came third, with 14 points. For all three mechanisms state agencies indicated a higher level of control than federal agencies.[39]

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[34] Regulatory agencies with powers associated with these two issues are not necessarily the same.

[35] Public examinations are required for all civil service positions in Brazil and represent a situation of stable employment. Temporary positions also exist, but they do not offer the same sort of stability and benefits to employees. Because fiscal rigidities limit the number of civil servants, public organizations contract temporary employees.

[36] *P*-value of 0.06.

[37] This result was expected since the salary of the attorney general is typically the highest in the public sector.

[38] *P*-values of 0.00, 0.00, and 0.09, respectively.

[39] Results were statistically significant at the 10 percent level.

Table 5. Accountability: Descriptive Results of Selected Questions

Issue	Results			
	Yes	No	Total	Other
The institutions to which affected parties can appeal a decision made by the agency are:	—	—	21	Agency (20); judiciary (18); attorney general (3); ministry (1); governor (1); general accounting (1); antitrust office (1); consumer rights office (2); congress (0); state legislature (0); mayor (0).
The number of legal suits against the agency is:	—	—	21	None (8); between 1 and 10 (3); between 11 and 50 (2); more than 50 (8).
The legal instruments used to contest an agency's decisions were:	—	—	21	Informal request to the agency (2); formal recourse to the agency (12); petition to the governor (3); petition to the state attorney (0); recourse to the judiciary (12).
Results of legal suits against the agency have been:	—	—	9	Overwhelmingly for the agency (9); mostly against the agency (0).
A case has reached the Supreme Court:	5	16	21	—
The degree of interference of the attorney general in the agency's decisions is:	—	—	21	Very high (1); high (2); medium (2); low (9); very low (7).
The degree of interference of the General Accounting Office in the agency's decisions is:	—	—	21	Very high (1); high (1); medium (6); low (4); very low (9).
The legislature can exert control over the agency	17	4	21	—
Public hearings are held	15	6	21	If Yes, they are: oral (8); written (7).
There is evidence that public hearings have actually affected the decision-making process:	—	—	21	Changed the original project (16); retarded (11); blocked the original proposal (4); other (2).

Notes: Total number of agencies = 21. Number in parentheses indicates the total number of agencies that gave a particular answer.

Source: Survey questionnaire.

Finally, the results indicate that public hearings do in fact serve as important means to ensure control and accountability. Of the 21 surveyed agencies, 15 hold public hearings and those hearings have, in fact, affected the agencies' decisions by, at least once, changing the original proposal (16 agencies), retarding a decision (11 agencies), and, less frequently, blocking the original proposal (4 agencies).

Does Accountability Improve over Time?
Of the four dimensions analyzed, accountability was the one that demonstrated greater difference between "older" and "younger" agencies, with 10 of the 26 questions having statistically significant difference in means of responses. "Older" agencies were subject to the control of fewer other governmental offices, but they had a higher probability of using public hearings and public consultations—and those consultations were more frequent.[40]

"Older" agencies stated that they saw more evidence that the consultations have a discernable effect.[41] "Older" agencies also had more legal provisions to ensure the participation of external agents, as well as the forms of participation, and they had a higher number of such agents actually participating.[42] Finally, "older" agencies had greater participation of the consumer protection agency in their affairs.[43] The overall picture, thus, shows that the governance of "older" agencies is better established as regards to accountability and participation than that of "younger" agencies.

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[40] *P*-values of 0.09, 0.00, 0.05, and 0.07, respectively.

[41] *P*-value of 0.10.

[42] *P*-values of 0.03, 0.04, and 0.02, respectively.

[43] *P*-value of 0.09.

Summary of Results: Can Regulators Be Effective?

The analysis of the disaggregated data from the survey presented in this section shows significant variation in terms of several aspects of regulatory governance both among and within the 21 agencies. That is, not only do some agencies have better developed governance than others, but also some agencies are better endowed in some attributes than in others. Overall, the data show that considerable care was taken to follow good governance practices—for example, by formally endowing the agencies with mechanisms that provide autonomy, by formally delegating several powers (such as the right to impose fines), and by hardwiring in the enabling legislation the channels through which affected parties can participate in the regulatory process.

Nonetheless, several aspects have been neglected. One important factor relates to the consolidation of rules and procedures that govern the decision-making process. For example, the fact that the decision-making process must be formally documented in most agencies should be balanced against the fact that jurisprudence does not have to be cited as part of the fundament for the decision, increasing the degree of arbitrariness. Moreover, there are no legal impediments for board members to rig decisions prior to decision meetings in most of the cases and nothing precludes directors from participating in informal meetings or engaging in undocumented exchange of information with stakeholders. Another key aspect is related to the availability of appropriate means for decision making, particularly well-qualified staff and regulatory tools. Most of the agencies reported salary levels that may be interpreted as non-competitive; and entrance through public exams for permanent positions was rather rare. That may create an adverse selection problem, with agencies unable to attract the most qualified personal, as indicated by the low share of staff with graduate studies. More sophisticated instruments, especially those related to economic regulation—such as benchmarking instruments and methodologies for the establishment of interconnection tariffs—are available for a much smaller number of regulators. None of these problems seem to have been reduced over time.

Generally, we conclude from the analysis of the disaggregated data that, although many positive aspects exist overall in Brazilian regulatory agencies' governance (international comparisons will be shown in Section 4), room exists for improvements both in the aspects that the agencies themselves can control—such as ensuring increased participation and transparency—and in those aspects that depend on the legislation and the powers that have been delegated.

MEASURING AND BENCHMARKING GOVERNANCE

In this section, we propose and test three different approaches of measuring and benchmarking governance of infrastructure regulatory agencies in Brazil. The regulatory governance index (RGI-83) is our baseline indicator and represents an attempt to capture a wider set of attributes affecting governance, as compared to the existing indicators. The parsimonious index (RGI-43) is based on objective information and represents an effort to mitigate the problem of subjectivity that is somehow inherent in surveys such as the one we applied. Finally, we construct a third index (RGI-28) based on actual enforcement and practices of regulators, with the goal of assessing effectiveness instead of simple availability of formal attributes. In the remainder of the section, we explain the methodology for the construction of indexes, describe and compare the main results, and offer preliminary evidence on their determinants.

Methodology

Governance and its components are not straightforwardly quantifiable attributes. Survey information is, therefore, quantified according to the conceptual framework established in Section 2 to yield a single number between 0 and 1. Values close to 1 indicate better developed attributes, whereas those closer to 0 suggest otherwise. The better the attribute is, the higher will be its corresponding value and, therefore, the higher will be the overall governance index. We do not discriminate in the weight given to each attribute (that is, all of them have the same weight).[44] We also adopt the simplifying assumption that those attributes have a positive monotonic and constant relationship with governance.

The survey questions and the criteria used to score the answers are provided in Appendix 1. Values were then rescaled to set each agency's index to a similar distribution, allowing for comparison among agencies. The rescaled score for agency i for RGI-83 component j was

$$\tilde{I}_{ij} = \bar{I}_j + \frac{(I_{ij} - \bar{I}_j)}{SD_j} \qquad (4.1.1)$$

where $\tilde{I}_{ij}$ = rescaled score of agency i in component j, $\bar{I}_j$ = mean of component j, I_{ij} = original score of agency i in component j, and SD_j = standard deviation of component j.

To show how the survey responses were quantified, we provide a few examples here. Question 5 in the autonomy section of the questionnaire asks: "Has it ever happened that the line ministry, or the governor in the case of a state agency, has interfered formally or informally in the agency's policy-making process?" This question allows for a "yes" or "no" answer. If the answer was "no," a value of 1 was attributed to the agency in that question. If the answer was "yes," the agency received a 0.

As another example, question 23 in the decision-making section asks: "Are the agency's meetings open to the participation of other entities or external organizations?" A "yes" yielded a value of 1 and a "no" a value of 0. Some questions were not of a yes-or-no nature. Question 3 in the personnel section, for example, asks:

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[44] In each component, an average with equal weights was taken of all the questions asked (the number varies for each component). Because each question has a minimum value of 0 and maximum of 1, the component index ranged between 0 and 1. The weights were set equally because no theoretical basis exists for determining differentiated weights. Nevertheless, sensitivity analysis can easily be performed by altering the weights in the spreadsheets containing the data.

Table 6. Number of Questions and Weight in Each Version of the RGI per Subcomponent

Subcomponent	RGI-83		RGI-43		RGI-28	
	Number of questions	Weight	Number of questions	Weight	Number of questions	Weight
Autonomy	23	0.25	12	0.25	06	0.21
Decision tools	13	0.25	09	0.25	01	0.04
Decision making	21	0.25	10	0.25	06	0.21
Accountability	26	0.25	12	0.25	15	0.54
Total	83	1.00	43	1.00	28	1.00

Source: Authors' elaboration.

"The formal process for selecting directors (a) has clear rules; (b) has clear rules and is based on merit; (c) does not have clear rules; (d) is not based on merit." This question was quantified by assigning 0.5 points if (a) was chosen, 1 point if (b) was chosen, and 0 if (c) or (d) was chosen.[45]

RGI-83 is composed of 83 different attributes grouped in four components—autonomy, decision making, decision tools, and accountability—with a direct correspondence to the sections of the questionnaire.[46] The section on decision tools contains a subsection on personnel-related issues, and the control and accountability section contains a subsection on participation. To test the robustness of RGI-83, we recalculated the parsimonious index (RGI-43) using only 43 less subjective questions, thereby capturing the quality of governance with less ambiguity.

We created a de facto RGI (RGI-28) using the 28 questions related to actual practices of the regulatory agencies and excluding all other questions related to legislation and purely formal attributes of the agencies as an attempt to distinguish between formal rules and actual practices.[47] The 28 questions in RGI-28 are all weighted equally because there is no division among the four sub dimensions used in the original RGI-83.

Table 6 provides a general view of the composition of each of the three indexes and their components. Note that due to its composition, the de facto index is biased toward the attribute accountability and against decision tools. The implicit weight of the former attribute is 53 percent (the share of questions in that topic used in the index), double the value of 25 percent imposed in the other two indicators. In turn, the weight of the decision tools attribute drops from the imposed 25 percent to 3 percent.

Results of the Regulatory Governance Indexes

RGI-83

This section analyzes the results of the RGI-83 for 21 agencies at the national and subnational levels in Brazil.[48] First, we highlight the most important findings on similarities and discrepancies among agencies generated by the aggregated index (RGI-83) and its four institutional components (Table 7). The final rank for the RGI-83 is shown in Figure 3.[49] Also, we analyze the

[45] Clearly, there is some subjectivity as to what values are assigned. In part, this subjectivity is inherent in the nature of creating indexes whose task is to quantify aspects that do not present a direct metric unit.

[46] Some questions were not used to avoid duplication of information.

[47] Gutierrez (2003), for example, based his index on data taken primarily from legislation and recognizes the problems it can create: "Because the index tries to capture the objective aspects that a sound regulatory framework should have, it reflects the letter of law but not how the law is applied. When we assign a 1 to countries with legislation, that says regulators cannot be freely removed, we are assuming that this is accurate. However, day-to-day politics can deviate from legal theory. We did not attempt to correct for this by including the beliefs of practitioners or experts about the performance of a regulatory body (as in, say, the various rating systems for U.S. state regulatory agencies). The actual index reflects only the letter of the legislation and the day-to-day (year-to-year) evolution of regulatory tasks granted the regulatory authority."

[48] AGEAC from the state of Acre was not included because its questionnaire presented several missing answers. Perhaps this noninclusion resulted because the agency faces a very incipient phase of implementation without regulatory activities.

[49] Three state regulatory agencies (AGERGS, ARSAL, and ARTESP) complained about their RGI-83 scores during the one-day workshop at the World Bank in Brasilia on August 9, 2005. They were allowed to redo their answers to the questionnaire. A new RGI-83 was built using the questionnaires revised by those three state regulatory agencies. The new ranks of the RGI-83 and its four components can be found in Appendix 4. However, because of the possibility of strategic responses, it was decided to focus this research's analysis on the original responses.

Table 7. Scores of 21 Brazilian Regulatory Agencies on the RGI-83 and Its Four Components

Agency (state)	Sector	Autonomy	Decision Making	Decision Tools	Accountability	RGI-83
Federal						
ANATEL	Tel	0.5735	0.8292	0.8269	0.6942	0.7454
ANEEL	E	0.6896	0.8976	0.5160	0.5885	0.6980
ANP	P	0.6043	0.6841	0.7608	0.5962	0.6752
ANA	W	0.6583	0.6717	0.7448	0.2837	0.6159
ANTT	GTr	0.6591	0.6136	0.6154	0.4500	0.6036
ANTAQ	WTr	0.5500	0.8214	0.3962	0.5135	0.5993
State						
ASEP (RJ)	G, R, S, Tr	0.6078	0.7897	0.5000	0.5308	0.6318
AGERBA (BA)	E, G, R, Tr	0.4109	0.7190	0.7444	0.5077	0.6171
AGR (GO)	E, S, Tr, W	0.5022	0.7103	0.5385	0.5750	0.6020
AGEPAN (MS)	E, G, Tr	0.6326	0.6121	0.5692	0.5038	0.5972
AGERGS (RS)	E, R, Tr,	0.6217	0.7543	0.3775	0.5231	0.5946
ARPE (PE)	E, G, Tr, W	0.5787	0.5190	0.6154	0.5385	0.5756
ARSEP (MA)	E, S, Tr	0.3196	0.8444	0.4418	0.5423	0.5677
CSPE (SP)	E, G	0.5519	0.5071	0.5664	0.5154	0.5496
AGER (MT)	E, G, S, Tr	0.3478	0.7044	0.5654	0.4769	0.5495
ARSAL (AL)	E, G, S, Tr	0.5374	0.7032	0.3846	0.3942	0.5348
ARCE (CE)	E, G, S, Tr	0.4543	0.6302	0.4505	0.4577	0.5226
AGEEL (PB)	E, G	0.6507	0.5486	0.3385	0.3250	0.4921
ARTESP (SP)	Tr	0.5275	0.4000	0.5769	0.1942	0.4488
AAGISA (PB)	I, S, W	0.3754	0.5500	0.4023	0.2250	0.4212
ARSEP (RN)	E, G	0.3768	0.3583	0.4462	0.2250	0.3767
Mean	–	0.5348	0.6769	0.5418	0.4600	0.5723
Standard Deviation	–	0.1127	0.0212	0.1395	0.1361	0.0881

Note: E = electricity, G = natural gas, GTr = ground transportation, I = irrigation, P = petroleum, R = railroads, S = sewerage, Tel = telecommunications, Tr = general transportation, W = water, and WTr = water transportation.

Source: Authors' calculations.

relationship between the RGI-83 and the variability of its four components.

ANATEL, ANEEL, and ANP, the three best-ranked agencies, are the three oldest federal regulatory agencies of Brazil.[50] In addition, the RGI-83 index for those three agencies was above one standard deviation from the mean, which suggests that they are the institutionally best equipped regulatory bodies in Brazil. At the other extreme, three state regulatory agencies (ARSEP-RN, AAGISA, and ARTESP) presented the three lowest indexes of regulatory governance, which are below one standard deviation from the mean. In terms of age, those three agencies are the seventh (created in December 1999), the fourth (created in November 2001), and the second (created in January 2002) youngest state agencies, respectively. We found relatively small dispersion of

the RGI-83, but a clear cleavage exists between federal and state agencies—with some exceptions, such as ANTAQ, ASEP, and AGERBA. This statistical pattern is relatively similar for all four subcomponents of the RGI-83, as will be seen in Section 4.3.

The RGI-83 and the Variability of Its Components
Results presented in this section can be used to further analyze the contribution of each of the four components to the final RGI-83 score of each regulatory agency in Brazil. Agencies that presented higher RGI-83 scores tended to score higher—in a relatively uniform way—

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[50] Enabling legislation of federal regulatory agencies in Brazil is as follows: ANEEL (law number 9427/1996), ANATEL (law number 9472/1997), ANP (law number 9478/1997), ANA (law number 9984/2000), and ANTT and ANTAQ (law number 10233/2001).

Figure 3. Brazilian Regulatory Agencies: RGI-83 Rank
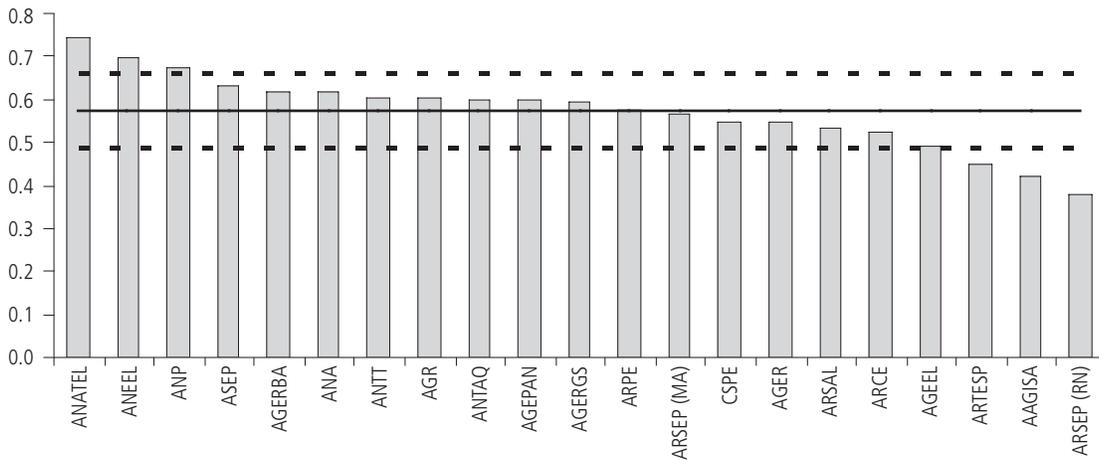
Note: One standard deviation from the mean (- - -), and mean (—).
Source: Authors' calculations.

Figure 4. Relationship between RGI-83 and the Variability of Its Components
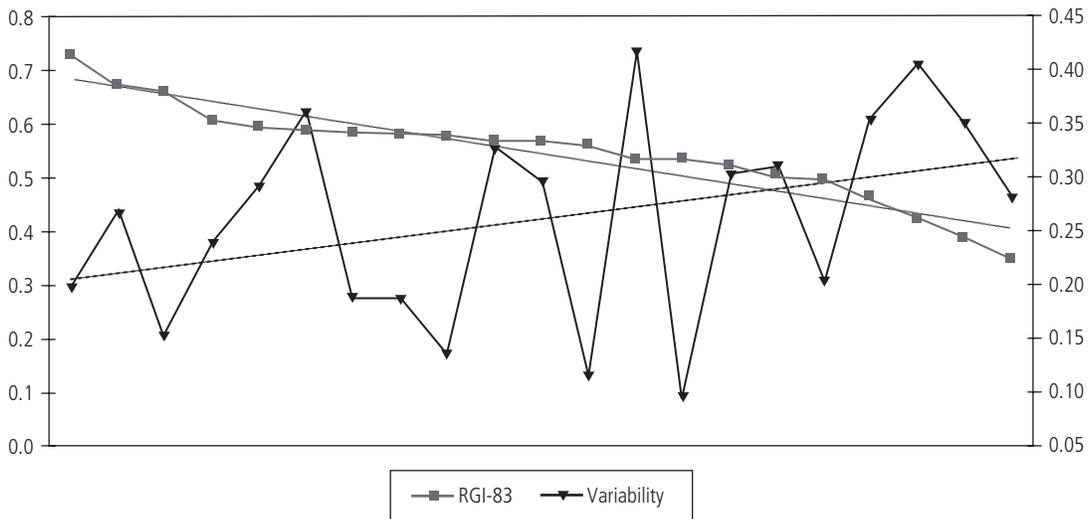
Source: Authors' calculations.

across the four index components, showing lower variability (that is, coefficient variation) among the contributions of each index component (figure 4).[51] Such a pattern, named the scissor pattern, was also found by the United Nations Conference on Trade and Development (UNCTAD 2005, 32) when computing the Trade and Development Index for 110 countries.

The RGI-83 and the coefficient of variability present a correlation of -0.42, indicating a negative and moderate linear relationship between them.[52] This finding

[51] The variability coefficient is equal to the ratio of the standard deviation over the means of the series under consideration. The measure is unit free and controls for possible scoring-scale effects.
[52] This correlation is significant at the 5 percent level.

Determinants of the RGI-83

To analyze the determinants of the RGI-83 for an agency i, a multiple linear regression model was developed, which is detailed in following equation:

$$RGI\text{-}83_i = \beta_0 + \beta_1 Age_i + \beta_2 Federal_i + \beta_3 Electricity_i + \beta_4 Gas_i + \beta_5 Oil_i + \beta_6 Sewerage_i + \beta_7 Transport_i + \beta_8 Water_i + e \qquad (1)$$

where β_0 is the constant term; β_j with $j = 1, 2, 3 \ldots 8$ is the coefficient of the independent variables, which are listed in the following Table; and e is the error term.[a]

Table. Independent Variables Considered in the Multiple Linear Regression Model for the RGI-83

Variable	Unit
Age	Months of operation from its creation to May 2005
Federal	Dummy for federal regulatory agency
Electricity	Dummy regulatory agency in the electricity sector
Gas	Dummy regulatory agency in the gas sector
Oil	Dummy regulatory agency in the oil sector
Sewerage	Dummy regulatory agency in the sewerage sector
Transport	Dummy regulatory agency in the transportation sector
Water	Dummy regulatory agency in the water services sector

The following table shows the results of the ordinary least squares (OLS) estimation with four variables having statistically significant coefficients.

Table. OLS Estimation on the Determinants of RGI-83

Variable	Coefficient	t-value
Constant	0.3507034***	5.94
Age	0.0013753**	1.98
Federal	0.1636898***	3.30
Electricity	0.0680736	1.39
Gas	-0.0135205	-0.35
Oil	0.0329052	0.46
Sewerage	-0.0022141	-0.07
Transport	0.0607813*	1.91
Water	0.0219985	0.59

Note: *Significant at a 10 percent level. **Significant at a 5 percent level. ***Significant at a 1 percent level. Number of observations = 21. R-square = 0.7171. F-value = 3.80. State is the omitted geographical category. Telecommunications is the omitted sector.

Continued

implies that whereas changes in the RGI-83 overtime could be regarded as a quantitative indication of trends in regulatory governance for Brazilian agencies, changes related to variability (decreases) could be seen as qualitative. Thus, both changes in the RGI-83 and in the variability coefficient could be used to track the progress of regulatory governance for regulatory agencies in Brazil.

Continued

The *F*-value of 3.80 leads us to reject the null hypothesis at the 95 percent confidence level.[b] Therefore, we conclude that at least one of the eight regression coefficients for the RGI-83 is different from 0 in the population regression equation. The value of R-square is approximately 0.72, which means that almost 72 percent of the observed variation in the RGI-83 is explained by the multiple linear regression of equation (1).

Federal regulatory agencies are relatively more likely to have a higher RGI-83 than state regulatory agencies. The positive and significantly coefficient on *Federal* is consistent with the view of institutional homogeneity, which means that there is a single legislative branch and a single executive branch delegating to all federal agencies. In contrast, for state agencies, the delegating powers are different for each Brazilian state. Everything else held constant, federal regulatory agencies would present a RGI-83 0.164 higher than state regulatory agencies. In addition, transport agencies at both the federal and the state levels are more likely to have a higher RGI-83, which increases by 0.061 if an agency regulates this sector. Finally, older agencies are relatively more likely to present a higher RGI-83, and if age increases by one month, all other things being equal, the marginal increase in the RGI-83 will be about 0.001.

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a. β_1 gives a measure of the marginal increase in age on the RGI-83. The other coefficients of the remaining independent variables—which are all dummy variables—give the change in the RGI-83 when the dummy variable has a value of 1 (as opposed to 0).

b. H_0: $\beta_j = 0$ with $j = 1, 2, 3 \dots 8$. Ha at least β_j with $j = 1, 2, 3 \dots 8$ is different from 0.

RGI-43

Results comparing the RGI-43 (that is, the parsimonious index) and the RGI-83 are shown in Figure 5. Those two indexes have a correlation coefficient *(r)* of 0.917, which indicates that the two variables present a positive and strong linear relationship and that the final results are very robust to the inclusion or exclusion of 40 subjective questions of the survey in the calculation of the final regulatory governance index.[53, 54]

No change in the three best ranked and the three worst ranked regulatory agencies is associated with this high correlation between the RGI-43 and the RGI-83 indexes. ANATEL, ANEEL, and ANP present the three highest RGI-43 indexes, but only for ANATEL and ANEEL was the score of the RGI-43 above one standard deviation from the mean. In contrast, ARSEP-RN, AAG-ISA, and ARTESP have the three lowest scores for the RGI-43—all three with RGI-43 scores below one standard deviation from the mean. We found relatively small dispersion of the RGI-43, but again a clear cleavage exists between federal and state agencies, with some exceptions. With the exception of the best ranked, the four agencies with the lowest scores for both the RGI-83

and the RGI-43 and ANATEL, all the surveyed regulatory agencies presented higher scores for the RGI-43 than for the RGI-83.

RGI-28

The RGI-28 (the de facto index) was created to capture procedures that are used by each regulatory agency.[55] To compare the RGI-28 with the RGI-83, we created an index including all 83 questions used in the RGI-83, but

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[53] A Spearman rank correlation test yielded a coefficient of 0.081, and, thus, we rejected the null hypothesis that the two indexes (RGI-83 and RGI-43) are independent (*P*-value of 0.00).

[54] Even though this high correlation between the RGI-83 and the RGI-43 was found, it is important to make it clear that one of the objectives of this research was using a comprehensive questionnaire not only to develop indexes of regulatory governance, but also to assess detailed information on 21 Brazilian regulatory agency. Thus, the information collected from the regulators was a plentiful and useful snapshot for a better understanding of the current situation of regulatory governance in Brazil.

[55] It is not correct to interpret the RGI-28 as a true snapshot of an agency's governance because some of the questions excluded from the RGI-28 measure important attributes of regulatory governance. The main idea behind creation of the RGI-28 is comparing the legal apparatus supporting a regulatory agency in Brazil with what is found in practice.

Figure 5. Brazilian Regulatory Agencies: RGI-83 and RGI-43 Ranks
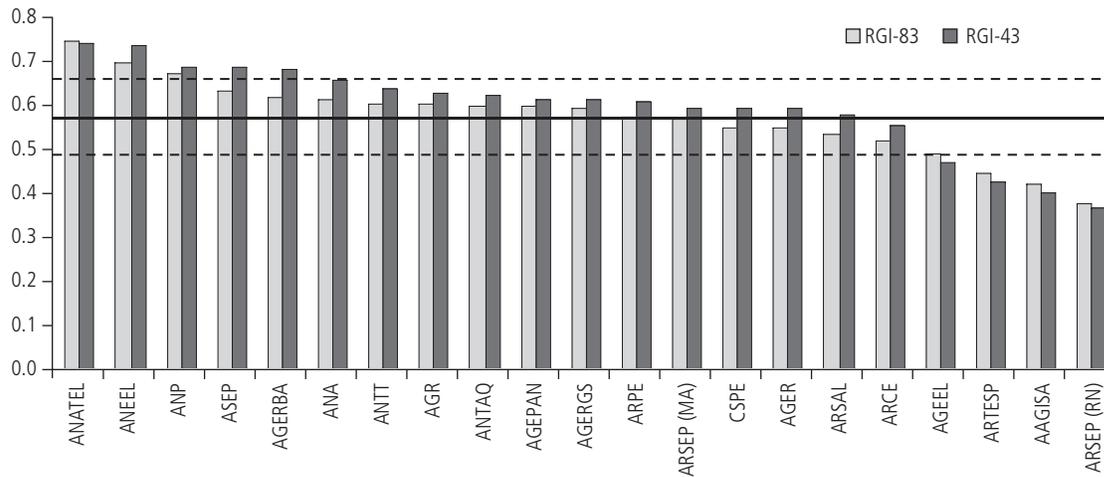
Note: One standard deviation from the RGI-43 mean (- - -), and RGI-43 mean (——).

Source: Authors' calculations.

we weighted each answer equally.[56] The correlation between the two indexes with 83 questions (with distinct weighting methodology) was 0.99. This result indicates that the two indexes with 83 questions present a positive and very strong linear relationship. Therefore, it was possible to compare the RGI-28 with the RGI using 83 questions equally weighted. In most cases, no statistical differences were found, and those two compared indexes presented a correlation of 0.704, which shows that they are positively related and the relationship between them is relatively strong.

Figure 6 shows that the three better ranked regulatory agencies in the RGI-28 were ANEEL, ARSEP-MA, and ARPE, but only for ANEEL and ARSEP-MA was the RGI-28 above one standard deviation from the mean.[57] This change in the ranking is notable, and the youngest state agency (ARSEP-MA) moved from the 13th position to the 2nd. On the other extreme, the three agencies with the lowest RGI-28 scores were ARTESP, ARSEP-RN, and AGEEL—all three with RGI-28 scores below one standard deviation from the mean. Thus, an important change occurred in how agencies were ranked when the RGI-28 is compared to the RGI-83 and the RGI-43.The agency with the largest difference in the scores of the RGI-28 and the RGI with 83 questions equally weighted was ARSEP-MA, which

was ranked first in the RGI-28. This may be an indication that ARSEP-MA may, in fact, have better governance than was shown in the original RGI-83. For the RGI-28, we found relatively more dispersion than for the RGI-83 and the RGI-43. In addition, no clear cleavage was found between federal and state agencies as was explicitly found for the two other regulatory governance indexes.

Deconstructing the RGI-83[58]

In this section, the RGI-83 is deconstructed according to its four components: autonomy, decision making, decision tools, and accountability.
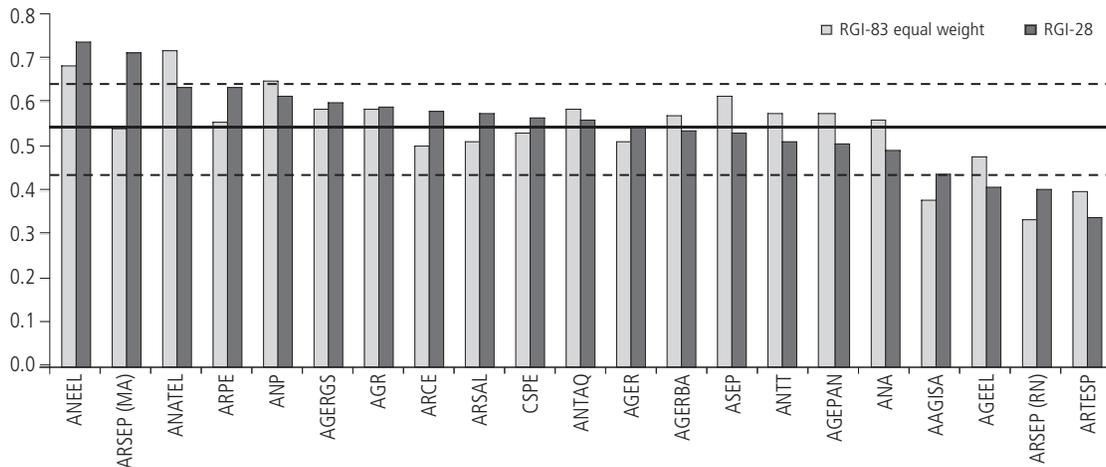
In the autonomy component of the RGI-83, the three best ranked regulatory agencies were the oldest federal agency, ANEEL; the youngest federal agency, ANTT; and the fourth-oldest federal agency, ANA. Those three agencies were above one standard deviation from the mean, suggesting that they are the most politically insulated agencies in Brazil, which is associated with the lowest regulatory risk for investors. At

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[56] See Table 6.

[57] The fourth- and fifth-best ranked agencies in the RGI-28 are ANATEL (federal, telecommunications) and ANP (federal, petroleum).

[58] See data displayed in table 7, which is also illustrated in Appendix 2.

Figure 6. Brazilian Regulatory Agencies: RGI-83 Equally Weighted and RGI-28 Rank

Note: One standard deviation from the RGI-28 mean (- - -), and RGI-28 mean (—).

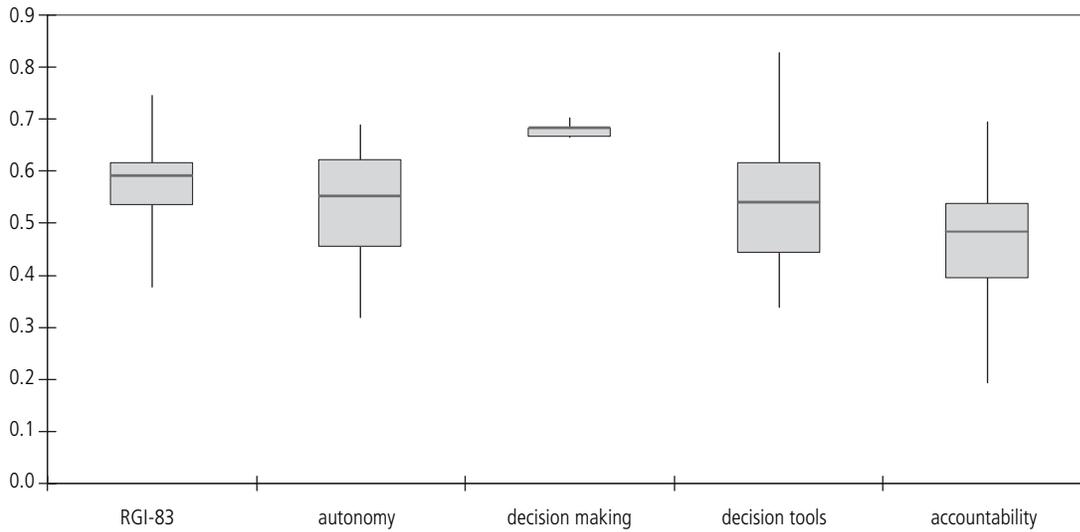Source: Authors' calculations.

the other extreme, three state regulatory agencies—ARSEP-MA, AGER, and AAGISA—presented the three lowest scores for the autonomy component of the RGI-83, which are all below one standard deviation from the mean. In terms of age, those three agencies are the first (created in April 2002), the ninth (created in January 1999), and the fourth (created in November 2001) youngest state agencies, respectively. We found relatively small dispersion of the score for the autonomy component, even though no clear separation exists between federal and state regulatory agencies. Finally, only state agencies (eight agencies in total) can be found below the mean for the autonomy component of the RGI-83.

With respect to the decision-making component of the RGI-83, the four best ranked regulatory agencies were the oldest federal agency, ANEEL; the youngest state agency, ARSEP-MA; the second-oldest federal agency, ANATEL; and the youngest federal agency, ANTAQ. Of interest is the age difference with respect to the two federal agencies and the state agency, which account for the three best ranked agencies in the decision-making component of the RGI-83. Those four agencies were above one standard deviation from the mean, suggesting that they are the best agencies in adopting administrative procedures, which induces ade-

quate compliance with rules and regulations. At the other extreme, three state regulatory agencies—ARSEP-RN, ARTESP, and CSEP—presented the three lowest scores for the decision-making component of the RGI-83, which are all below one standard deviation from the mean. In terms of age, those three agencies are the seventh-youngest (created in December 1999), the second-youngest (created in January 2002), and the oldest (created in October 1997) state agencies, respectively. Note that two of the three worst ranked agencies in the decision-making sphere of the RGI-83 are located in the most developed state of Brazil (São Paulo). We found relatively large dispersion of the score for the decision-making component, which ranged from about 0.3 to almost 0.9. Again, no clear separation between federal and state regulatory agencies was found, but only state agencies are found below one standard deviation from the mean for the decision-making component of the RGI-83—with the exception of ANTT.

In the third component of the RGI-83, decision tools, the four best ranked regulatory agencies were the fourth-oldest federal agency, ANA; the third-oldest federal agency, ANP; the third-youngest state agency AGEPAN; and the second-oldest federal agency, ANATEL. Those four agencies were above one standard deviation from the mean, suggesting that they have the

Note: The box plot is a graph of the five-number summary in which the central box spans from the first to the third quartiles, the line within the box marks the median, and vertical lines extend from the box out to the smallest and largest observations.
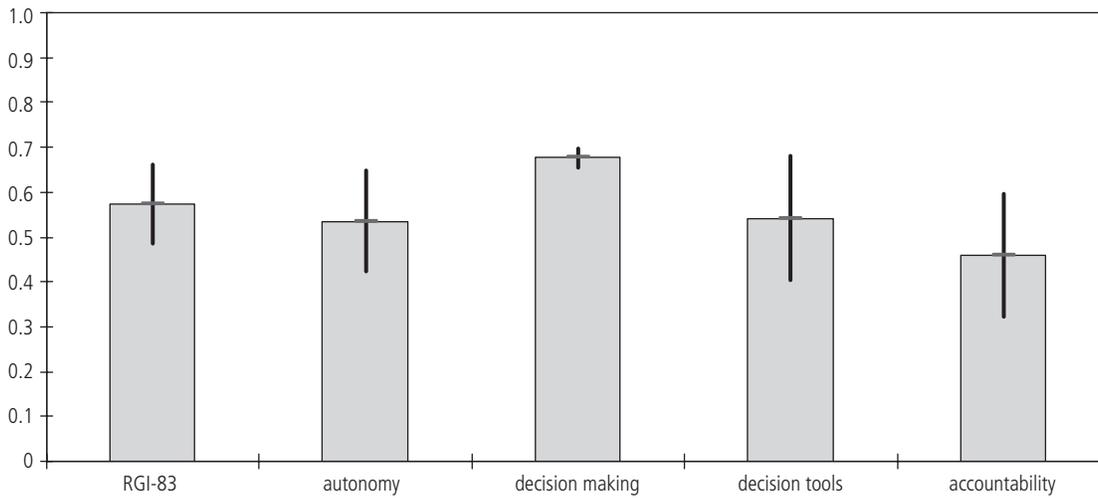
Source: Authors' calculations.

best decision tools available for their use in the regulatory process in Brazil, which include well-developed regulatory accounting systems, adequate methodologies for tariff setting, and availability of appropriate mechanism for quality monitoring. In contrast, three state regulatory agencies AGEEL, AGERGS, and ARSAL—presented the three lowest scores for the decision tools component of RGI-83, which are all below one standard deviation from the mean. In terms of age, those three agencies are the fourth-youngest (created in November 2001), the oldest (created in January 1997), and the fifth-youngest (created in September 2001) state agencies, respectively. Notably, two of the three worst ranked agencies in the decision tools sphere of the RGI-83 are located in the northeastern region of Brazil—the least developed region of the country. We found relatively small dispersion of the score for the decision tools component, which ranged from about 0.35 to about 0.75. However, there is a clear cleavage between federal and state regulatory agencies, with federal agencies ranking above the mean with the exception of ANTAQ.

With respect to the accountability component of the RGI-83, the three best ranked regulators were the same that were the best ranked in the overall RGI-83—the federal agencies ANATEL, ANP, and ANEEL. They are,

therefore, the most transparent agencies in Brazil with the most effective arrangements to allow other parties to appeal the regulator's decisions and the most efficient oversight tools. ANATEL was the only agency above one standard deviation from the mean. Similarly, the three worst ranked agencies in the accountability sphere were the same agencies that presented the three lowest overall scores for the RGI-83—ARTESP, ARSEP-RN, and AAGISA. All of them, together with ANA, presented scores in the accountability component below one standard deviation from the mean. We found relatively small dispersion of the score for the accountability component, which ranged from about 0.35 to about 0.75. No clear separation between federal and state regulatory agencies was found.

In addition, a comparison of the distribution of the RGI-83 and its four components is interesting. Figure 7 shows the box plots—graphs of the five-number summary—for each of them. The most dispersed distributions are for the decision tools and accountability components, while the distribution of the decision-making component presents the lowest spread. Two components of the RGI-83—autonomy and decision tools—present a very similar median, but the data related to the latter are more variable. All components of the RGI-83

Figure 8. Brazilian Regulatory Agencies: Distribution of the RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.

Source: Authors' calculations.

and the index itself present a left-skewed distribution, except for the decision tools component.

Another numerical description of the distribution of the RGI-83 and its four components can be made using their means and standard deviations. The means for each variable are as follows: 0.57 for the RGI-83, 0.53 for autonomy, 0.68 for decision making, 0.54 for decision tools, and 0.46 for accountability. Thus, only the decision tools component presents a mean that is higher than the mean of the RGI-83 index. As seen with the box plots, the decision tools and accountability components present the largest variation (that is, the largest standard deviations), while decision making presents the lowest variation (Figure 8).

Looking at Regulators

Federal versus State Regulatory Agencies

One way of comparing federal to state regulatory agencies is verifying the means of the RGI-83 and its four components (autonomy, decision making, decision tools, and accountability) for each group. Because federal regulatory agencies present higher means in the RGI-83 and its four components than do state regulatory agencies, we tested the null hypothesis (no difference between the means for each category) against the alternative hypothesis of federal regulatory agencies having higher means in every characteristic than state regulatory agencies.

Results are presented in table 8, statistical difference was found in all components, but accountability.

The results show that, on average, federal regulatory agencies have scores in the autonomy component 22 percent higher than those of state regulatory agencies, which indicates that federal agencies are more insulated from interests of regulated industries and show higher degrees of financial and political autonomy. One of the factors related to this difference is the fact that most state regulators oversee several industries, whereas federal regulators oversee a specific infrastructure industry. Except for transportation, however, none of the sectors is under the exclusive jurisdiction of states. Therefore, the state agencies regulate sectors by virtue of agreements with the federal (e.g., energy) or the municipal (e.g., water and sanitation) governments.

On average, federal regulatory agencies present scores in the decision-making component 25 percent higher than those of state regulatory agencies. This result indicates that federal agencies have been better at adopting standard administrative procedures than state agencies. We speculate that this finding might be related to the fact that federal regulators present a high degree of institutional homogeneity, whereas state agencies differ significantly in their institutional design.

With respect to the decision tools component, on average, federal regulatory agencies present scores 26

Table 8. Means of RGI-83 and Its Four components for Brazilian Federal and State Regulatory Agencies

Characteristic	Federal (N = 06)	State (N = 15)
RGI-83***	0.656	0.539
Autonomy**	0.641	0.524
Decision making*	0.666	0.533
Decision tools**	0.716	0.567
Accountability	0.602	0.532

Notes: Null hypothesis: $\overline{X}_{Federal} = \overline{X}_{State}$. Alternative hypothesis: $\overline{X}_{Federal} > \overline{X}_{State}$. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

Source: Authors' calculations.

percent higher than state regulatory agencies, which points out that federal agencies have more developed and appropriate tools available for their use in the regulatory process. Those tools include well-developed regulatory accounting systems, adequate methodologies for tariff setting, availability of appropriate mechanisms for quality monitoring and more qualified, and better selected personnel.

Finally, federal regulatory agencies present, on average, an RGI-83 22 percent higher than those that regulate at the state level.

Old versus New Regulatory Agencies

In addition to comparing federal to state regulatory agencies, we compared the means of the RGI-83 and its four components between two distinct age groups: "older" and "younger."[59] Because "older" regulatory agencies present higher means in the RGI-83 and its four components than "younger" agencies, we tested the null hypothesis (no difference between the means for each age group) against the alternative hypothesis of "older" regulatory agencies having higher means in every characteristic than "younger" regulatory agencies. Results are presented in table 9, statistical difference was found in the RGI-83 and the decision tools and accountability components.

On average, "older" regulatory agencies have scores in the decision tools component 23 percent higher than those of "younger" regulatory agencies, which indicates that "older" agencies are better at adopting standard administrative procedures than "younger" agencies. In addition, with respect to the accountability component, on average, "older" regulatory agencies present scores 24 percent higher than those of "younger" regulatory agencies, which points out that "older" agencies have better oversight and transparency mechanisms than new agencies—a fact that might be related to the time the

learning process takes. Finally, "older" agencies present, on average, an RGI-83 16 percent higher than "younger" ones.

Selected Cases[60]

ANATEL

ANATEL is the second-oldest Brazilian federal regulatory agency, which was created in 1997 by law number 9472. ANATEL was positioned first in the RGI-83 ranking, but it holds the 10th place in the autonomy component.[61] ANATEL's scores are above one standard deviation from the mean for every component but autonomy. Its financial autonomy is limited as its resources have been significantly impounded by the executive in recent years. It never had its own career staff, and, in spite of having highly qualified personnel, the fact that a significant share of its staff was recruited from other institutions weakens its score in the decision tools component.[62] But it is still the best equipped regulatory agency in Brazil and favorably compares with its counterparts in Latin America.[63]

ANEEL

ANEEL was created in 1996 by law number 9427. The regulator performs well (one standard deviation above the mean or close to it) in three out of the four components of the RGI-83, with the result being particularly high for the decision-making attributes. Surprisingly, it scores below the sample average in terms of access to decision tools. This may be related to the fact that a

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[59] For information on agencies belonging to the "older" and the "younger" groups, see footnote 23.

[60] See data displayed in table 7, which is also illustrated in Appendix 3.

[61] See box 2 on budgetary impoundments.

[62] In addition, two of ANATEL's directors suffered strong pressure to resign from their posts .

[63] For international comparison for ANATEL, see Gutierrez (2003).

Table 9. Means of RGI-83 and Its Four Components for Old and New Brazilian Regulatory Agencies

Characteristic	Old (N = 09)	New (N = 12)
RGI-83***	0.620	0.536
Autonomy	0.562	0.553
Decision making	0.616	0.537
Decision tools**	0.682	0.554
Accountability***	0.621	0.500

Note: Null hypothesis: $\overline{X}_{Old} = \overline{X}_{New}$. Alternative hypothesis: $\overline{X}_{Old} > \overline{X}_{New}$. ***Significant at the 1 percent level. **Significant at the 5 percent level.

Source: Authors' calculations.

relatively small share of its actual employees and a large share of its temporary workers are not part of its career staff.

ANP

ANP was created in 1997 by law number 9478. It performs relatively well in the decision tools component and relatively poorly in the decision-making dimension. It presented small variability among the RGI-83 components. Observers claim that ANP has suffered less executive interference.[64] It is common knowledge, however, that price and tariff adjustments in the Brazilian oil sector are strongly influenced by the Ministry of Finance. Although most of ANP's board decisions are preceded by technical reports, its decision-making process is considered centralized, and neither a fixed deadline nor an institutional mechanism exists to force members of the board to reach a decision.

ANTAQ and ANTT

ANTAQ and ANTT—water and ground transportation, respectively—are the two youngest federal regulatory agencies, created in 2001 by law number 10233. ANTAQ and ANTT scored poorly in the decision tools and decision-making components of the RGI-83, respectively. ANTAQ's decision tools are either almost absent or, when in place, weak. For example, ANTAQ does not have an electronic database for regulatory accounting, monitoring and oversight checking processes, quality control of services offered by regulated firms, methodology for tariff adjustments and revisions, rules to protect consumer rights, or rules for arbitration of conflicts between rival firms. ANTT presented weak results in the decision-making component of the RGI-83 because its decisions are centralized, which can be clearly seen in its answers to questions on transparency (low), access of the general public to its meetings and to the board members' decisions (low), announcements

about meetings (not in advance), and ways of publicizing its decisions (absent). ANTT did not score well in the accountability dimension of the RGI-83—below the mean either.

ASEP (Rio de Janeiro)

ASEP is the second-oldest state regulatory agency, created in February 1997 by state law number 2686 to regulate Rio de Janeiro's natural gas, railroads, sewerage, and transportation sectors. It is among the five state regulatory agencies that scored above the mean in the RGI-83.[65] It has been argued that the main motivation behind this institutional change was the need of the current government to "tie the hands" of the next state government administration.[66] ASEP excelled in its performance in all RGI-83 components (scoring above the mean) except decision tools. Interestingly, ASEP was recently divided into two distinct agencies: AGENERSA to deal exclusively with electricity and sewerage matters, and AGETRANSP to regulate the transportation sector.[67]

AGR (Goiás)

AGR was created in November 1999 by state law number 13550 to regulate Goiás's electricity, sewerage, transportation, and water sectors. AGR scored above the mean in every RGI-83 component but autonomy. One of the remarkable aspects of its high RGI-83 score (it was ranked in 8th place) was its performance in the accountability component. AGR is accountable to the state accounting office, the state assembly, the state executive, and the general public on various matters, including administrative efficacy and economic efficiency. In terms

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[64] See Mueller and Pereira (2002).
[65] The other four agencies are AGEPAN, AGERBA, AGERGS, and AGR.
[66] See Melo and Pereira (2004).
[67] State laws number 4555 and number 4556 of June 6, 2005.

of decision tools, AGR is well equipped with most regulatory instruments, such as means of making tariff adjustments, instituting technical guidelines, and resolving conflicts among existing and new firms.

ARSEP-RN (Rio Grande do Norte)
ARSEP-RN was created in December 1999 by state law number 7463 to regulate Rio Grande do Norte's electricity and gas sectors, but progress in improving its institutional design seems to have been limited. Even though the regulatory agency is not young, it scored relatively low in all RGI-83 components—below one standard deviation from the mean in the autonomy, decision-making, and accountability components and below the mean in the decision tools component. ARSEP-RN is not equipped with regulatory instruments; does not have adequate personnel, autonomy, and leadership; and shows a low participatory level of other stakeholders in the sectors it regulates—in addition to weak accountability mechanisms. For example, although the state governor could not simply dismiss the board of directors, he kept their appointments on standby, and directors have been earning salaries without carrying out regulatory activities.

ARSEP-MA (Maranhão)
ARSEP-MA is the youngest regulatory state agency, created in April 2002 by state law number 7734 to regulate Maranhão's electricity, sewerage, and transportation sectors. It presents an interesting oscillating pattern among the four RGI-83 components. For example, in the RGI-83 component of decision making, ARSEP-MA ranked 2nd among the 21 Brazilian regulatory agencies—above one standard deviation from the mean. At the same time, it performed very poorly in the autonomy and decision tools RGI-83 components (it held the last place among all agencies).

International Comparison

The creation of indexes to measure aspects of economic, political, and social behavior that are not directly quantifiable is a research field that has developed remarkably in the past years. In this study, we created an index of regulatory governance (RGI-83) that quantifies the governance situation of 21 Brazilian federal and state regulatory agencies as detailed in the Section 3.

In this section, we compare the RGI-83 to two other studies that developed indexes to measure the state of governance of regulatory agencies. The methodologies developed by the Asian Development Bank/National Economic Research Associated, or ADB/NERA

(Holder and Stern 1999), and by Gutierrez (2003) were applied to the data collected with 21 Brazilian regulatory agencies in order to compare the three distinct methodologies.

The ADB/NERA (Holder and Stern 1999) study assessed the state of regulatory governance in six Asian countries (Bangladesh, India, Indonesia, Malaysia, Pakistan, and the Philippines), using information compiled on six governance aspects. The data were used to assign a value between 1 (poor governance) and 5 (good governance) to each of the six governance aspects of each agency, which were then added to the final value in the interval [6, 30]. Gutierrez (2003) created regulatory governance indexes for the period 1980–2001 for the telecommunications sector of 25 Latin America countries with the objective of capturing inter-temporal indicators of regulatory governance. His index comprised eight questions on the presence of a rule or aspect; each question was assigned a value of either 0 (component is not present) or 1 (component is present).[68] The final index was equal to the average of the scores assigned to each question.[69]

The replication of the ADB/NERA methodology developed for the regulatory governance index for Brazilian agencies is shown in Table 10. In this process, we used the sum of answers for each of the six governance aspects and then performed a linear transformation for the final values so that scores assigned for each individual component would be in the interval [1, 5]. The score of the index was the sum of the scores of each of its individual components—interval [6, 30]. On average, Brazilian regulatory agencies presented higher ADB/NERA index scores than Asian agencies, and also showed smaller variance.[70] The correlation between the ADB/NERA index and the RGI-83 is 0.872, which indicates that the two indexes present a positive and strong linear relationship.

Using the ADB/NERA methodology, the four best ranked agencies were ANATEL, ANEEL, ANTT, and AGR. The ADB/NERA index for those four agencies was above one standard deviation from the mean. In comparison with the RGI-83, two of the best ranked agencies kept their positions—ANATEL (1st) and

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[68] In our replication, some questions were assigned values in the interval [0, 1].
[69] For a summary of those two methodologies and the one developed in this study of 21 Brazilian regulatory agencies, see Appendix 6.
[70] Mean = 21.905, Standard Deviation = 2.606, Maximum = 27.000, and Minimum = 16.000.

Table 10. Replication of the ADB/NERA Index for 21 Brazilian Regulatory Agencies

Agency (state)	Clarity	Autonomy	Participation	Accountability	Transparency	Predictability	ADB/NERA index
ANATEL	4.83	4.75	4.20	3.97	4.73	5.00	27
ANEEL	4.83	4.45	4.04	3.23	4.73	5.00	26
ANTT	4.83	4.09	3.08	3.78	4.73	3.40	24
AGR (GO)	4.67	3.25	4.00	3.49	4.73	3.40	24
ANP	4.00	3.65	4.16	3.50	4.33	3.40	23
ASEP (RJ)	4.33	4.00	3.12	3.52	4.07	4.20	23
AGEPAN (MS)	4.17	4.60	3.76	2.74	4.87	2.60	23
CSPE (SP)	4.33	3.02	3.60	3.37	4.60	4.20	23
ANTAQ	3.80	3.50	3.08	3.38	5.00	3.16	22
AGERGS (RS)	3.27	4.65	4.16	3.09	4.33	2.12	22
ARPE (PE)	4.67	3.50	3.36	2.54	4.07	3.40	22
ARSEP (MA)	3.17	3.40	4.16	3.00	4.87	3.84	22
AGER (MT)	3.33	3.71	3.44	3.71	4.60	3.04	22
ARCE (CE)	4.60	3.40	3.80	3.15	3.13	3.72	22
AGEEL (PB)	5.00	4.40	1.96	2.86	3.40	4.20	22
AGERBA (BA)	4.33	2.69	3.96	2.49	4.20	3.40	21
ARSAL (AL)	3.53	3.00	3.16	2.11	4.60	4.84	21
ANA	4.17	3.72	2.28	2.67	4.87	2.60	20
ARTESP (SP)	4.00	3.30	1.16	3.06	3.40	2.60	18
ARSEP (RN)	4.33	2.50	1.00	2.80	2.07	4.20	17
AAGISA (PB)	3.67	2.11	1.00	2.06	3.60	3.40	16

Source: Authors' calculations based on Holder and Stern (1999).

ANEEL (2nd)—while ANP moved from 3rd to 4th place and ANTT and AGR improved their positions from 7th and 8th places, respectively, to 3rd place in the ADB/NERA index ranking.

Three state regulatory agencies—AAGISA, ARSEP-RN, and ARTESP—presented the three lowest ADB/NERA indexes, which are all below one standard deviation from the mean. Those are the same agencies that presented the three lowest RGI-83 scores, with the difference that AAGISA and ARSEP-RN changed positions with each other in the ADB/NERA rankings in comparison with the RGI-83. A clear cleavage exists between federal and state agencies, with some exceptions, such as ANA, ANTAQ, and AGR. This statistical pattern is about the same for all six components of the ADB/NERA index.

The replication of the Gutierrez (2003) regulatory methodology developed for the regulatory governance index for Brazilian agencies is shown in Table 11. In this process, we used the sum of scores assigned to each of the eight answers (0.0 or 0.5 or 1.0) and weighted them equally by 0.125 to keep the final index score in the interval [0, 1].[71] The correlation between the Gutierrez (2003) index and the RGI-83 is 0.350, which indicates that the two indexes present a positive and weak linear relationship.[72] Using the Gutierrez (2003) methodology, the four best ranked agencies—all presenting the highest score of 1—were ANATEL, ANTT, AGEPAN, and AGER.[73]

In comparison with the RGI-83, one of the better ranked agencies kept its position (ANATEL) whereas the other three significantly improved their ranking in the Gutierrez (2003) index in comparison to the RGI-83. In Gutierrez (2003), who focused on telecommunications

[71] Mean = 0.816, Standard Deviation = 0.132, Maximum = 1.000, and Minimum = 0.500.

[72] We believe that this low correlation between the Gutierrez (2003) and RGI-83 indexes is related to the difference in the number of questions composing each index—the first is based on 8 questions, and the latter on 83.

[73] Gutierrez (2003) stresses that reaching an index score of 1 does not mean that the agency has reached "complete regulatory governance" but simply that it has "advanced well in all the regulatory factors included in the index."

Table 11. Replication of the Gutierrez Regulatory Framework Index Applied to 21 Brazilian Regulatory Agencies

Agency (state)	Separation	Legal mandate	Financial and budgetary independence	Removal of directors	Clear mechanisms for resolving disputes	Fines	Agency determines tariffs	Hearings to determine tariffs	Regulatory framework index
ANATEL	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.000
ANTT	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.000
AGEPAN (MS)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.000
AGER (MT)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.000
ARCE (CE)	1.0	1.0	1.0	0.5	1.0	1.0	1.0	1.0	0.938
ANP	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.875
ARPE (PE)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.875
CSPE (SP)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.875
ANEEL	1.0	1.0	1.0	1.0	0.5	1.0	1.0	0.0	0.813
ASEP (RJ)	1.0	1.0	1.0	1.0	0.5	1.0	1.0	0.0	0.813
AGERBA (BA)	1.0	1.0	0.0	0.5	1.0	1.0	1.0	1.0	0.813
ARSAL (AL)	1.0	1.0	1.0	0.5	1.0	1.0	1.0	0.0	0.813
AAGISA (PB)	1.0	1.0	1.0	0.5	1.0	1.0	0.0	1.0	0.813
ANTAQ	1.0	1.0	0.0	1.0	0.5	0.5	1.0	1.0	0.750
AGR (GO)	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	0.750
AGERGS (RS)	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.750
ARTESP (SP)	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	0.750
ARSEP (MA)	1.0	1.0	0.0	0.5	1.0	1.0	0.0	1.0	0.688
ARSEP (RN)	1.0	1.0	1.0	0.5	0.0	1.0	0.0	1.0	0.688
ANA	1.0	1.0	1.0	1.0	0.0	1.0	0.0	0.0	0.625
AGEEL (PB)	1.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0	0.500

Source: Authors' calculations based on Gutierrez (2003).

agencies in his index, ANATEL was assigned a score of 0.896 for the period 1996–2001, whereas it received the maximum score when we replicated this index—which might be related to governance improvements achieved by the agency in the period 2001–2005.

At the other extreme, the three agencies with the lowest scores were AGEEL, ANA, and ARSEP-RN, but only the scores of ANA and ARSEP were below one standard deviation from the mean. Only ARSEP-RN was among the regulatory agencies that presented the three lowest RGI-83 scores, whereas AGEEL's and ANA's position decreased by 1 and 14 places, respectively, in comparison to the RGI-83 rank. No clear separation exists between federal and state agencies.

5.

CONCLUSIONS AND RECOMMENDATIONS FOR REGULATORY IMPROVEMENTS

In the 1990s, the Latin America and Caribbean (LAC) region embarked on the so-called first generation of reforms in the infrastructure sector, which involved privatization, deregulation, and restructuring of service provisions. As a result, remarkable changes occurred in the role of the state with respect to the provision of infrastructure services. Following privatization several independent regulatory bodies were created all over the region and the view was that an appropriate regulatory environment would naturally emerge.

Currently, however, prospects for private participation in infrastructure are far less optimistic, and regulatory risk, or at least its perception among private investors, appears to have increased. Regulatory governance, broadly understood as the conditions for the enforcement of laws and contracts by regulators, is an important component of regulatory risk. Market-friendly legislation and well-designed contracts may be innocuous if regulators are poorly equipped or face the wrong incentives for appropriate enforcement.

Brazil was no exception. With more than US$100 billion in private investments during the 1990s, success of infrastructure reforms in Brazil seemed inevitable. The first federal regulatory agency (ANEEL) was set up in December 1996 to regulate the electricity market. Between 1996 and 2005, at least 28 regulatory agencies were established in Brazil either at the federal or the state level. During this period, sector legislations have been established and subsequently changed, contracts have been unilaterally renegotiated, and public support for private participation in infrastructure has reduced. Yet, only limited assessment of the state of regulatory governance in Brazil has been available so far.

The objective of this report is twofold: to provide a comprehensive assessment of the state of regulatory governance in infrastructure industries in Brazil, and to suggest possible indicators for future monitoring. After the introduction, Section 2 set up the analytical frame-work for the report, identifying key components of regulatory governance, namely, autonomy (political and financial), procedures for decision-making, "instruments" (including personnel), and accountability. Section 3 assessed each of these components in practice, reporting the results of a survey with 21 regulatory agencies in Brazil, which designed and implemented by the research team in 2005. Section 4 measured regulatory governance based on three related indexes, ranked the Brazilian regulators among themselves, and compared the proposed indexes with other two indicators available in the literature.

Main conclusions from Section 3 are as follows:

- **Autonomy:** for almost every surveyed agency, power delegation was appropriate. However, one-third of the directors did not complete their terms; most agencies complain about the impact that budget impoundments have on their financial autonomy; in 13 agencies, ministries or state governments have interfered in the agency's decision-making process (with a higher incidence among state agencies); and, 6 state agencies have no legal restrictions for dismissing directors.

- **Decision Making:** Eighteen out of the 21 surveyed agencies are legally required to formally document the decision-making process, detailing the actions of each actor involved; however, only 8 regulators are required to cite jurisprudence in support of their decisions, weakening the consistency of regulatory decision over time. In addition, formal documentation of the decision-making process is legally required and must contain every legal action of those actors directly involved in the process. Also important, only in the case of 6 regulators, decisions are taken without previous communication and discussion among board members. In addition, only in 3 (out of 18) agencies, a legal apparatus prohibits informal meetings of directors with stakeholders. Participation, however,

is substantial since in 17 agencies, external actors and those affected by the agencies' decisions are entitled to take part in the decision-making process, and such participation has led to changes in their decisions in 15 agencies.

- **Decision Tools:** Five out of the 8 regulatory instruments were available for more than 13 agencies. More sophisticated instruments specially related to economic regulation (as opposed to technical regulation) were less available. Almost all surveyed agencies considered themselves to have the power and legal means to secure compliance with their decisions; however, one-fifth of the agencies' personnel was admitted by public exams (this share was higher for older agencies than for the newer ones)—with this share being 26 percent and 18 percent among federal and state agencies, respectively. approximately 95 percent of the agencies' staff had undertaken short-term courses. Staff also present low turnover rates. Nonetheless, low salaries are the norm, which lead to a workforce with a "medium" degree of motivation. Out of 14 agencies, 9 employed personnel with master's degrees (4 percent of their staff) and 6 agencies had employees with PhDs (2 percent of their staff).

- **Accountability:** Congress and state Legislatures exert some control over 17 agencies, which include (a) public hearings, (b) summoning the directors, and (c) making official requests for explanations. In one-forth of the agencies, at least one case has been settled by the Supreme Court. Public hearings do affect agencies' decisions, as they have caused changes in decisions at least once in 15 agencies.

Main conclusions from Section 4 are as follows:

- **The Governance Ranking:** overall, ANATEL, ANEEL, and ANP were the three best ranked agencies in terms of regulatory governance (RGI-83 and RGI-43). On the other hand, three state agencies (ARSEP-RN, AAGISA, and ARTESP) presented the lowest scores. RGI-83 and RGI-43 distributions present small dispersion with a clear cleavage between federal (with higher scores) and state agencies. One caveat to this result is that when RGI-28 was computed ANEEL, ARSEP-MA, and ARPE were three best ranked agencies, which suggests that the difference between having governance attribute and implementing it may be significant.

- **RGI Components:** the means for each component were 0.53 for autonomy, 0.68 for decision making, 0.54 for decision tools, and 0.46 for accountability. Thus, only the decision-making component presents a mean that is higher than the mean of the RGI-83 index. The decision tools and the accountability components present the largest variation (that is, the largest standard deviations), while decision making presents the lowest variation. Moreover, it was found that federal agencies have scores in the autonomy, decision-making, and decision tools components of the RGI-83 22 percent, 25 percent, and 26 percent higher, respectively, than state agencies. Similarly, older agencies present scores in the decision tools and accountability dimensions of the RGI-83 23 percent and 24 percent higher, respectively, than younger agencies.

- **International Comparison:** when the RGI-83 was compared to the ADB/NERA (Holder and Stern 1999), it was found that, on average, Brazilian agencies presented higher ADB/NERA index scores, with a smaller dispersion, than Asian regulators. The cleavage between federal and state regulatory agencies persisted and the three top-ranked agencies using the ADB/NERA methodology were the federal agencies ANATEL, ANEEL, and ANTT, and the three agencies with the lowest scores were the same as the ones using the RGI-83 methodology. The correlation between the replicated ADB/NERA index and the RGI-83 is 0.872. In addition, survey data were used to replicate the methodology developed by Gutierrez (2003). Major changes occurred in the index rank, with ANATEL, ANTT, AGEPAN, and AGER presenting the highest possible score (1.00) and AGEEL, ANA, and ARSEP-RN ranked in the three lowest positions. The correlation between the replicated Gutierrez (2003) index and the RGI-83 is 0.350.

In summary, this report concluded that (a) the level of regulatory governance is relatively similar among the 21 Brazilian regulators surveyed, (b) there is a clear cleavage between federal and state regulatory agencies, (c) formal attributes do not always translate into effective governance (even though the data suggest that agencies improve over time), and (d) independence and accountability attributes are more developed than regulatory means and instruments (particularly qualified personnel and regulatory tools) and decision-making procedures (particularly with respect to those mechanisms that can guarantee consistency of decisions and reduce arbitrariness).

6.

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CODEBOOK FOR THE REGULATORY GOVERNANCE INDEX

Values before squares indicate the points that should be attributed to that item when that has been the answer given by the interviewee. Letters in brackets following the question number indicate which indexes were considered in the question's construction: G = RGI-83 (Regulatory Governance Index, 83 questions); P = RGI-43 (Regulatory Governance Index, parsimonious index, 43 questions); and, F = RGI-28 (Regulatory Governance Index, de facto, 28 questions).

Group I — Autonomy

I.1) [G] Does the legislation clearly define the duties and responsibilities of the regulator?
0 ❏ No   1 ❏ Yes

I.1.2) If not, how do you evaluate the degree of ambiguity in the definition of the agency's autonomy and objectives?

1. Very High	2. High	3. Medium	4. Low	5. Very Low
0.0 ❏	0.2 ❏	0.4 ❏	0.6 ❏	0.8 ❏

I.2) [G] Does the legislation that created the agency define the roles of other institutions in the regulatory process?
0 ❏ No   1 ❏ Yes

I.2.1) In case it does, which:

Body or Institution	Yes	No
1. Judiciary	0.2 ❏	0.0 ❏
2. Congress; in case of state agency the state legislature	0.2 ❏	0.0 ❏
3. Line ministry(ies); in the case of state agency, state secretariat	0.2 ❏	0.0 ❏
4. Governor	0.2 ❏	0.0 ❏
5. Mayor	0.2 ❏	0.0 ❏
6. Political parties	0.2 ❏	0.0 ❏
7. Individual federal or state deputies	0.2 ❏	0.0 ❏
8. Public prosecutors' office	0.2 ❏	0.0 ❏
9. Federal or state audit court	0.2 ❏	0.0 ❏

[Maximum total points are 1.0.]

I.3) In comparison to the past, do you identify differences in the relationship between the executive branch (i.e., president or governor) and the agency in the last two years?

0 ❏ No   1 ❏ Yes

I.4) [G, F] How do you evaluate the degree of interference by the ministry or the state governor in the agency's decisions?

1. Very High	2. High	3. Medium	4. Low	5. Very Low
0.00 ❏	0.25 ❏	0.50 ❏	0.75 ❏	1.00 ❏

I.5) [G, P, F] Has the ministry or the governor ever formally or informally interfered in the agency's policy-making process?

0 ❏ No   1 ❏ Yes

I.6) [G, P, F] Has it ever happened that some directors have not completed their term?

0 ❏ No   1 ❏ Yes

I.6.1) If Yes, mark the reason?

Reason	Yes	No
1. Death 1	❏	❏
2. Retirement 1	❏	❏
3. Voluntary leave 0	❏	❏
4. External pressure 0	❏	❏
5. Dismissal 0	❏	❏
6. Other. Which one?	❏	❏

[Multiply every value if more than one reason appears.]

I.7) [G] Which instruments are available for the ministry or state government to exert control over the agency? What is the efficacy of each of them?

Instrument	Efficiency of Regulatory Instruments				
	1. Very low	2. Low	3. Medium	4. High	5. Very high
1. Interfering with the agency's budget	1.00 ❏	0.75 ❏	0.50 ❏	0.25 ❏	0.00 ❏
2. Changing the agency's directorship	1.00 ❏	0.75 ❏	0.50 ❏	0.25 ❏	0.00 ❏
3. Appointing new directors	1.00 ❏	0.75 ❏	0.50 ❏	0.25 ❏	0.00 ❏
4. Altering the order decisions are made	1.00 ❏	0.75 ❏	0.50 ❏	0.25 ❏	0.00 ❏
5. Other. Which ones?	1.00 ❏	0.75 ❏	0.50 ❏	0.25 ❏	0.00 ❏

[Add the most efficient row.]

I.8) [G, P] What is the source of the agency's budget? Please, identify the percentages of each source.

Component	Percentage	Yes	No
1. Government budget		0 ❏	0 ❏
2. Fines		1 ❏	0 ❏
3. Donations		1 ❏	0 ❏
4. Transfers from the federal agency (agreements)		1 ❏	0 ❏
5. Regulation tax		1 ❏	0 ❏
4. others		❏	❏

[If *yes* only in item 1 = 0.0, if *yes* in both item 1 and either item 2, item 3 or item 4 = 0.5, if *yes* in item 2 to 4 = 1.0.]

I.9) [G, P] Does the agency have financial autonomy to determine its own expenses?
0 ❏ No   1 ❏ Yes

I.10) [G, F] Have the agency's resources been impounded (contingenciados) by the executive in the last three years?
0 ❏ No   1 ❏ Yes

I.11) How do evaluate the problems that impoundments might cause for the functioning of the agency?

1. Very High	2. High	3. Medium	4. Low	5. Very Low
0.00 ❏	0.25 ❏	0.50 ❏	0.75 ❏	1.00 ❏

I.12) [P] Does the agency have its own legal department?
0 ❏ No   1 ❏ Yes

I.13) [G, P] Do directors' terms coincide with the executive's (president or governor?
0 ❏ No   1 ❏ Yes

I.14) [G, P] Does congress or state legislature need to approve the nomination of the director by the executive?
0.0 ❏ Governor acts unilaterally
0.5 ❏ If the executive nomination is not approved in three rounds of vote the governor's or president's choice prevail
1.0 ❏ Legislative approval is required

I.15) [G] Does the legislative have a seat in the agency's board (or other similar entity)?
0 ❏ No   1 ❏ Yes

I.16) [G, P] Is there a possibility that a representative of the regulated industry, of the agency's employees, or of consumers can be appointed as president, director or a board member?
0 ❏ No   1 ❏ Yes

I.17) [G, P] Is legislative authorization necessary for the dismissal of an agency's director or its president?

0 ❏ No   1 ❏ Yes

I.18) [G] It is forbidden for directors to:

1.0 ❏ Hold an elected position before the term at the agency

0.5 ❏ Hold an elected position during the term at the agency

0.0 ❏ There is no prohibition

I.19) [G] Is experience a prerequisite for an individual to be appointed as a director?

0   ❏ No

1   ❏ Yes (length of time not specified)

1.0 ❏ Yes (more than 5 years of experience)

I.20) [G, P] How can the directors be fired?

0.0 ❏ Ad nutum

0.5 ❏ In cases in which "they jeopardize the integrity or independence of the agency"

1.0 ❏ Only in cases of crimes as defined by administrative law

I.21) [G, P, F] Agency's directors came from:

Origin	Dir. 1	Dir. 2	Dir. 3	Dir. 4	Dir. 5
1. Old public companies in the same sector	0.2 ❏	0.2 ❏	0.2 ❏	0.2 ❏	0.2 ❏
2. Corresponding line ministry	0.0 ❏	0.0 ❏	0.0 ❏	0.0 ❏	0.0 ❏
3. Secretariat (state/municipal)	0.0 ❏	0.0 ❏	0.0 ❏	0.0 ❏	0.0 ❏
4. Congress/legislative assembly	0.2 ❏	0.2 ❏	0.2 ❏	0.2 ❏	0.2 ❏
5. Political parties	0.2 ❏	0.2 ❏	0.2 ❏	0.2 ❏	0.2 ❏
6. Private companies in the same sector	0.6 ❏	0.6 ❏	0.6 ❏	0.6 ❏	0.6 ❏
7. Private sector (consultant, etc.)	1.0 ❏	1.0 ❏	1.0 ❏	1.0 ❏	1.0 ❏
8. University or academia	1.0 ❏	1.0 ❏	1.0 ❏	1.0 ❏	1.0 ❏
9. Other. Which?	1.0 ❏	1.0 ❏	1.0 ❏	1.0 ❏	1.0 ❏

[If a director has more than one origin, then use the lowest score. Make the average for all directors.]

I.22) [G] Agency's directors are selected through:

Selection Process	Yes	No
1. Direction of the executive	0.5 ❏	0.0 ❏
2. Direction of the legislature	0.5 ❏	0.0 ❏
3. Both 1 and 2	1.0 ❏	0.0 ❏
4. Headhunters	1.0 ❏	0.0 ❏

[Use the average of the checked items.]

I.23) [G] The formal process of director selection:

Selection Process	Yes	No
1. Has clear rules	0.5 ❏	0.0 ❏
2. Has clear rules and is merit-based	1.0 ❏	0.0 ❏
3. Does not have clear rules	0.0 ❏	1.0 ❏
4. Is not based on merit	0.0 ❏	1.0 ❏

[If each row was differently answered, take the average.
Maximum total points are 1.0.]

I.24) [G, P, F] Agency's directors, after their terms in office, were employed:

Employment	Dir. 1	Dir. 2	Dir. 3	Dir. 4	Dir. 5
1. By the largest private regulated firm	0.0 ❏	0.0 ❏	0.0 ❏	0.0 ❏	0.0 ❏
2. By another regulated firm	0.2 ❏	0.2 ❏	0.2 ❏	0.2 ❏	0.2 ❏
3. By the private sector in general (consultant, etc.)	1.0❏	1.0❏	1.0 ❏	1.0❏	1.0 ❏
4. By the old public enterprises in the same sector	0.8 ❏	0.8 ❏	0.8 ❏	0.8 ❏	0.8 ❏
5. By the corresponding line ministry	0.4 ❏	0.4 ❏	0.4 ❏	0.4 ❏	0.4 ❏
6. By the corresponding secretariat (state/municipal)	0.4 ❏	0.4 ❏	0.4 ❏	0.4 ❏	0.4 ❏
7. By a university	1.0 ❏	1.0 ❏	1.0 ❏	1.0 ❏	1.0 ❏
8. Other—which?	0.0 ❏	0.0 ❏	0.0 ❏	0.0 ❏	0.0 ❏

[If a director has more than one job after leaving the agency, use the lowest value. Use the average of the checked items.]

I.25) [G, P] Does the agency have a quarantine rule for its directors?

0 ❏ No   1 ❏ Yes

I.25.1) If so, how long is it?
Time (Months):

I.26) [G] Is the quarantine paid?

0 ❏ No   1 ❏ Yes

Group II — Decision Making

II.1) [G] How do you define the decision-making process?

1. Very Decentralized	2. Decentralized	3. Medium	4. Centralized	5. Very Centralized
1.00 ❏	0.75 ❏	0.50 ❏	0.25 ❏	0.00 ❏

II.2) [G] Answer the questions below regarding to who take decisions from the choices *a* to *e*:

a. By the directors or board
b. By the directors or board on the basis of recommendations by the technical staff
c. By the technical staff after review by the directors
d. By the director general or president
e. B the executive branch
f. Ombudsman
g. Combination of two options above

Type of Decision	a 0.05	b 0.10	c 0.07	d 0.00	e 0.00	f 0.05	g 0.10
1. Decisions about tariff revisions	❏	❏	❏	❏	❏	❏	❏
2. Decisions about tariff readjustments	❏	❏	❏	❏	❏	❏	❏
3. Decisions about conflicts between rival agents such as consumers and concessionaires	❏	❏	❏	❏	❏	❏	❏
4. Claims by large consumers	❏	❏	❏	❏	❏	❏	❏
5. Claims by small consumers	❏	❏	❏	❏	❏	❏	❏
6. Arbitrage between private parties	❏	❏	❏	❏	❏	❏	❏
7. Setting of regulations regarding entry of new firms	❏	❏	❏	❏	❏	❏	❏
8. Setting of regulations regarding quality	❏	❏	❏	❏	❏	❏	❏
9. Setting of regulations about technical standards	❏	❏	❏	❏	❏	❏	❏
10. Setting of supplementary regulations	❏	❏	❏	❏	❏	❏	❏

[Use the sum of each checked item.]

II.3) [G, P] What form does the division of work among directors take? What is the degree of transfer of responsibility among directors?

Form of Allocation	Yes	No	Not applicable
1. By area of specialization	1 ❏	0 ❏	❏
2. By decision of the director general	0 ❏	1 ❏	❏
3. By a random mechanism	1 ❏	0 ❏	❏
4. Other—which?	❏	❏	❏

[Take the average of the checked items.]

II.4) [G, P] Once a case has been assigned to a director, can another director or the president of the agency block the case?

0 ❏ No   1 ❏ Yes

II.5) [G] Does any director have the power to veto a decision made by the board of directors?

0 ❏ No   1 ❏ Yes

II.6) [G] Is a qualified quorum necessary for the board of directors to be able to deliberate and decide?

0 ❏ No   1 ❏ Yes

II.7) The board's decisions on issues *a* to *i* are based on:

   a. Tariff revisions
   b. Tariff readjustments
   c. Quality
   d. Technical standards
   e. Claims by large consumers
   f. Claims by small consumers
   g. Claims by potential entrant firms
   h. Conflict between rival firms
   i. Other (supplementary regulation)

Board Decision	a	b	c	d	e	f	g	h	i
	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
1. Simple majority	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏
2. Qualified majority 1	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏
3. Unanimity	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏
4. Other—which?	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏	❏❏

[Put 0 or 1 indicating if the agency uses more simple majority or qualified majority. Unanimity = 1. Use the row with the most checked items to answer this question.]

II.8) [G] Can a director or a board member be punished?

0 ❏ No   1 ❏ Yes

II.9) [G] If there is a draw in a round of vote, who has the Minerva vote?

0 ❏ President   1 ❏ Other. Please, say:

II.10) [G, P] Is the decision-making process behind the agency's decisions formally documented?

0 ❏ No   1 ❏ Yes

II.11) [G, P] Is this documentation legally required?

0 ❏ No   1 ❏ Yes

II.11.1) If legally required, does the document have to contain the action of all agents directly involved?

0 ❏ No   1 ❏ Yes

II.11.2) Does the document have to cite jurisprudence?

0 ❏ No   1 ❏ Yes 0.5   ❏ Not necessarily

[For II.11, use the average of answers II.1, II.11.1, and II.11.2.]

II.12) [G, F] Is all exchange of information among the directors and the parties interested in a decision by the agency formally documented?

0 ❏ No   1 ❏ Yes

II.13) [G] Is there a requirement to cite jurisprudence to support a decision?

0 ❏ No   1 ❏ Yes

II.14) [G] Is there a requirement to provide technical analysis to support a decision?

0 ❏ No   1 ❏ Yes

II.15) [G] Is a written brief necessary or an oral discussion for a decision to be taken by the agency?

0.0 ❏ Oral   1.0 ❏ Written   0.5 ❏ not applicable

II.16) [G] Is it necessary that the parties involved in the decision-making process present formal statements?

0 ❏ No   1 ❏ Yes

II.17) [G, P] What are the means used by the agency to publicize the its decisions?

Means	Yes	No
1. Official gazette	1 ❏	0 ❏
2. Internet (e-mail)	1 ❏	0 ❏
3. Newspapers	1 ❏	0 ❏
4. Other, please cite	❏	❏

[Take the average of the checked items.]

II.18) [G, P] Are the issues to be discussed in board meetings publicly announced ahead of the meeting?

0 ❏ No   1 ❏ Yes

II.19) [G, P, F] Are the minutes of the meetings of the board of directors available?

0 ❏ No   1 ❏ Yes

II.20) [G,P, F] Are the board meetings publicly announced ahead of time?

0 ❏ No   1 ❏ Yes

20.1) If yes, where

Means	Yes	No
1. Official gazette	1 ❏	0 ❏
2. Internet (e-mail)	1 ❏	0 ❏
3. Newspapers	1 ❏	0 ❏
4. Other, please cite	1 ❏	0 ❏

II.21) [G, P, F] Are the board meetings opened to participation of those affected by the decisions to be made?

0 ❏ No   1 ❏ Yes

II.22) [G, P, F] Are the board meetings open to other entities and external organizations?

0 ❏ No   1 ❏ Yes

Group III — Decision Tools

III.1) [G] Which regulatory instruments are available to the agency?

Instrument	Yes	No	Not applicable
1. By area of specialization	1 ❏	0 ❏	❏
1. Database for regulatory accounting	0.2 ❏	0.0 ❏	❏
2. Methodology for tariff revision	0.2 ❏	0.0 ❏	❏
3. Methodology for annual tariff readjustment	0.2 ❏	0.0 ❏	❏
4. Instruments for monitoring quality	0.2 ❏	0.0 ❏	❏
5. Instruments for monitoring technical standards	0.2 ❏	0.0 ❏	❏
6. Methodology for defining interconnection tariffs	0.2 ❏	0.0 ❏	❏
7. Benchmarking	0.2 ❏	0.0 ❏	❏
8. Five-year revision	0.2 ❏	0.0 ❏	❏

[Maximum total points are 1.0.]

III.2) [G] Does the agency staff require additional training?

0 ❏ No   1 ❏ Yes

III.3) Does the agency have the power to change tariffs in the regulated market?

0 ❏ No   1 ❏ Yes

III.4) Does the agency have the power to establish quality standards in the regulated market?

0 ❏ No   1 ❏ Yes

III.5) Does the agency have the power to establish technical norms in the regulated market?

0 ❏ No   1 ❏ Yes

III.6) Does the agency have the power to arbitrate conflicts among rivals in the regulated market?

0 ❏ No   1 ❏ Yes

III.7) Does the agency have the power to resolve conflicts between existing firms and potential entrants?

0.0 ❏ No   1.0 ❏ Yes   0.5❏ Not applicable

III.8) Does the agency have the power to promote competition in the regulated market?

0 ❏ No   1 ❏ Yes

III.9) Does the agency have the power to establish consumers' rights legislation in the regulated market?

0 ❏ No   1 ❏ Yes

III.10) [G, P] Does the agency have the power to financially punish the actors in the regulated market for not complying with contracts?

0 ❏ No   1 ❏ Yes

III.12) Does the agency have the power to impose fines in the regulated market for behavior contrary to the agency's decisions?

0 ❏ No   1 ❏ Yes

III.13) Are these regulatory powers, when they exist, well defined?

0 ❏ No   1 ❏ Yes

III.14) [G, P, F] Does the agency have the power and legal means to guarantee adherence to its decisions by the regulated entities?

0 ❏ No   1 ❏ Yes

III.14. 1) If Yes, are those means effective?

0 ❏ No   1 ❏ Yes

III.15) [G, P] How many employees does the agency have?

	1. There are no employees	2. Fewer than 50	3. From 50 to 100	4. From 100 to 200	5. From 200 to 500	6. More than 500
Public exam	❏	❏	❏	❏	❏	❏
Partnership	❏	❏	❏	❏	❏	❏
Shared	❏	❏	❏	❏	❏	❏
Contracted out	❏	❏	❏	❏	❏	❏

[Use the share of employees hired through public exams.]

III.16) [G] What is the average length of employment of technical personnel in the agency?

1. Less than 6 months	2. From 6 months to one year	3. From one to two years	4. More than two years
0.00 ❏	0.33 ❏	0.66 ❏	1.00 ❏

III.16.1) [G, P] If high, what is the reason for the turnover?

Reason for Turnover	Yes	No
1. Employment in the regulated firms	0.0 ❏	0.0 ❏
2. Employment in other sectors	0.5 ❏	0.0 ❏
3. To improve qualification	0.5 ❏	0.0 ❏
4. Search for better salaries	0.5 ❏	0.0 ❏
5. Other, which?	❏	❏

[A maximum total point is 1.0.]

III.17) [G, P] Does the agency have its own career posts with entrance through public exams?

0 ❏ No   1 ❏ Yes   ❏ How many?

III.18) Have the technical staff members received training?

0 ❏ No   1 ❏ Yes

III.18.1) If so, at what level? Please indicate the average percentage:

Level	Percentage	Yes	No
1. Specialization		0.5 ❏	0.0 ❏
2. Master's		0.8 ❏	0.0 ❏
3. Doctorate		1.0 ❏	0.0 ❏
4. Other		0.3 ❏	0.0 ❏

[Use the average of the percentages.]

III.19) How would you describe staff motivation?

1. Very High	2. High	3. Medium	4. Low	5. Very Low
1.00 ❏	0.75 ❏	0.50 ❏	0.25 ❏	0.00 ❏

III.20) Give the number of employees, with their level of professional training, average age at each level and if possible previous employment:

Level	Number	Average age	Previous employment
Secondary school			
High school			
College			
Masters			
PhD			

III.21) [G, P] Does the agency have a defined structure of posts and salaries?

0 ❏ No   1 ❏ Yes

III.22) [G, P] For the main technical and management positions, what is the initial salary (relative to the salary of the salary of the attorney general or secretary of finance)?

1. Much higher (25% or more)	2. Higher (from 10% to 25%)	3. About the same	4. Lower (from 10% to 25%)	5. Much lower (25% or less)
1.00 ❏	0.75 ❏	0.50 ❏	0.25 ❏	0.00 ❏

III.23) [G] Does the agency have a department of consumer affairs?

0 ❏ No   1 ❏ Yes

III.24) [G] Does the agency have a competition department?

0 ❏ No   1 ❏ Yes

III.25) Does the agency have cooperation agreements with other agencies:

Location	Yes	No	Which?
1. In Brazil	0.2 ❏	0.0 ❏	
2. In Mercosur	0.2 ❏	0.0 ❏	
3. In NAFTA	0.2 ❏	0.0 ❏	
4. In Latin America	0.2 ❏	0.0 ❏	
5. In the European Union	0.2 ❏	0.0 ❏	
6. In other countries	0.2 ❏	0.0 ❏	

[Maximum total points are 1.0.]

III.25.1) If so, what is the main objective of this agreement:

Main Objective	Yes	No
1. Exchange of generic information	❏	❏
2. Exchange of specific information	❏	❏
3. Joint investigation	❏	❏
4. Training	❏	❏
5. Other—which?	❏	❏

III.26) Does the agency have agreements with:

Type of Institution	Yes	No
1. Public for consumer affairs	0.2 ❏	0.0 ❏
2. Public competition agencies	0.2 ❏	0.0 ❏
3. Public attorneys	0.2 ❏	0.0 ❏
4. Universities	0.2 ❏	0.0 ❏
5. Research centers	0.2 ❏	0.0 ❏

[Maximum total points are 1.0.]

III.27) [G] Are discussion and decisions of the directors taken only within the board meetings without previous communication among directors?

0 ❏ No   1 ❏ Yes

III.27.1) Is there any legal prohibition of informal meetings among directors and representatives of economic agents directly involved in issues being considered by the agency?

0 ❏ No   1 ❏ Yes

III.27.2) Is there any legal authority for informal meetings among directors and representatives of economic agents directly involved in issues being considered by the agency?

0 ❏ No   1 ❏ Yes

Group IV — Control and Accountability

IV.1) [G, P] To which institutions can affected parties appeal a decision made by the agency?

Institution	Yes	No
1. The agency itself	0.1 ❏	0.0 ❏
2. Judiciary	0.2 ❏	0.0 ❏
3. Federal legislature	0.2 ❏	0.0 ❏
4. State legislature	0.2 ❏	0.0 ❏
5. Ministry	0.2 ❏	0.0 ❏
6. Governor	0.2 ❏	0.0 ❏
7. Mayor	0.2 ❏	0.0 ❏
8. Attorney general	0.2 ❏	0.0 ❏
9. General auditor	0.2 ❏	0.0 ❏
10. State auditor	0.2 ❏	0.0 ❏
11. Antitrust office	0.2 ❏	0.0 ❏
12. Consumer protection office	0.2 ❏	0.0 ❏

[Maximum total points are 1.0.]

IV.2) [F] What is the number of legal suits against the agency?

	2004	2003	2002	2001	2000	1999	1998
Number							

[0 = 0, from 1 to 10 = 0.3, from 11 to 50 = 0.6, 51 or more = 1.0.]

IV.2.2) What was the legal nature of these suits?

1 ❏ Merit   0 ❏ Form/Procedure

IV.3) [G, P, F] Which legal instruments have been used to contest the agency's decisions?

Instrument	Number	Yes	No
1. Informal request of revision to the agency itself		0.1 ❏	0.0 ❏
2. Formal request of revision to the agency		0.2 ❏	0.0 ❏
3. Petition or complaint to the governor		0.2 ❏	0.0 ❏
4. Petition to the state's legal attorney		0.2 ❏	0.0 ❏
5. Judiciary		0.4 ❏	0.0 ❏
6. Other, which?		0.2 ❏	0.0 ❏

[Maximum total points are 1.0.]

IV.4) What have been the results of the legal suits against the agency?

	Pro-Agency	Against
Results		

IV.5) [G, F] Have any cases reached the Supreme Court??

0 ❏ No   1 ❏ Yes   ❏ number

IV.6) [G] Which institutions can impose some control over the agency's decisions?

Institution	Yes	No
1. Corresponding line ministry	0.2 ❑	0.0 ❑
2. Congress or state assembly	0.2 ❑	0.0 ❑
3. Public attorney	0.2 ❑	0.0 ❑
4. General accounting office	0.2 ❑	0.0 ❑
5. Governor.	0.2 ❑	0.0 ❑
6. For state agencies, the corresponding national agency	0.2 ❑	0.0 ❑

[Maximum total points are 1.0.]

IV.6.1) [G, F] What is the impact of these controls?

Impact	Yes	No
1. Improved the quality of the decisions	0.5 ❑	0.0 ❑
2. Increased legitimacy	0.5 ❑	0.0 ❑
3. Created operational problems	0.0 ❑	0.0 ❑
4. Other	❑	❑

IV.7) [G, F] What is the degree of interference of the attorney general (ministerio publico) in the agency's decisions?

1. Very High	2. High	3. Medium	4. Low	5. Very Low
1.00 ❑	0.75 ❑	0.50 ❑	0.25 ❑	0.00 ❑

IV.8) [G, F] What is the degree of interference of the general accounting office (tribunal de contas da uniäo/estado) in the agency's decisions?

1. Very High	2. High	3. Medium	4. Low	5. Very Low
1.00 ❑	0.75 ❑	0.50 ❑	0.25 ❑	0.00 ❑

IV.9) [G] What is the role played by the management contract (contrato de Gestão) for the agency?

1. Very High	2. High	3. Medium	4. Low	5. Very Low
1.00 ❑	0.75 ❑	0.50 ❑	0.25 ❑	0.00 ❑

[If there is no management contract, use 0.5.]

IV.10) [G] Can the legislature impose any form of control over the agency?

0 ❑ No   1 ❑ Yes

IV.10.1) If Yes, indicate the type of control and evaluate its efficacy:

Type	1. Very High	2. High	3. Medium	4. Low	5. Very Low
1. Public hearings	0.25 ❑	0.20 ❑	0.15 ❑	0.10 ❑	0.05 ❑
2. Calling in directors for explanations	0.25 ❑	0.20 ❑	0.15 ❑	0.10 ❑	0.05 ❑
3. Request for information	0.25 ❑	0.20 ❑	0.15 ❑	0.10 ❑	0.05 ❑
4. Other—which?	0.25 ❑	0.20 ❑	0.15 ❑	0.10 ❑	0.05 ❑

[Use the sum of the checked items.]

IV.11) [G] Is there any legal requirement for the provision of reports on the agency's actions?

0 ❏ No   1 ❏ Yes

IV.11.1) If Yes, how frequently?

Time Frequency	Yes	No
1. Less often than even six months	1.00 ❏	0.00 ❏
2. Six months	0.75 ❏	0.00 ❏
3. Annually	0.50 ❏	0.00 ❏
4. Whenever asked	0.25 ❏	0.00 ❏

IV.12) [G, P, F] Are public hearings held?

0 ❏ No   1 ❏ Yes

IV.12.1) If Yes, what form do they take?

0.5 ❏ Oral   1.0 ❏ Written (Report)

[If both, use 1.0. If none, use 0.0.]

IV.13) [G, P] With regard to the agency's report:

Characteristics	Yes	No
1. Is there an evaluation of administrative efficiency (how many decisions, how much time, what cost, etc.)?	0.25 ❏	0.00 ❏
2. Is there an evaluation of economic efficiency (impact of the agency's decisions on the market)?	0.25 ❏	0.00 ❏
3. Is there an evaluation of the distributive impact of the agency's decisions? (consumers, producers, region, income level, etc.)?	0.25 ❏	0.00 ❏
4. Is there an evaluation of budgetary impact?	0.25 ❏	0.00 ❏

[Use the sum of the checked items.]

IV.13.1) [G] If these evaluations are done, who does them:

Institution	Yes	No
1. The agency itself?	0.2 ❏	0.0 ❏
2. A commercial institution (consultant)?	0.2 ❏	0.0 ❏
3. An academic institution?	0.2 ❏	0.0 ❏

[Use the sum of the checked items.]

IV.14) [G, P, F] Does the agency perform public consultations?

0 ❏ No   1 ❏ Yes

IV.15) [G, P] How frequently and how many public consultations are done by
the agency?

1. Weekly	2. Every two weeks	3. Monthly	4. Semester	5. Annually
1.0 ❏	0.8 ❏	0.6 ❏	0.4 ❏	0.2 ❏

How many

IV.16) [G, P, F] Is there evidence that public hearings actually affect the
decision-making process?

	Yes	No
1. Changes in the original project	0.25 ❏	0.00 ❏
2. Retard some decisions	0.25 ❏	0.00 ❏
3. Discontinue an original proposal	0.25 ❏	0.00 ❏
4. Others, which?	0.25 ❏	0.00 ❏

[Use the sum of the checked items.]

IV.17) [G, P] Is there a legal requirement that regulated firms, consumers
and other external actors directly affected by the agency's decisions
participate in the decision-making process?
0 ❏ No   1 ❏ Yes

IV.17.1) [G, P, F] If Yes, what other external actors? Please indicate
the degree to which they participate.

External Actor	Yes	No	Degree
1. Consumers	0.2 ❏	0.0 ❏	
2. Firms	0.2 ❏	0.0 ❏	
3. Civil society institutions	0.2 ❏	0.0 ❏	
4. Representatives of other official powers (public prosecutor's office, courts of accounts)	0.2 ❏	0.0 ❏	
5. Concession holders	0.2 ❏	0.0 ❏	

[Use the sum of the checked items.]

IV.17.2) [G] If Yes, what is the legal instrument that calls for the partici-
pation of those involved in the process?

Instrument	Yes	No
1. Informal (No legal provision)		
2. The law that creates the agency		
3. Executive decree		
4. Agency internal book of rules		
5. Concession contract		
6. Other, please cite		

[0 if Informal or 1 if any other answer is Yes]

IV.17.3) [G, P] If any economic agent participates, please indicate the exact moment of the decision making?

Event	Yes	No	Others
1. Board meetings (regulatory sessions)	0.25 ❑	0.00 ❑	
2. Public hearings	0.25 ❑	0.00 ❑	
3. Technical report	0.25 ❑	0.00 ❑	
4. Other	0.25 ❑	0.00 ❑	

[Use the sum of the checked items.]

IV.17.4) [G] is there a legal obligation about the occasions in which the interested parts can speak?

0 ❑ No   1 ❑ Yes

IV.17.5) [F] Independent of legal means, do you think there are equal opportunities for manifestation of all interested involved?

1. Yes	1.00 ❑
2. No, the opportunities are greater for the firms in general	0.50 ❑
3. No the opportunities are greater for the big firms	0.25 ❑
4. No, the opportunities are greater for the firms that play in that specific market	0.00 ❑

IV.17.6) [G, F] Please, evaluate the impact of the participation of following actors:

Player	1. Very High	2. High	3. Medium	4. Low	5. Very Low
Concessionary	0.25 ❑	0.20 ❑	0.15 ❑	0.05 ❑	0.00 ❑
Executive	0.25 ❑	0.20 ❑	0.15 ❑	0.05 ❑	0.00 ❑
Consumers	0.25 ❑	0.20 ❑	0.15 ❑	0.05 ❑	0.00 ❑
Other?	0.25 ❑	0.20 ❑	0.15 ❑	0.05 ❑	0.00 ❑

[Use the sum of the checked items.]

IV.18) [G, P, F] Has it happened that the participation of an actor changed a previous decision made by the agency?

0 ❑ No   1 ❑ Yes

IV.19) [G, F] Do consumers participate in the agency's decision-making process?

0 ❑ No   1 ❑ Yes

IV.19.1) If Yes, is this participation legally required?

0.5 ❑ No   1.0 ❑ Yes

IV.20) [G, F] Does the antitrust office participate in the agency's decision-making process?

0 ❏ No   1 ❏ Yes

IV.20.1) If yes, is this participation legally required?

0 ❏ No   1 ❏ Yes

IV.21) How long does it take for the agency's board to make a decision?

	Up to 1 month	From 1 to 6 months	From 6 to 12 months	More than 12 months
Maximum	0.25 ❏	0.15 ❏	0.05 ❏	0.00 ❏
Minimum	0.25 ❏	0.15 ❏	0.05 ❏	0.00 ❏
Mean	0.25 ❏	0.15 ❏	0.05 ❏	0.00 ❏
Mode	0.25 ❏	0.15 ❏	0.05 ❏	0.00 ❏

APPENDIX 2

Figure A2.1. Brazilian Regulatory Agencies: Rank of the Autonomy Component of the RGI-83
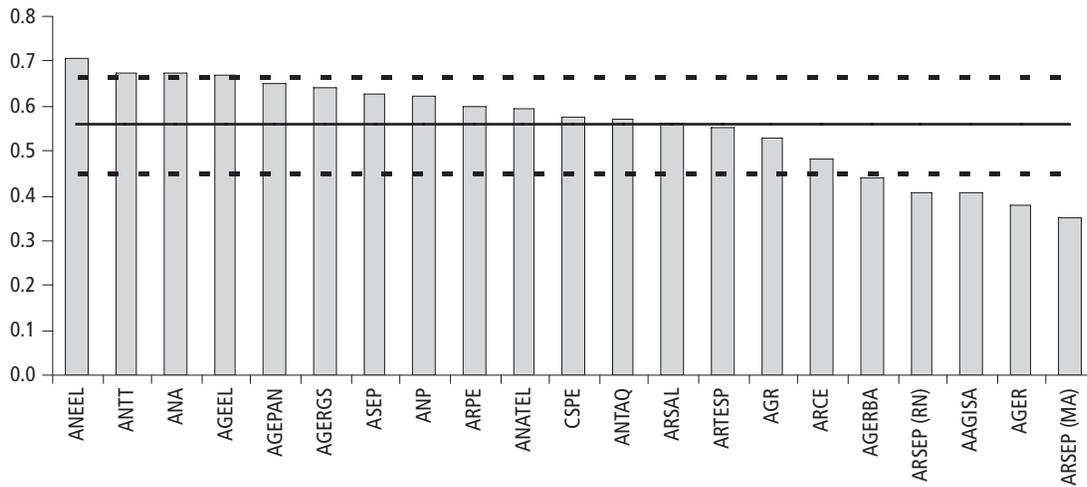
Note: One standard deviation from the mean (- - -), and mean (—).
Source: Authors' calculations.

Figure A2.2. Brazilian Regulatory Agencies: Rank of the Decision-Making Component of the RGI-83
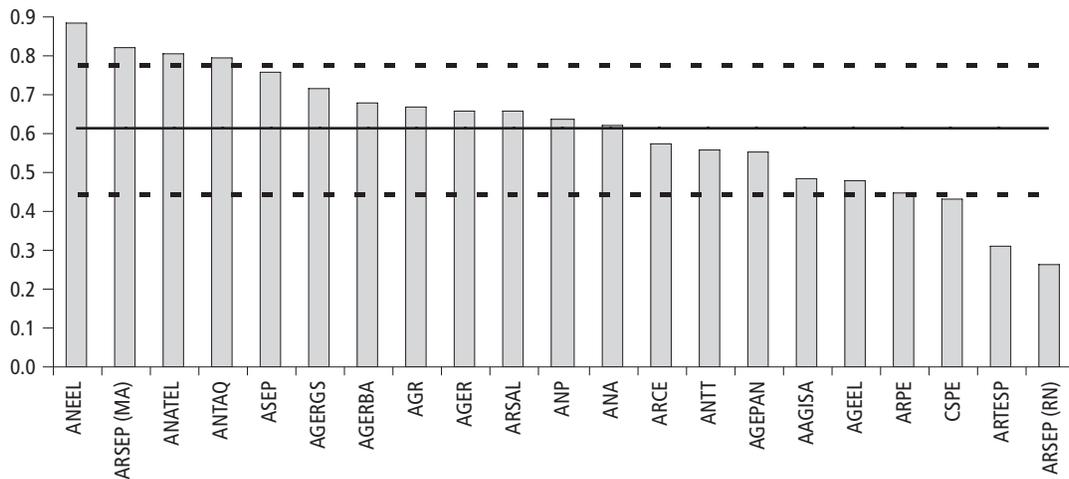
Note: One standard deviation from the mean (- - -), and mean (—).
Source: Authors' calculations.

Figure A2.3. Brazilian Regulatory Agencies: Rank of the Decision Tools Component of the RGI-83
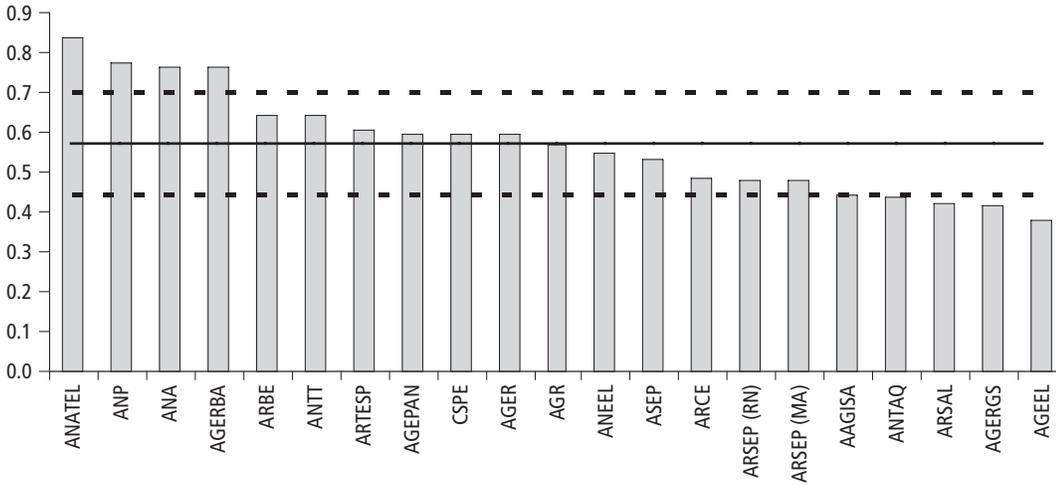
Note: One standard deviation from the mean (- - -), and mean (—).

Source: Authors' calculations.

Figure A2.4. Brazilian Regulatory Agencies: Rank of the Accountability Component of the RGI-83
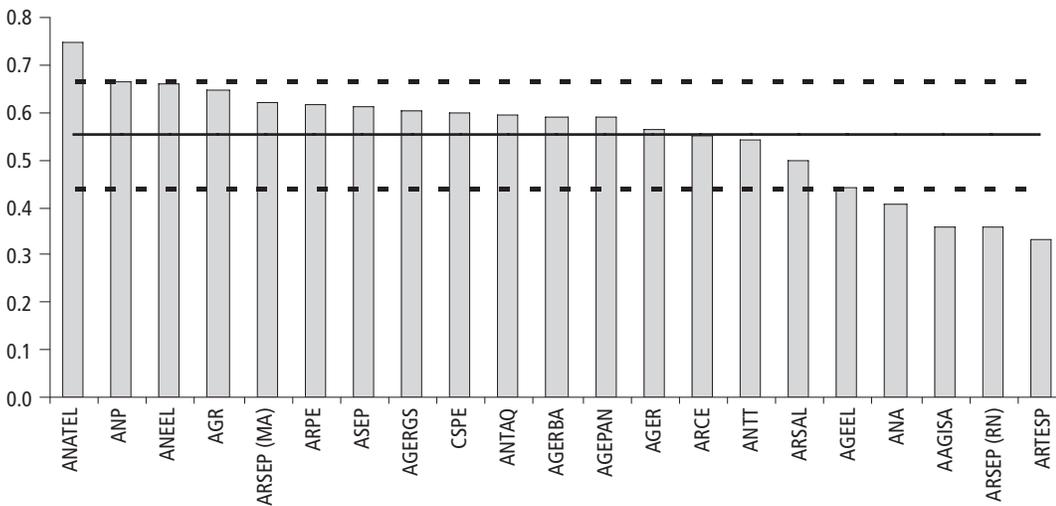
Note: One standard deviation from the mean (- - -), and mean (—).

Source: Authors' calculations.

APPENDIX 3

Figure A3.1. ANATEL: RGI-83 and Its Four Components
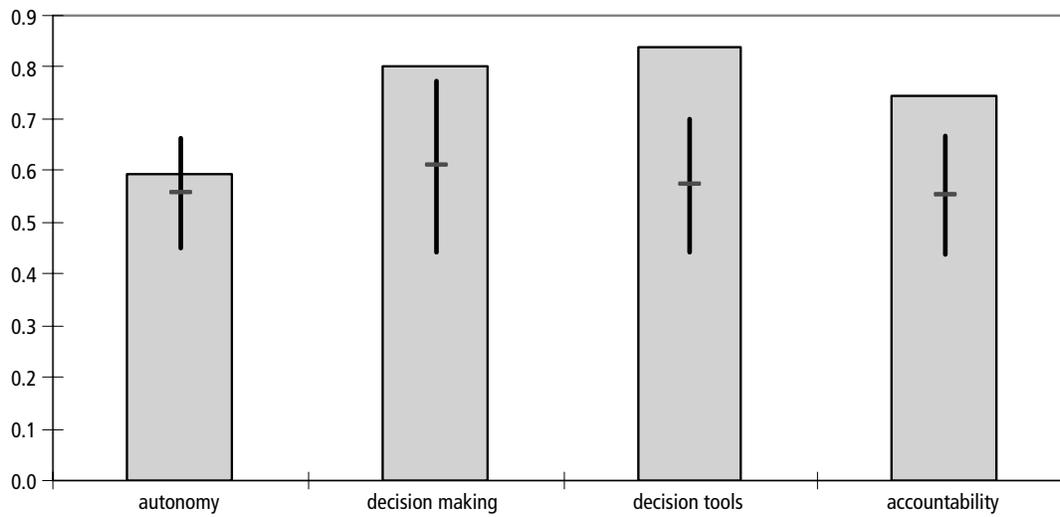
Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
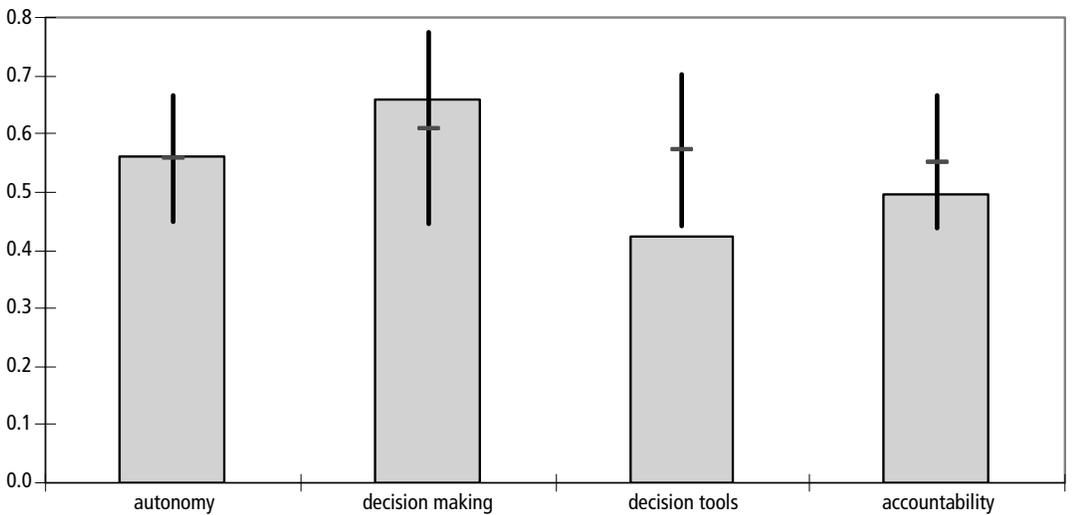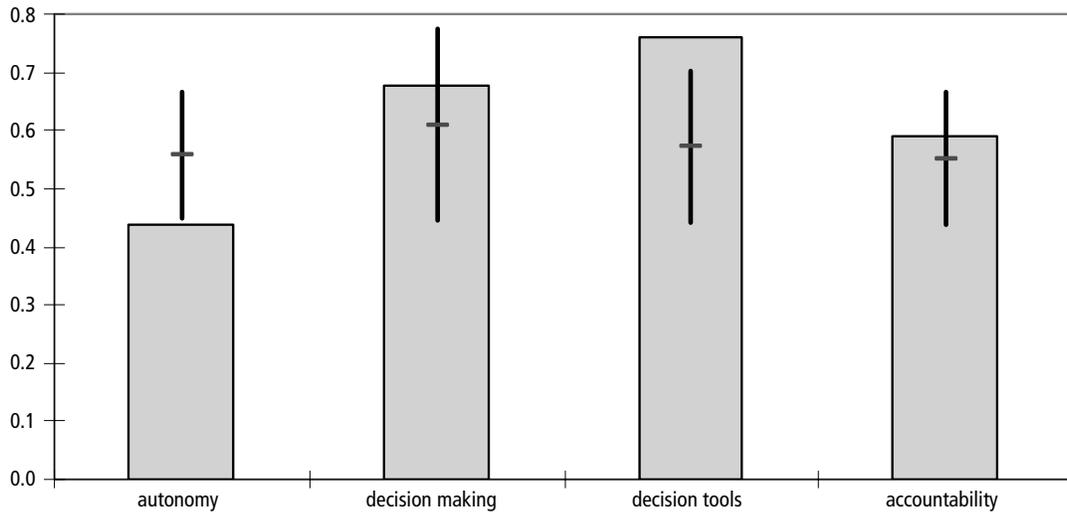
Source: Authors' calculations.

Figure A3.2. ANEEL: RGI-83 and Its Four Components
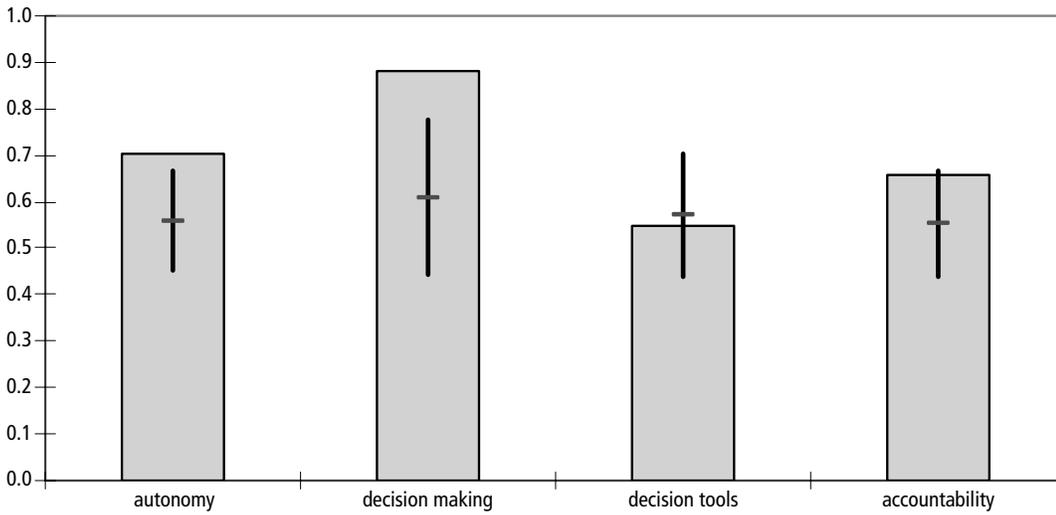
Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
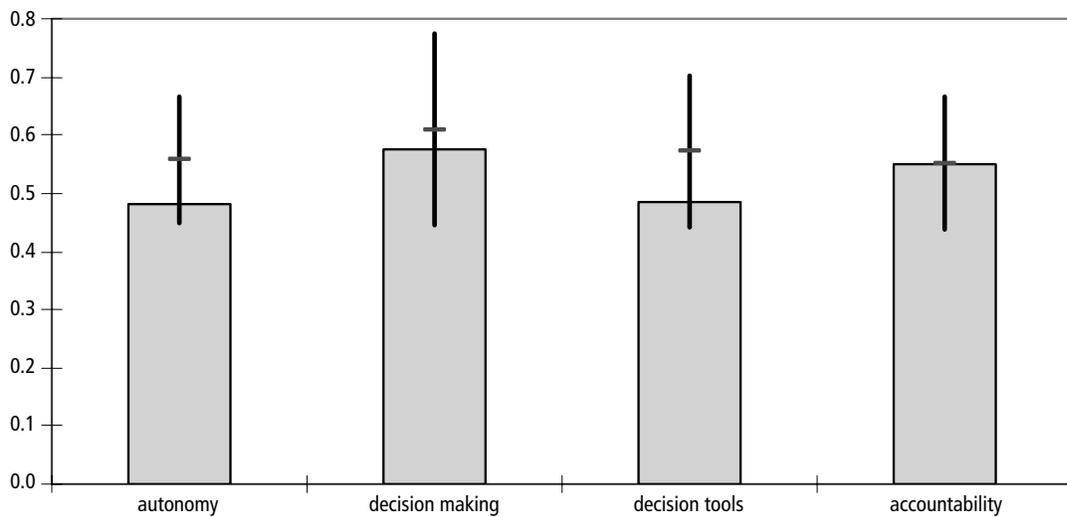Source: Authors' calculations.

Figure A3.3. ANP: RGI-83 and Its Four Components
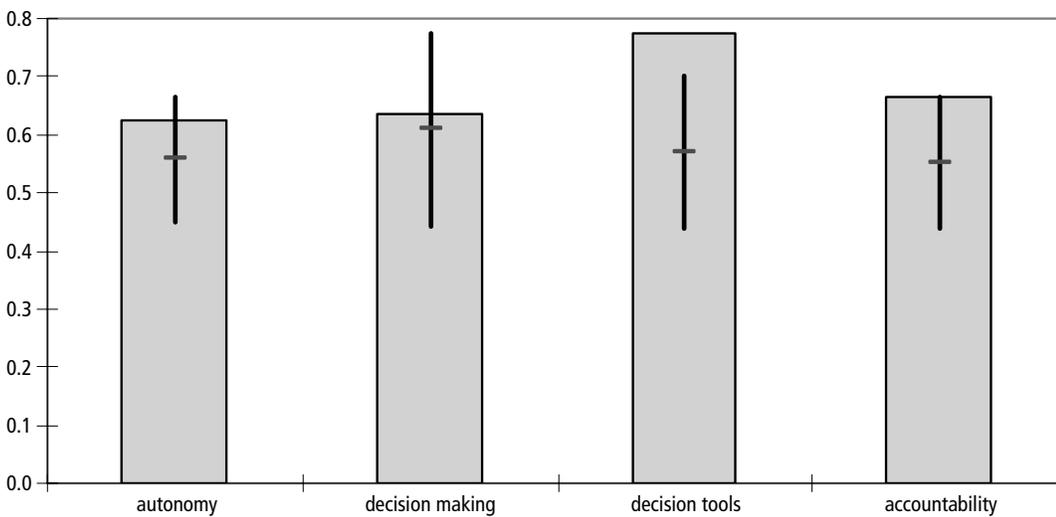
Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.4. ANA: RGI-83 and Its Four Components
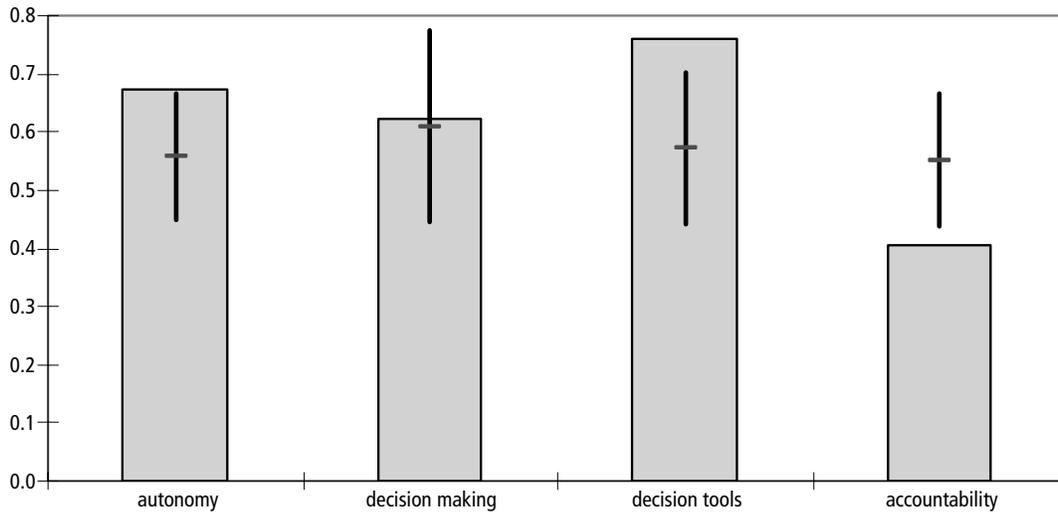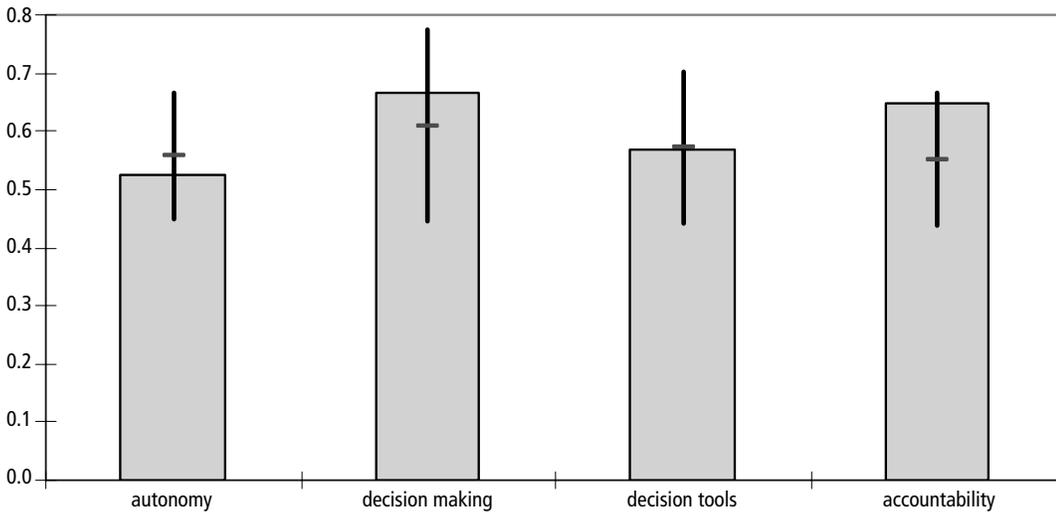

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.5. ANTAQ: RGI-83 and Its Four Components
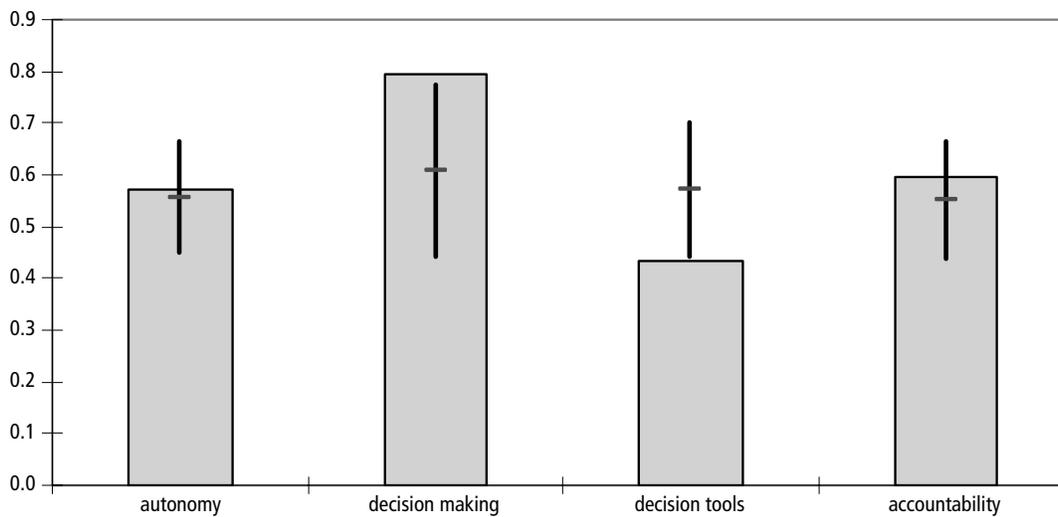
Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.6. ANTT: RGI-83 and Its Four Components
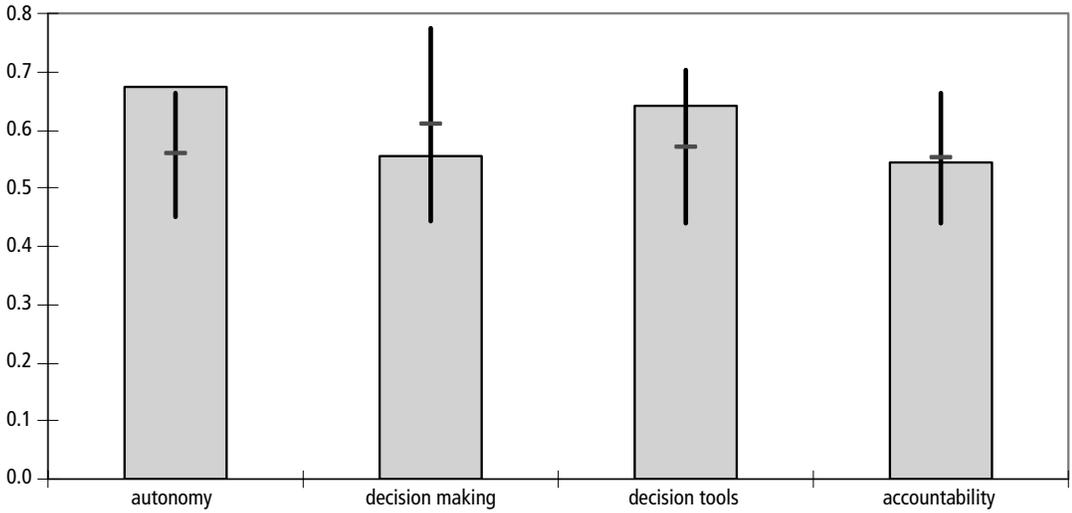
Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
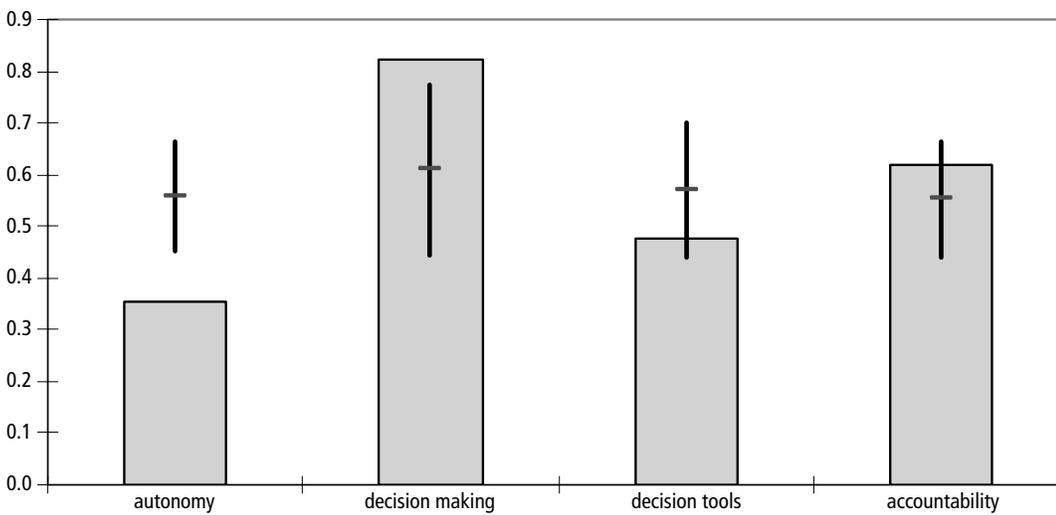Source: Authors' calculations.

Figure A3.7. ARSAL (Alagoas): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.8. AGERBA (Bahia): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
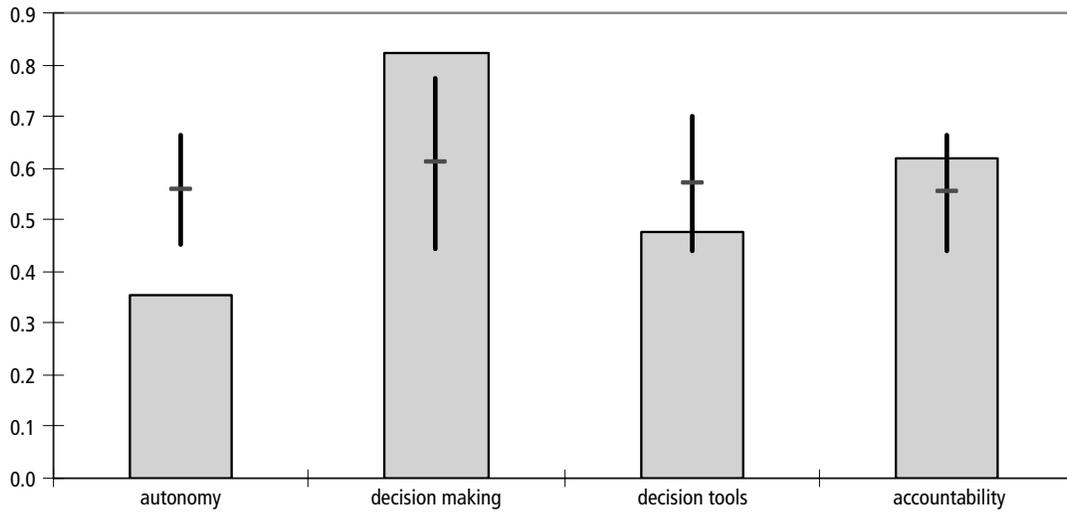Source: Authors' calculations.

Figure A3.9. ARCE (Ceará): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.10. AGR (Goiás): RGI-83 and Its Four Components

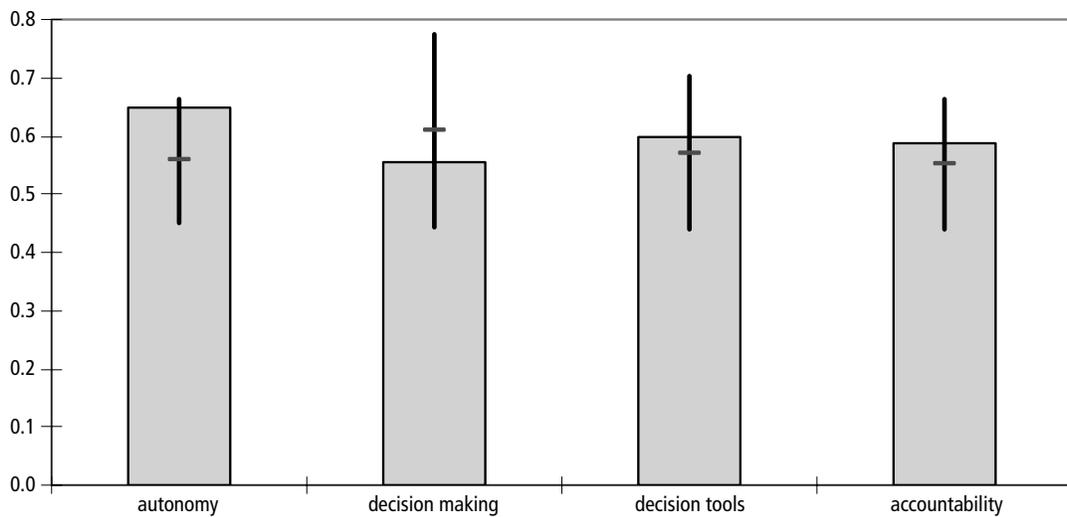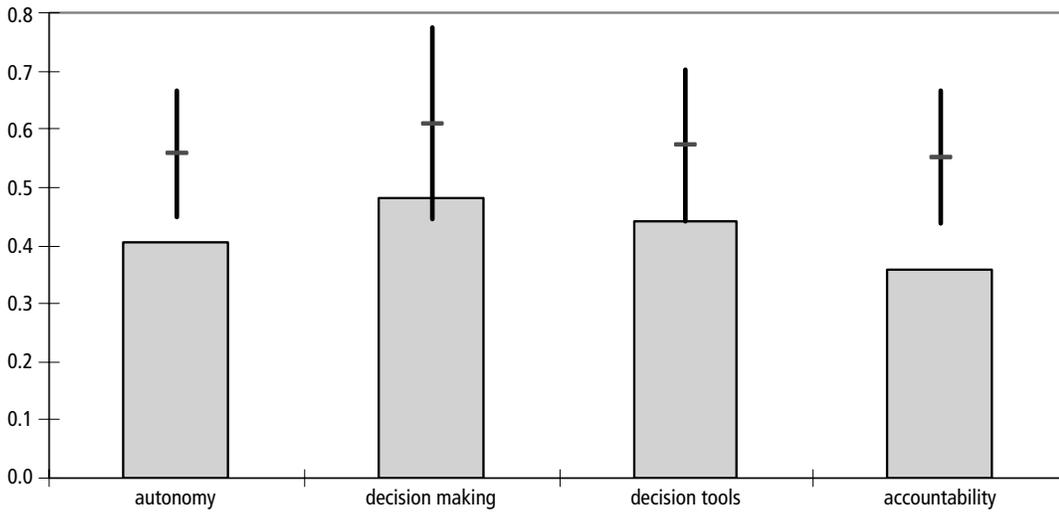Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.11. ARSEP-MA (Maranhão): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.12. AGER (Mato Grosso): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.13. AGEPAN (Mato Grosso do Sul): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
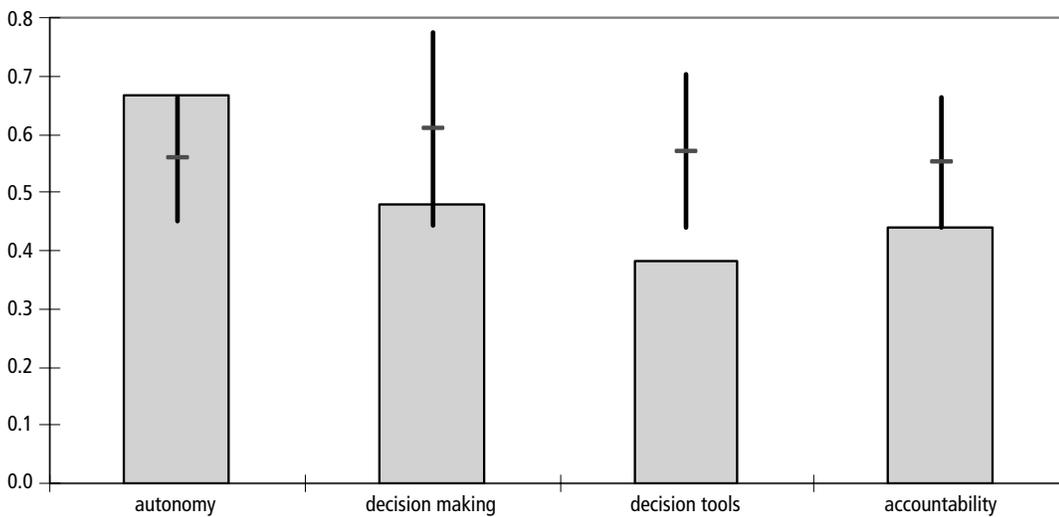Source: Authors' calculations.

Figure A3.14. AAGISA (Paraíba): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
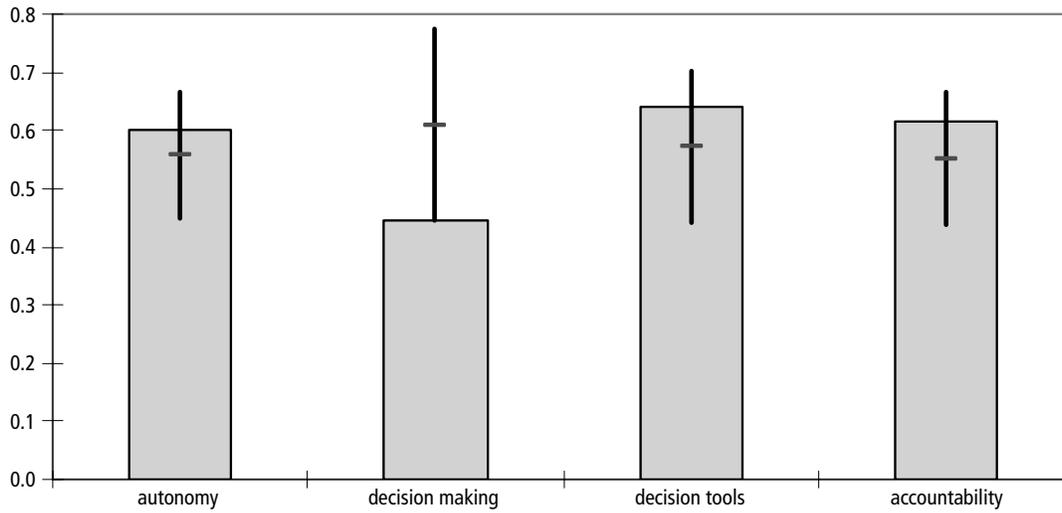Source: Authors' calculations.

Figure A3.15. AGEEL (Paraíba): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
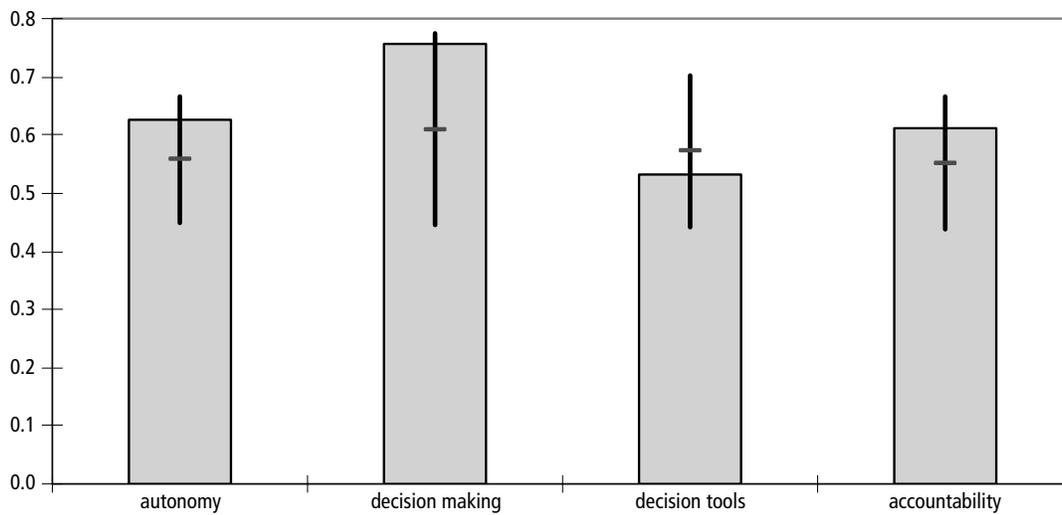Source: Authors' calculations.

Figure A3.16. ARPE (Pernambuco): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
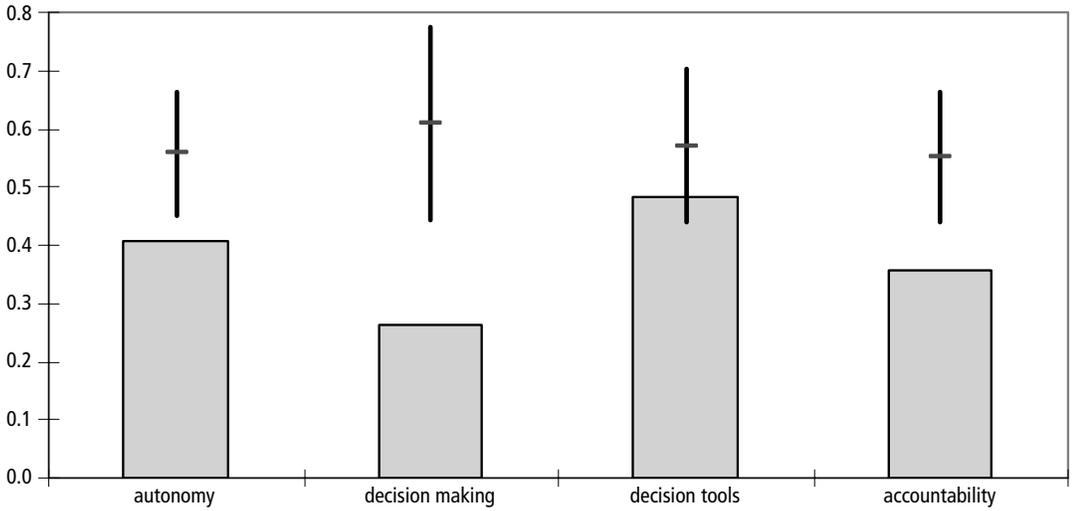Source: Authors' calculations.

Figure A3.17. ASEP (Rio de Janeiro): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
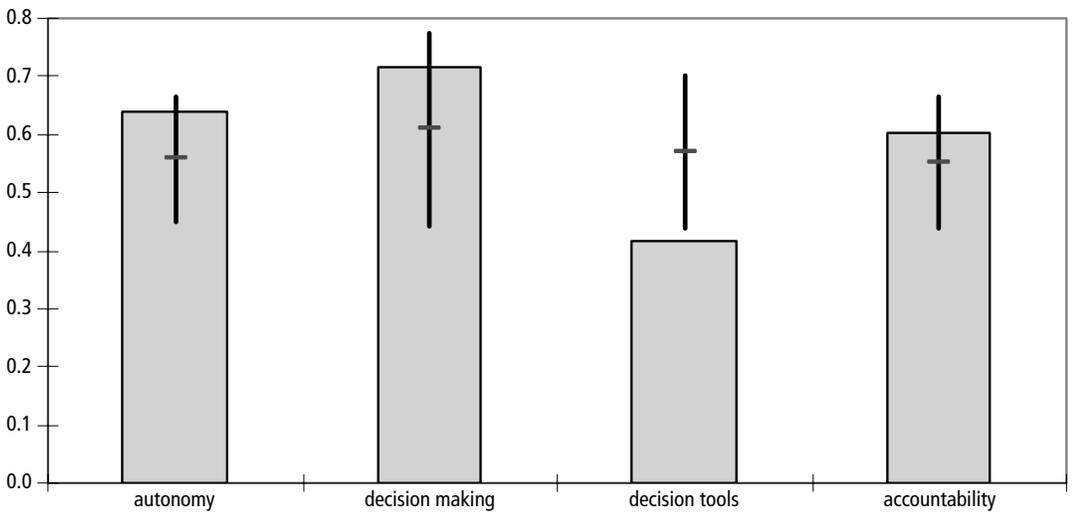Source: Authors' calculations.

Figure A3.18. ARSEP-RN (Rio Grande do Norte): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
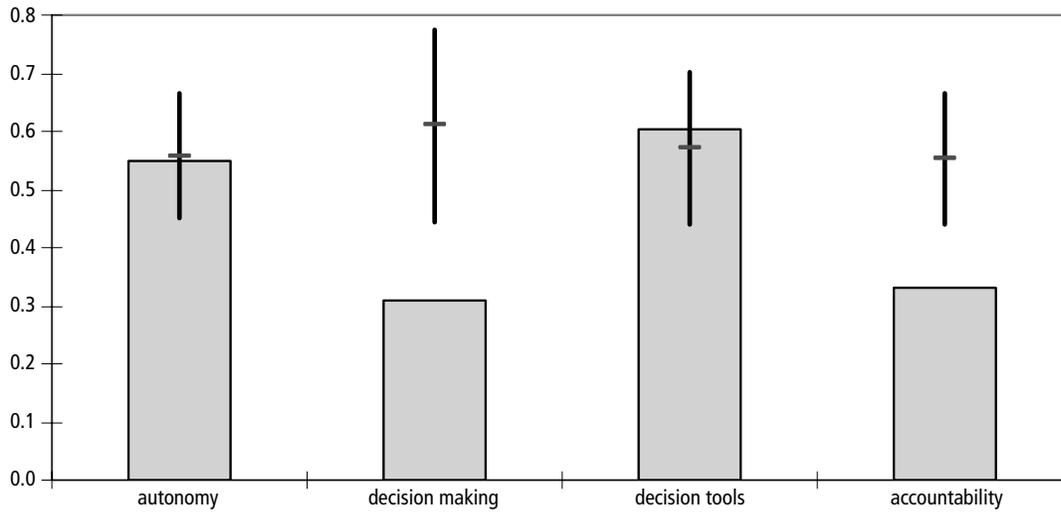Source: Authors' calculations.

Figure A3.19. AGERGS (Rio Grande do Sul): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.20. ARTESP (São Paulo): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
Source: Authors' calculations.

Figure A3.21. CSPE (São Paulo): RGI-83 and Its Four Components

Note: Vertical lines show the mean (–) and one standard deviation above and below it for the entire sample.
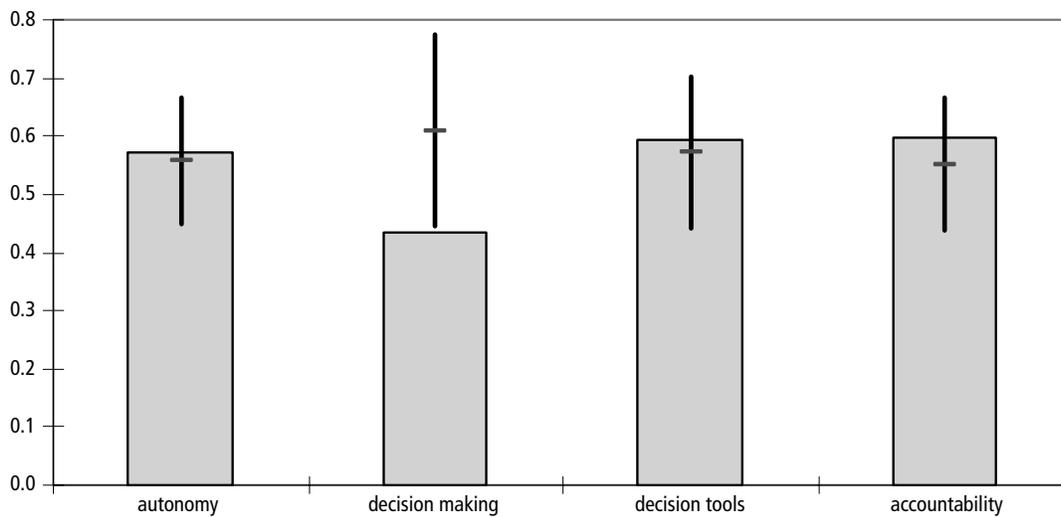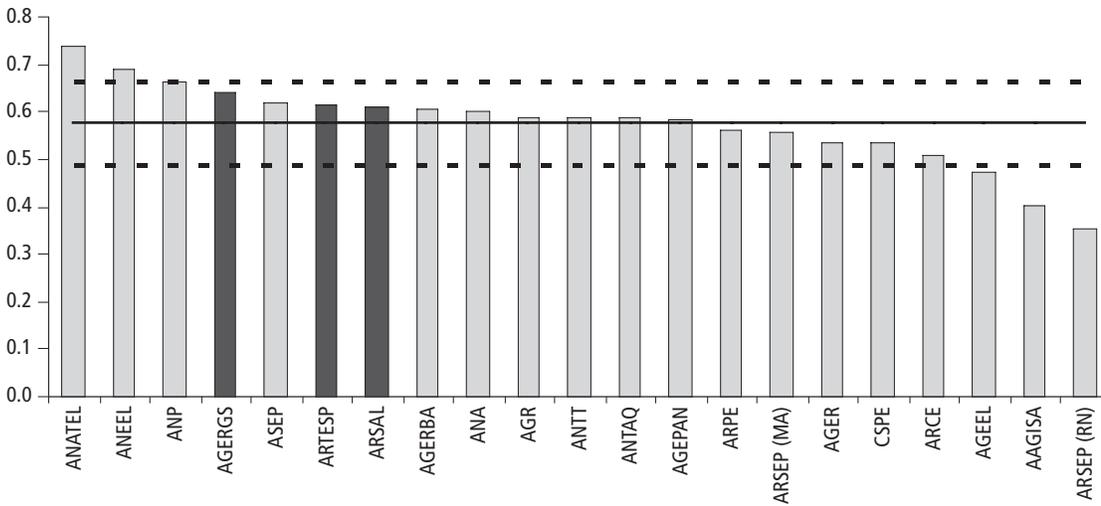Source: Authors' calculations.

APPENDIX 4

Three state regulatory agencies—AGERGS (Rio Grande do Sul), ARSAL (Alagoas) and ARTESP (São Paulo)—complained about their RGI-83 scores during the one-day workshop at the World Bank in *Brasilia* on August 9th, 2005. They were allowed to redo the questionnaire. A new RGI-83 was built based on the revised questionnaires. The new ranks of the RGI-83 and its four components can be found below.

Figure A4.1. Brazilian Regulatory Agencies: RGI-83 Rank

Note: One standard deviation from the mean (- - -); mean (—).

Source: Authors' calculations.

Figure A4.2. Brazilian Regulatory Agencies: Autonomy Component of the RGI-83 Rank
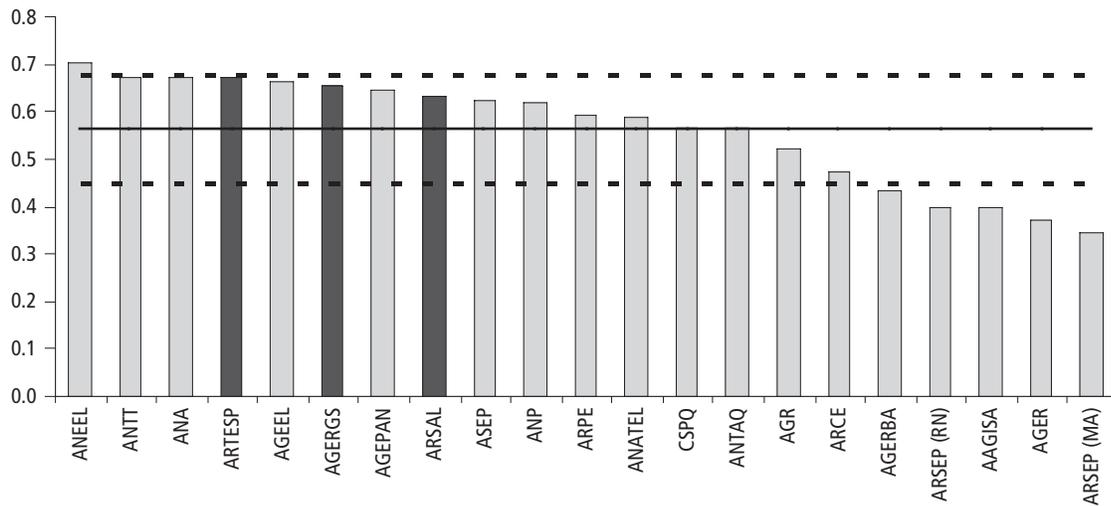
Note: One standard deviation from the mean (- - -); mean (—).
Source: Authors' calculations.

Figure A4.3. Brazilian Regulatory Agencies: Decision-Making Component of the RGI-83 Rank

Note: One standard deviation from the mean (- - -); mean (—).
Source: Authors' calculations.

Figure A4.4. Brazilian Regulatory Agencies: Decision Tools Component of the RGI-83 Rank

Note: One standard deviation from the mean (- - -); mean (—).
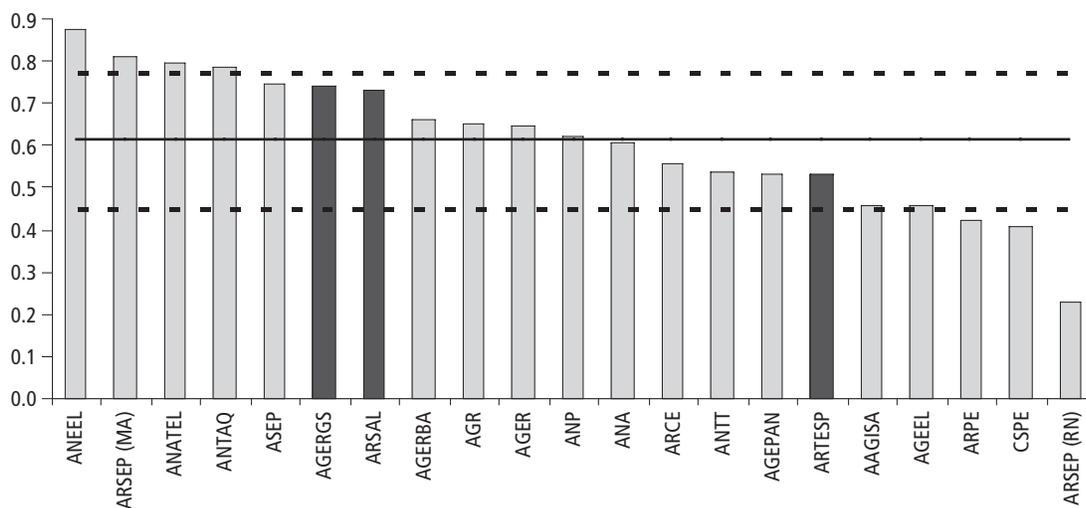Source: Authors' calculations.

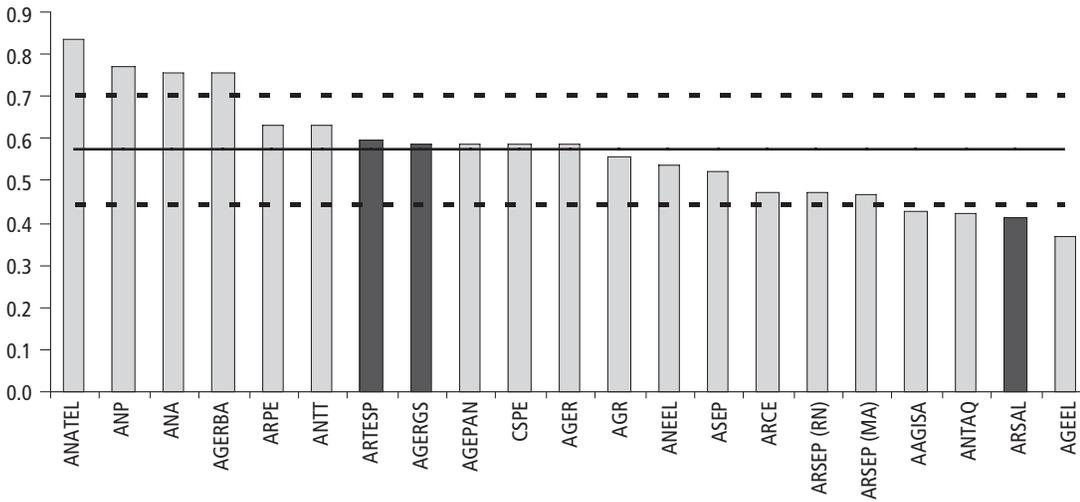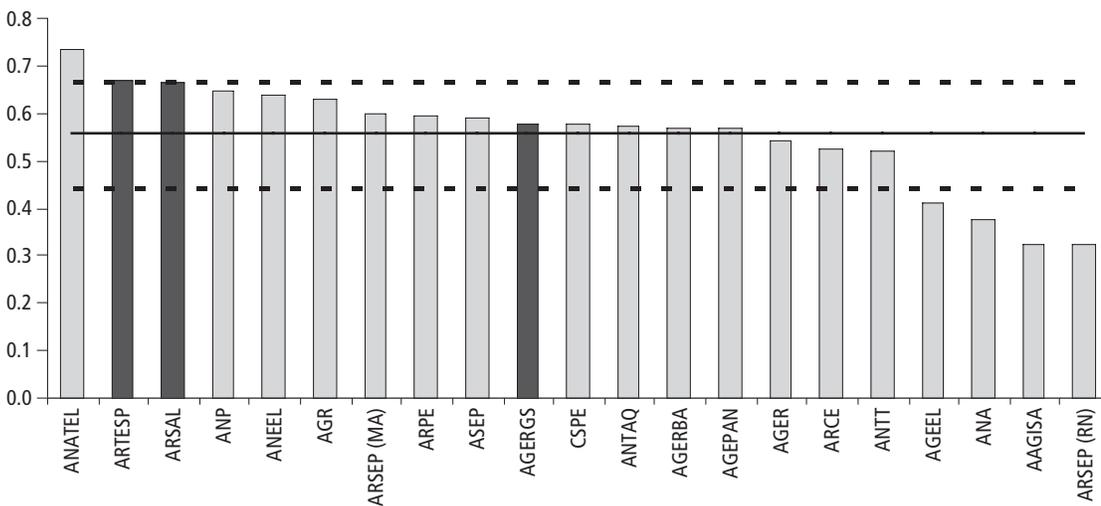**Figure A4.5. Brazilian Regulatory Agencies: Accountability Component of the RGI-83 Rank**

Note: One standard deviation from the mean (- - -); mean (—).
Source: Authors' calculations.

APPENDIX 5

Table A5.1. Correlation Matrix for the Determinants of the Regulatory Governance Index (RGI-83)

	Age	Federal	Gas	Transportation	Electricity	Sewerage	Oil	Water
Age	1.0000							
Federal	0.1562	1.0000						
Gas	0.0700	-0.6030	1.0000					
Transportation	-0.1795	-0.3721	0.1589	1.0000				
Electricity	0.2354	-0.6708	0.6742	0.2774	1.0000			
Sewerage	-0.0819	-0.4472	0.1348	0.3467	0.2857	1.0000		
Oil	0.2445	0.3536	-0.2132	-0.2850	-0.3162	-0.1581	1.0000	
Water	-0.2013	-0.0383	-0.2197	-0.1189	0.1715	0.1715	-0.1085	1.0000

Source: Authors' calculations.

APPENDIX 6

Table A6.1. Summary of Three Methodologies for Regulatory Governance Indexes

Index and source	Sample	Sectors	Index components	Data	Results
ADB/NERA (Holder and Stern 1999)	Bangladesh, India, Indonesia, Malaysia, Pakistan, the Philippines	E, G, Tr, W	Accountability, autonomy, clarity, participation, predictability, transparency	Experts assigned values between 1 and 5 for each of the 32 variables (January 1998)	Results Mean = 13.9 SD = 6.1 Max = 25.0 Min = 6.0 Interval: [6, 30]
Gutierrez (2003)	25 Latin American countries	Tel	Accountability, autonomy, clarity of roles and objectives, participation, transparency, type of legal mandate	National legislation and secondary sources (books, journals, press releases); eight variables with values of either 0 or 1 (1980–2001)	**1980–89** Mean = 0.257 SD = 0.133 Max = 0.600 Min = 0.125 **1990–2001** Mean = 0.527 SD = 0.127 Max = 0.750 Min = 0.188 Interval: [0, 1]
This paper	21 Brazilian regulatory agencies (6 federal and 15 sub-national)	E, G, GTr, I, P, R, S, Tel, W, WTr	Accountability, autonomy, decision-making, decision tools	Surveys applied by two researchers to agencies' directors; index with 83 variables (January–March, 2005)	Mean = 0.568 SD = 0.088 Max = 0.727 Min = 0.367 Interval: [0, 1]

Note: E = electricity, G = gas, GTr = ground transportation, I = irrigation, P = petroleum, R = railroads, S = sewerage, Tel = telecommunications, Tr = general transportation, W = water, WTr = water transportation. SD = standard deviation, Max = maximum, and Min = minimum.

With more than US$100 billion in private investments during the 1990s, the success of infrastructure reforms in Brazil seemed inevitable. However, the current prospects for private participation in infrastructure are far less optimistic and regulatory risk, or at least its perception among private investors, appears to have increased.

Regulatory governance, broadly understood as the conditions for the enforcement of laws and contracts by regulators, is an important component of regulatory risk. Market-friendly legislation and well-designed contracts may be innocuous if regulators are poorly equipped or face the wrong incentives for appropriate enforcement. Between 1997 and 2005, at least 28 regulatory agencies were established in Brazil, either at the federal or state level. Yet, only limited assessment of the state of regulatory governance in Brazil is available so far.

Regulatory Governance in Infrastructure Industries provides a comprehensive assessment of the state of regulatory governance in infrastructure industries in Brazil and suggests possible indicators for future monitoring. The book identifies key components of regulatory governance, namely autonomy (political and financial), procedures for decision making, "instruments" (including personnel), and accountability. It then assesses each of these components in practice, reporting the results of a survey with 21 Brazilian regulatory agencies, which was designed and implemented by the authors in 2005. Finally, the book measures regulatory governance based on three related indexes, ranks the Brazilian regulators among themselves, and compares the proposed indexes with two other indicators available in the literature.

Regulatory Governance in Infrastructure Industries will be of interest to readers in federal and state or regional governments, nongovernmental organizations, research institutions, and organizations involved in regulating infrastructure.

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