The Institutional Theory of Regulation: An Application to the U.S. Constitution♣

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Abstract

The neoclassical economic theory presumes that public interest can be maximized through regulation. Regulation is efficient since the first-best institutional design of regulation is possible. However, the neoclassical approach to regulation has ignored the institutional foundations of regulation and has left the supply side of regulatory policymaking as a black box. Moving from the pure efficiency considerations to the role and importance of institutions, (old) institutional economics introduced a different approach to the analysis of regulation. Then, (new) institutional economics clearly rejected the notion of optimal regulation from a perspective of transaction costs. Adopting the different components of institutional economics, this paper aims to construct an institutional theory of regulation to explain why and how there is no optimal regulation. The paper also introduces an application to the U.S. Constitution to highlight the importance and usefulness of institutional approach to regulation. It concludes that regulation is inevitably sub-optimal because the first-best institutional design of regulation is not possible even though the Constitution establishes the political institutions of regulation to maximize public interest through regulation.

Keywords: Regulation, Institutions, Institutional Design, Transaction Costs and Credible Commitment, Constitution

Jel Codes: L51, D02, D72

1 Introduction

The neoclassical theories of government regulation such as the public interest theory of regulation and the economic theory of regulation focus heavily on the demand side of regulation. In this literature, regulation is viewed as a product, which is produced in the political market. Because regulation is demanded by interest groups in the regulated industry and is designed for the benefit of the industry, regulators are captured by those interest groups (Stigler 1971; Posner 1974; Peltzman, 1976; Becker, 1983). Whereas the neoclassical economic theory explains the demand side of regulation, the supply side[2] is viewed as a black box (Spiller and Tommasi, 2005). In order to open the black box, (old) institutional economics included institutions into the analysis of regulation (Trebing, 1984 and 1987; Reynolds, 1981; Kling, 1988; Miller and Samuels, 2002; Nickerson and Phillips, 2003; Melody, 2016). Then, (new) institutional economics initiated to analyze the supply side of regulation through institutional components such as political institutions, transaction costs, and credible commitment (North, 1991; Levy and Spiller, 1994 and 1996; Spiller, 1995; Spiller and Tommasi, 2003 and 2005; Spiller, 2013).

Institutional economics[3] focuses on the relationship among the political institutions of regulation because regulation is supplied as an outcome of interaction among those institutions. I define this relationship as the institutional interaction or design of regulation, which determines transaction costs and regulatory commitment and thus, reveals the quality of regulation[4] (Spiller, 1995; Levy and Spiller, 1996). Now, regulation is an institutional design problem. Some studies in this literature partly examine the roles of political institutions in the regulatory process (Epstein and O'Halloran, 1997; Spiller, 2013). Some others merely focus on the interaction between two of those institutions (McNollgast, 1987; Figueiredo and

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[2] In this paper, the supply side of regulation represents its institutional structure.
[3] Even though I make a distinction between old and new institutional economics, I also call those two approaches institutional economics as a whole.
[4] Throughout the paper, the quality of regulation refers to the efficiency of regulation, good regulatory governance or optimal regulation.

Tiller, 1996; Tiller and Spiller, 1999; Rogers, 2001; Maskin and Tirole, 2004). Moreover, to my knowledge, there is no study that has analyzed the supply side of regulation by combining the interaction among the political institutions of regulation with transaction costs and credible commitment. For the first time, this paper examines regulation in this context. The aim is to explain why and how there is no optimal regulation under institutional constraints. To this aim, I develop a basic model based on the regulatory institutional structure designed by the U.S. Constitution. Thus, opening the "black box" of regulation and differing the previous literature, the paper introduces the institutional theory of regulation.

The paper consists of four sections along with introduction. Section 2 surveys the related literature to better understand the lack of perspective of institutional economics in the current analysis of regulation by making a distinction between the pre- and post-institutional economics literatures. Originated from the separation of powers system established by the U.S. Constitution, section 3 introduces an institutional design of regulation. The section explains the role of political institutions in the regulatory policy-making process and considers the effect of transaction costs and credible commitment as institutional constraints on regulation. Section 4 constructs a model to explain whether the efficient design of regulation or optimal regulation is possible from the perspective of institutional economics. Section 5 concludes with an assessment of the results.

2 Literature review

2.1 The traditional theories of regulation: Neoclassical approach

Until the present, many different approaches have been used to explain regulation[5]. These approaches have led to a huge literature that reveals the implications of regulatory intervention in the economy. The public interest theory of regulation justifies the necessity of regulation due to market failures (Joskow and Rose, 1989). Regulation is accepted unique in

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[5] In this section, I will review some selected works rather than a comprehensive examination of all previous studies due to the presence of a huge literature on the theories of regulation. Please see Hantke-Domas (2003) and Trebing (1984) for more detailed information about the previous theories of regulation.

both structure and function. The institutions of regulation can maximize public interest through regulation because they have a specialized expertise, monitor developments in the regulated industry in detail, and make more informed decisions rapidly. As a rule, the institutional structure of regulation is designed to achieve both economic and social policy objectives efficiently and effectively through the market (Commons, 1924; Melody, 2016).

By the 1970s, economists started criticizing the public interest theory of regulation (Demsetz, 1968; Stigler, 1971; Posner, 1974; Baumol, 1982). Including the perspectives of the Chicago School, Public Choice Theory, and relatively Austrian Economics, those studies led to the rise of an economic theory of regulation. The economic theory of regulation introduced by the Chicago School began with the seminal paper of George Stigler in 1971. This study clarifies the political behavior inherent in the regulatory process. In this approach, regulators are self-interested maximizers like the private agents of economic activity. Influencing regulators, the private interest groups can manipulate the regulatory outcomes. Regulation is implemented through manipulation of the private interest groups and is operated primarily to the benefit of the regulated industry, but not public interest (Stigler, 1971; Posner, 1974; Peltzman et al., 1989)[6]. Regulation is a commodity produced in the political market, including voters on the demand side and their representatives on the supply side (Peltzman, 1976). Politicians and bureaucrats in the political market carry out the political allocation of wealth through competition among pressure groups (Becker, 1983).

According to the Public Choice theory of regulation, the regulatory process transforms a rent seeking process with the pressure of interest groups and never maximizes public interest as presumed by the public interest theory of regulation (Tullock, 1967; Krueger, 1974; Levine and Forrence, 1990). The Austrian approach accepts regulation as a political tool, which

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[6] Recently, Çetin and Eyigit (2011 and 2013) presented evidence showing that regulation in the taxicab markets of Istanbul and New York, which are unique to analyze the effect of interest groups on regulation, led to artificial rents by increasing medallion prices. This evidence suggests that regulation is designed for the benefit of the industry, but not public interest.

reallocates property rights and wealth in the society. Regulation occurs in an entrepreneurial and dynamic process in which bureaucrats, regulators, and firms try to maximize their self-interests (Benson, 1984; Boottke and Lopez, 2002; Parker, 2002). Lastly, in this literature, studying the mechanism design of interaction between regulator and the regulated firm, the incentive theory of regulation shows the effect of information asymmetries on regulation. The first-best design of regulation is not possible due to the presence of asymmetric information between regulator and the regulated firm (Baron and Myerson, 1982; Laffont and Tirole 1993). Those approaches to regulation, which take into account the perspective of neoclassical economics, focus on the demand side of regulation. This neoclassical approach takes institutions as given and neglects the effect of institutional components on regulation. Thus, the supply side of regulation including the effect of institutions on the outcomes of a regulation policy is viewed as a black box in the literature prior to institutional economics.

2.2 The approach of old institutional economics to regulation

The approaches of neoclassical and institutional economics to regulation are different. Even though both approaches admit to the phenomenon of market failures, old institutional economics considers a broader role for regulation, and neoclassical economics examines a narrow scope for regulatory intervention in the markets. While neoclassical approach examines how regulation can impact on individual incentives to replicate the allocation that would be achieved under the efficient markets hypothesis, old institutional economics presents an approach on the basis of improving welfare through redistribution, in which governments change, through collective action, institutional structure in which markets are embedded (Reynolds, 1981; Trebing, 1984; Kling, 1988; Nickerson and Phillips, 2003).

Extending the analysis of regulation beyond efficiency considerations to a range of ethical and religious issues, old institutionalists have constructed the social (institutional) foundations of regulation (Trebing, 1984 and 1987; Reynolds, 1981; Kling, 1988; Miller and Samuels,

2002; Melody, 2016). They emphasize the role and importance of change in the nature of society and its technological environment on the evolution of regulations, which was ignored by the previous theories of regulation. Nickerson and Phillips (2003) argue that regulatory intervention may not be necessary to provide an optimum outcome even in the presence of a market failure when technological change inherent in the markets ameliorates the problems of inefficiency or inequity in the regulated industries. Moving from the pure efficiency considerations to the role and importance of social/institutional structure in the analysis of regulation, old institutionalism introduced a different approach to regulation.

2.3 The rise of new institutionalist approach to regulation

Even though the traditional approaches of neoclassical and institutional economics to regulation share a fundamental reliance on the role of the state in influencing the evolution of institutions governing market activities (Nickerson and Phillips; 2003), those approaches have not been successful to account for the dynamic relationships in the institutional structure of regulation. The new institutionalists have accomplished a more detailed analysis because the perspective of new institutionalism is perfectly qualified to assume the pivotal role in more comprehensive analysis of regulation (Trebing, 1984 and 1987). This approach, which directly focuses on the dynamic nature of change in institutional structures, has initiated to open the black box of regulation by analyzing institutional interaction within the supply side. In this sense, the new institutionalism differs from the previous literature (Spiller and Tommasi, 2005). It is mainly interested in the institutional determinants of regulatory performance (Spiller, 2013). Institutional determinants refer to the distinctive characteristics of the supply of regulation and these characteristics represent the nature of institutional interaction among political institutions.

Note that the importance of regulation stems from the effect of regulatory process on investors and investment environment (Baron, 1995; Spiller and Tommasi, 2005; Spiller,

2013). The institutional structure of regulation directly affects investments in public utility industries and thus economic performance in the country because those investments include high fixed and sunk costs. While the interaction among the institutions of regulation determines the quality of regulation, the institutional quality of regulation influences the investment decisions of investors. Agents of the economy expect a regulatory institutional environment with low transaction costs and a credible regulatory commitment. For that reason, the new institutionalist approach considers regulation as the outcome of these interactions and focuses on the institutional characteristics of contractual hazards inherent to these interactions. These contractual hazards are defined as coordination problems and governmental and third-party opportunism (Williamson, 1975 and 1985). As they vary across sectors, their intensity varies with the institutional nature of regulation. Thus, the emphasis of this approach on contractual hazards differentiates it from the aforementioned approaches (Spiller, 1995 and 2013).

However, in this paper, I also differ from the current approach of new institutionalists. While new institutionalism is only interested in the hazards characterizing the particular government and investor interactions in a regulatory process, I focus on the institutional constraints determining the interaction among the political institutions of regulation. I believe that, in order to develop the institutional theory of regulation, it is imperative to introduce an institutional analysis explaining the institutional determinants of regulatory performance by taking into account transaction costs and credible commitment as institutional constraints characterizing this interaction. For that reason, using transaction costs and credible commitment, which are the main tools in the approach of institutional economics to regulation, I aim to explain regulation from the perspective of institutional economics.

3 The institutional design of regulation: An application to the U.S. Constitution

Because understanding the institutional design of regulation requires a micro-analytical approach (Spiller, 2013), the political institutions of regulation, the interaction among these institutions, transaction costs, regulatory commitment, and the maximization of utility principle are fundamental in the analysis of regulation. A major cause of high transaction costs and non-credible commitment in the regulatory process is the presence of unified state, which includes governmental and third-party opportunism (Willamson, 1975). By contrast, the explicit separation of powers can lower transaction costs and ensure a credible regulatory commitment because the separation of powers system can limit to governmental opportunism and provide more guaranties to investors than a highly centralized government or unified state (Epstein and O'Halloran, 1997; Estache and Martimort, 1999). For that reason, regulation is designed through the interaction among three major branches of government in many countries: the legislature, the executive, and the judiciary. In this paper, I follow the separation of powers system in the United States because it is one of the most powerful and effective systems in the world. Accordingly, regulation under the U.S. Constitution is primarily created by the legislative branch (under Article I); is enforced by the executive branch (under Article II); and is interpreted by the judicial branch (under Article III). Under this constitutional structure, regulation is not implemented directly by politician. It is heavily determined by the actual and anticipated interactions among those institutions. In other words, the legislative branch shares the regulatory power with regulatory agencies, departments, or the courts (Spiller, 1990; Epstein and O'Halloran, 1997). The aim is to design a credible institutional structure in the regulatory policy-making process. IRAs, by using their independence, can limit to the opportunistic use of legislative powers. An independent judiciary, by reviewing decisions of the legislative branch, can impede governmental and third-party opportunism (Spiller, 2013).

Using this constitutional structure in the United States, Figure 1 presents the institutional design of regulation[7] determined by the legislature, the executive[8], and the judiciary. The figure depicts that the interaction among those institutions reveals transaction costs and regulatory commitment in the regulatory process. Accordingly, regulatory performance is dependent on the regulatory institutional structure, which can provide a credible commitment against governmental opportunism and the potential threats from third party opportunism (Williamson, 1993; Spiller, 2013). Likewise, the institutions of regulation can play a crucial role in reducing transaction costs (North, 1991).

Figure 1 The institutional design of regulation[9]
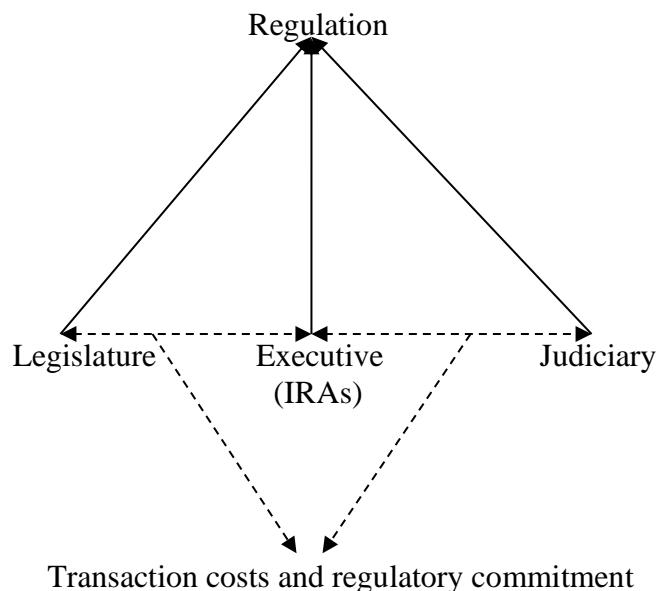
3.1 The political institutions of regulation

In this structure, the political institutions of regulation are the legislature, the executive, and the judiciary. A regulatory policy is carried out by these institutions under the separation

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[7] Also, note that this institutional structure of regulation is applicable to all the regulatory processes such as environmental, health, energy, transportation, and telecommunications regulation.

[8] I use independent regulatory agencies (IRAs) in our model instead of the traditional executive branch because the U.S. Constitution established a relatively weak executive and then, IRAs heavily started to perform in the regulatory policy-making in the United States (Epstein and O'Halloran, 1997).

[9] This figure and framework presented here are drawn from Çetin (2007).

of powers. The political institutions of regulation are independent from each other and the function of each institution is different. However, they have to interact with each other for a successful regulatory performance.

3.1.1 The legislature

The legislature is the principal player of regulation, which decides government policies regarding regulation, deregulation, privatization and competition in the markets. For that reason, the legislature decides the primary regulatory policy and enacts regulatory laws. The legislature also establishes the regulatory institutional structure that constitutionally defines and protects property rights and contracts. The strength of constitutional rules does not only minimize transaction costs by protecting property rights and contracts against governmental opportunism, but also establishes a credible commitment by preventing the political attraction of rent-extraction strategies on returns to private capital (McChesney, 1987). However, the legislature is not the only policy-maker in the regulatory process. Instead, it shares the regulatory policy-making discretion with more credible institutions.

3.1.2 The executive

The executive is established with the aim of bureaucratic agencies responsive to the will of the legislature (McCubbins, 1985; Epstein and O'Halloran, 1999). This structure constitutes a form of the delegation of regulation. In such environment, the task of the executive is to implement the main regulatory policy decided by the legislature. The executive only decides the secondary regulatory statutes that are compatible with the primary regulatory policy of the legislature. On the other hand, the delegation of discretion to the executive is subject to amendment and authorization by the legislature. The legislature determines the administrative structure and process that the executive has to abide. As a result, in the regulatory process, the legislature is principal, and the executive is agent (McNollgast, 1987).

In the United States, the regulatory discretion is constitutionally delegated to IRAs instead of the traditional executive branch as in many other countries (Cushman, 1939). IRAs have a specialized expertise and technical knowledge that the legislature desires to use in the regulatory process. The delegation of policy-making power to IRAs reduces the political transaction costs of regulation (Çetin et al., 2016; Majone, 2001; McNollgast, 1987). Because governments commit that they will not interfere in operational affairs related to the market processes for political ends by establishing IRAs, the delegation of regulatory power to IRAs is a feasible and popular method for a credible regulatory commitment[10]. However, there are necessary conditions to ensure regulatory commitment in a system with IRAs. One of them is the independence of IRAs. The independence of IRAs that reduces political transaction costs is a precondition of credible commitment. Also, political principals have to guarantee the legitimacy of IRAs constitutionally[11] (Majone, 2001).

3.1.3 The judiciary

[10] Indeed, an argument for credible commitment is the time-inconsistency or the political uncertainty in the policy-making process (Majone, 2001; Moe, 1990). In modern democracies, principals are elected for a particular time period at regular intervals. While today's politicians can exercise the political property rights at present, other ones with different and perhaps opposing interests can acquire the right at next elections. Then today's political preferences are most probably subverted legally by tomorrow's political authority (Moe, 1990). In such cases, elected politicians cannot ensure a credible commitment in long-run policies and the political property rights amounts to the discretionary powers. Delegation of the regulatory discretion to IRAs can solve such a time-inconsistency problem. But, it is needed to pay attention that the policy-making power has to be delegated necessarily to IRAs, but not an administrative agent. Because, when short-run policies in the institutional structure of regulatory process deviate from the stable long-run policies, only an independent delegate can provide credible commitment in the long-term (Majone, 2001).

[11] The well-designed institutional environment ensures both procedural and substantive legitimacy. The institutional environment that is created by democratically enacted statutes can ensure procedural legitimacy. On the other hand, the fully delegation of political property rights to IRAs is the guarantee of the agent`s independence. The guarantee is particularly strong when the legal basis of the transfer is not a statute, but a constitutional provision (Majone, 2001). The regulatory discretions and responsibilities of politicians and IRAs in the regulatory process need to be defined and be protected by the Constitution of the country. When the constitutional delegation of political property rights to IRAs limits to third party opportunism, the institutional design of regulation will ensure a credible regulatory commitment and minimize transaction costs. On the contrary, the uncertainty created by the ill-defined political property rights in the regulatory process can impede regulatory commitment and lead to high transaction costs.

The last institution that plays a role in regulation is the judiciary. According to the U.S. Constitution, the main task of the judiciary is to review whether regulation is compatible with the constitution of the country. The judiciary can play a role as a rule maker because the courts can annul and shift by reinterpreting regulatory laws (Landes and Posner, 1975; Spiller, 1990; Rogers, 2001; Stephenson, 2003). Generally, the implementation of regulations has a legal effect only through the courts. Likewise, lobbying by interest groups on the legislature and the executive for a special interest may be negated only through the courts by declaring this action null and ineffective (Cross, 2003). The judiciary can obstacle the manipulation of regulatory process through playing a role as a check and balance mechanism on the legislative and executive branches (Macey, 1988). Legislative and administrative processes under a judicial review may provide a substantial regulatory commitment and minimize transaction costs in the regulatory environments characterized by the explicit separation of powers (Spiller and Tommasi, 2005).

3.2 Institutional constraints

In spite of an explicit separation of powers designed by the Constitution, the interaction among the political institutions of regulation can lead to positive transaction costs and non-credible commitment in the regulatory process (Peabody and Nugend, 2003). For instance, politicians and interest groups can manipulate legislative activities (Landes and Posner, 1975). Or, the judicial process can be shaped by the personal opinions and ideologies of the judges (Gely and Spiller, 1990). Even if all the players aim to maximize public interest, bounded rationality and uncertainty can impede the maximization of public interest through regulation (Williamson, 1975; 1985). Moreover, constitutions, which shape the institutional design of regulation, are incomplete contracts (Grossman and Hart, 1986; Hart and Moore, 1988; Williamson, 1985; Persson et al., 1997). In sum, from the perspective of institutional economics, the separation of powers is needed to limit institutional problems such as

governmental and third-party opportunism in a regulatory process, but it is not sufficient for a regulatory institutional structure with zero transaction costs and credible commitment (Epstein and O'Halloran, 1997). Even though the Constitution establishes the institutional structure of regulation so as to maximize public interest, it is still subject to institutional constraints such as positive transaction costs and non-credible commitment.

3.2.1 Transaction costs

Regulation can be explained in the standard transaction costs arguments (Spiller, 2013; Spiller and Tommasi, 2003). Transaction costs are the costs of transacting in the market. In general, there are three forms of transaction costs; search costs, bargaining costs, and enforcement costs. The cost of transacting is positive when there are hostile, many and unfamiliar parties, unique good or service, unreasonable behavior, numerous contingencies, high costs of monitoring, and costly punishments (Cooter and Ulen, 2004). Note that those costs are related to the contractual nature of regulation (Laffont, 2005). In this sense, transaction costs in the regulatory process are the costs of operating a contractual process and of enforcing regulation (Williamson, 1979). Regulatory contracts are incomplete. This incompleteness refers to the institutional weakness or failure of regulation (Estache and Wren-Lewis, 2009) because incomplete contracts lead to coordination problems (Grossman and Hart, 1986; Hart and Moore, 1988).

It is clear that the institutional design of a regulatory contract determines the magnitude of transaction costs in the regulatory process because the interaction among institutions shapes this institutional design and this interaction includes transaction costs. If the institutional structure of regulation facilitates coordination among institutions, the transaction costs of regulation will relatively be low. In such an institutional environment, regulation is efficient and adaptable. Conversely, an institutional environment, which makes coordination difficult,

will lead to regulation with transactional hazards. Transaction costs will be relatively higher than the former case (Spiller and Tommasi, 2003).

3.2.2 Credible commitment

Another useful tool to account for regulation is credible commitment. The main source of credible commitment in a regulatory process is regulatory governance established by the Constitution. Regulatory governance composes of institutional structures such as the separation of powers or highly centralized governments. The separation of powers is particularly important to limit regulatory discretion and to solve conflicts in the institutional design of regulation. Unless regulatory governance ensures the isolation of arbitrariness from the regulatory process, regulation may not lead to the high levels of investments and welfare (Spiller, 1995; Levy and Spiller, 1994).

In that sense, a major task of the institutional design of regulation is to ensure a credible regulatory commitment because credible commitment is a crucial factor in the realization of investments requiring high fixed and sunk costs (North, 1993). Firms expect to gain a fair rate of return on their investment costs. However, governments can manipulate regulation and expropriate the firm's assets. In particular, governments use this discretion where costs of the institutional manipulation of regulation are so low and the expected utility of such arbitrary discretion is too large (Levy and Spiller, 1996; McChesney, 1987). Clearly, the problem of regulatory commitment in public utility regulation is a consequence of the very nature of the regulatory policy-making processes (Majone, 2001). The coordination problems among institutions or an institutional weakness can lead to limited credibility[12] (Estache and Wren-Lewis, 2009). Firms do not invest if their assets are expropriated or if a fair rate of return is not committed through regulation (Baron, 1995).

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[12] In the previous literature, among others, Laffont (2005) explains the role of limited credibility in the interaction between regulator and the regulated firm.

4. Designing the institutional structure of regulation

4.1 A basic setup

Following the regulatory institutional structure established by the U.S. Constitution, I assume that regulation (R) is the outcome of a game played by the legislature (L), the executive (E), and the judiciary (J) under the separation of powers system. Hence, I introduce a regulation function determined by the interaction among those institutions as:

$$R \ = \ R\ (L, E, J)$$

Hereafter I define this interaction as a coordination problem among the political institutions of regulation to be compatible with the literature of institutional economics. From the perspective of institutional economics, the main reason for such coordination problems is the presence of incomplete contracts (Grossman and Hart, 1986; Hart and Moore, 1988; Williamson, 1975 and 1985). Because regulation as a contract is inevitably incomplete, the institutional design of regulation includes the coordination problems and these problems lead to positive transaction costs. In particular, an ill-designed institutional structure by the country's constitution[13] can lead to the coordination problems among institutions. Under an incomplete constitutional contract, transactions are uncertain and complex, and opportunism is pervasive (Crocker and Masten, 1996; Williamson, 1996). Therefore, I assume the regulatory process is uncertain and unforeseen under an ill-designed institutional structure. Also, I accept that the incompleteness is an outcome of the nature of regulation. This leads to positive transaction costs and a low level of credible commitment by bringing about uncertainty and opportunism in the regulatory process, even if the Constitution establishes institutions to pursue public interest rather than their own interest. Thus, the coordination among L, E, and J reveals transaction costs and regulatory commitment, which determine the

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[13] It is possible to find other institutional components such as the presence of private interest groups and interest conflict among the institutions of regulation that could lead to the ill-designed institutional structure of regulation. For simplicity, I only focus on the effect of incomplete constitutions as an external institutional component.

utility of regulation. When the expected coordination among L, E, and J is fulfilled, transaction costs reduce, and regulatory commitment increases, and *vice versa*.

   Therefore, I assume that there is a negative relationship between transaction costs and regulatory commitment at the different decision points of regulation. Figure 2 illustrates this negative relationship, *ceteris paribus*. Because the curve R represents the change in the regulatory policies established by the various institutional structures, points $d, e,$ and f refer to the different regulation outcomes. Note that the various regulation policies on the curve R correspond to the different combinations of regulatory commitment and transaction costs. If there is a change in regulation policy from d to e, while the level of regulatory commitment declines from RC_1 to RC_0, the level of transaction costs increases from TC_1 to TC_2. Conversely, when regulation policy moves from d to f, the level of regulatory commitment rises, whereas the level of transaction costs declines. This suggests that credible commitment decreases/increases if transaction costs increase/decrease when a new regulatory policy is determined under a different institutional structure in time. This is an outcome of the very nature of institutional structures in the real world from the perspective of institutional economics.

Figure 2 Relationship between regulatory commitment and transaction costs

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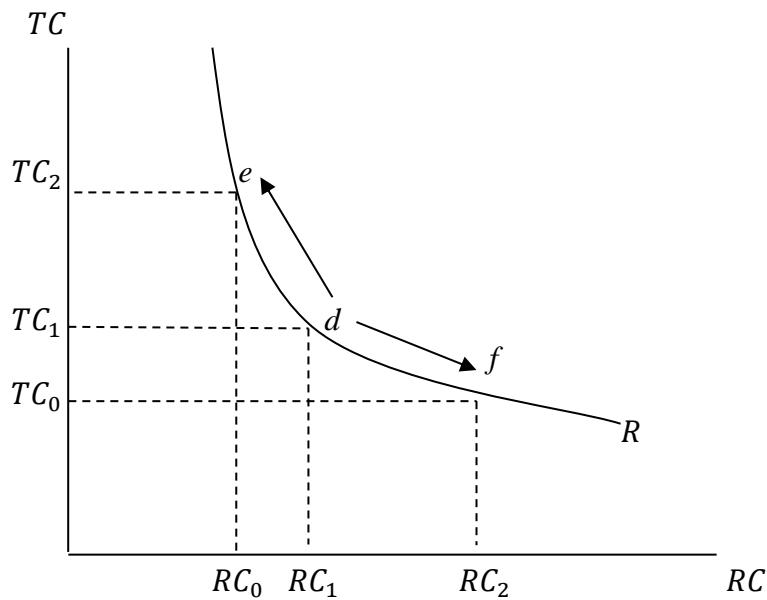
The game defined here is a cooperative game[14] in which each agent aims to maximize public interest rather than its-own interest. This is consistent with the U.S. Constitution because both regulation and the institutions of regulation are designed to pursue public interest according to the Constitution (Landes and Posner, 1975; Macey, 1987; Epstein and O'Halloran, 1997). Therefore, the optimum point for regulation will be able to attain in a game with the Nash Equilibrium since both the utility of agents and public interest resulting from regulation outcome are maximized in this equilibrium under a given institutional structure. In other words, the utility of institutions is positively correlated with public interest resulting from regulation. I conclude that when an outcome is achieved as the equilibrium of this cooperative game, this outcome is a regulation equilibrium where the utility of all agents is maximized under institutional constraints.

Because my objective is to analyze whether there is an efficient/optimal regulation under institutional structure with a well-defined public interest, as argued in the neoclassical economic theory, I define the efficient/optimal regulation through the utility resulting from the institutional structure of regulation. I assume that efficiency is achieved if the coordination among institutions leads to the best outcome in terms of the utility of regulation. The utility of regulation will be defined more formally below. At this point, I accept that there will be no deviation from the outcome of regulation game because the utility of agents is the same with public interest, which directly implies that the outcome will be Nash Equilibrium even when it is not Pareto-efficient.

Lastly, I employ two different technical tools in order to explain the different equilibrium regulations under institutional constraints. First, following Kameda (2005) and Kameda et al. (2012), I investigate the necessary conditions for the Pareto optimality of equilibrium

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[14] Hereafter, I interpret the player as a group of political institutions making a regulatory policy because a player may be interpreted as an individual or as a group of individuals making a decision. Also, note that this player or the group of political institutions clearly refers to the institutional structure of regulation. Accordingly, this is a cooperative game. I assume that the political institutions of regulation make a decision as a group and I refer to this group of players as coalition.

solutions. Second, using the Nash equilibrium analysis, I aim to explore the decision points for the political institutions of regulation as players of the game. The aim is to define the Pareto-efficient Nash equilibrium of regulation, which is the best policy outcome, from the viewpoint of neoclassical and institutional economics. Note that this is the outcome that the Constitution aims to reach through regulation. As expressed above, in the articles I, II, and III, the U.S. Constitution establishes the political institutions of regulation to this aim.

4.2 Equilibrium regulations

Figure 3 depicts the central thesis of the paper. In the figure, λ and θ, which are determined as per the coordination among institutions designed by the Constitution, represent regulatory commitment and transaction costs, respectively. Accordingly, the utility of regulation can be defined by $(\lambda - \theta)$, which represents the difference between transaction costs and credible commitment at each equilibrium point. In order to define the utility of regulation, I use a classic von Neumann expected utility function, which is linear. That is, the utility of regulation at each point is represented by $U_R(X_Z)$ where the value of X is determined by $(\lambda - \theta)$:

$$U_R(X_Z) = U_R(\lambda - \theta)$$

Figure 3 Decision points for regulation
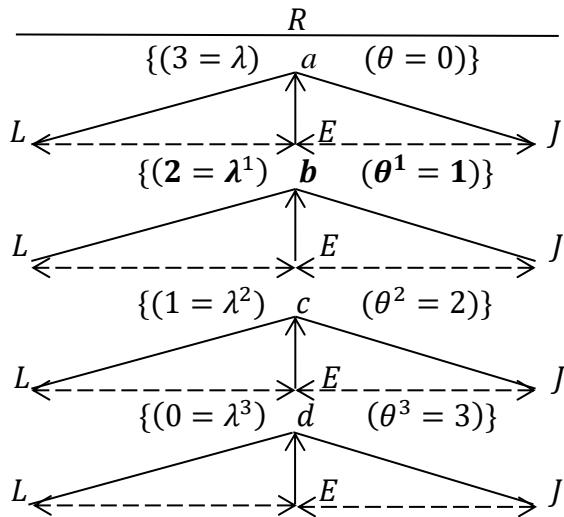
When the decision points for regulation move from point d to a, a negative relationship between λ and θ is observed:

$$R(d) \rightarrow R(a)$$

$$\lambda^3 R(a) < \lambda^2 R(b) < \lambda^1 R(c) < \lambda R(d)$$

$$\theta^3 R(d) > \theta^2 R(c) > \theta^1 R(b) > \theta R(a)$$

At each point, the net expected utility from the regulatory policy-making is as follows:

$$U_R(a) = (\lambda R(a) - \theta R(a))$$

$$U_R(b) = (\lambda^1 R(b) - \theta^1 R(b))$$

$$U_R(c) = (\lambda^2 R(c) - \theta^2 R(c))$$

$$U_R(d) = (\lambda^3 R(d) - \theta^3 R(d))$$

Then, the order of the net expected utility for regulation (R) is, in turn:

$$(\lambda R(a) - \theta R(a)) > (\lambda^1 R(b) - \theta^1 R(b)) > (\lambda^2 R(c) - \theta^2 R(c)) > (\lambda^3 R(d) - \theta^3 R(d))$$

Accordingly, the utility of regulation can be ranked as the set of possible outcomes:

$$U_R(a) > U_R(b) > U_R(c) > U_R(d)$$

Points $a, b, c,$ and d represent the different equilibria for regulation policy (R) under the various institutional structures in the different time periods. While point d refers to an institutional structure with the highest transaction costs $(\theta^3 = 3)$ and the lowest credible commitment $(\lambda^3 = 0)$, point a represents an institutional setting with the lowest transaction costs $(\theta = 0)$ and the highest credible commitment $(\lambda = 3)$. For that reason, the maximum level of the net expected utility is attained at point a. In other words, point a represents a regulation equilibrium in which public interest is maximized through regulation. I can conclude that there is no coordination problem among institutions at this point since institutional structure is perfectly designed by the Constitution.

However, the regulation equilibrium at point a where transaction costs are zero refers to a regulation policy from the perspective of neoclassical economics. Even though this point is

the first-best regulatory policy in which the institutions of regulation maximize public interest through regulation, this is not a realistic outcome because it does not include the effect of institutional components on regulation. For instance, this equilibrium implies the presence of perfect coordination or the absence of asymmetric information among institutions given an institutional structure designed by the Constitution. Yet, institutional structures include contractual/constitutional incompleteness as discussed above. If the Constitution are incomplete or if the institutional structure of regulation is ill-designed by the Constitution, such an institutional structure leads to the coordination problems that bring about the higher transaction costs and less credible commitment than point a. If this is the case, the decision points for regulation move from a to d. As a result, points $b, c,$ and d refer to the regulation equilibria in which public interest is not maximized since the Constitution is incomplete. In other words, points $b, c,$ and d where transaction costs are positive represent regulation outcomes from the perspective of institutional economics.

This is the first result of the model, which suggests that there is an important difference between neoclassical and institutional economics on regulation. While neoclassical economics totally neglects the effect of institutions in a regulation policy, institutional economics reveals the role of institutions in the regulatory process. If there are institutional constraints, a regulation policy with zero transaction costs is not possible. This result also suggests that the expected utility from regulation policy or public interest increases when the Constitution designs a better institutional structure, and *vice versa*.

4.2 The efficiency of regulation

As in illustrated in Figure 4, there are four (achievable and unachievable) outcomes from the equilibrium analysis of regulation: $U_R(a), U_R(b), U_R(c),$ and $U_R(d)$. These outcomes can be used to define the Pareto optimum conditions to explain the difference between neoclassical and institutional approaches to equilibrium regulations. If $U_R(a) > U_R(b) >$

$U_R(c) > U_R(d)$, $U_R(a)$ is Pareto superior to $U_R(b)$, $U_R(c)$, and $U_R(d)$. Or, $U_R(b)$, $U_R(c)$, and $U_R(d)$ are Pareto inferior to $U_R(a)$ since $U_R(d) < U_R(c) < U_R(b) < U_R(a)$. By using the set of these solutions, I can define strong Pareto superiority or inferiority and thus, the efficient and inefficient points of regulation. Accordingly, when I define k_i as $U_R(a)/U_R(b, c, \text{or } d)$, $U_R(a)$ is Pareto superior to $U_R(b)$ and the other points, if and only if $k_i > 1$ for all the points of regulation $a, b, c,$ and d (Kameda, 2005). Or, if and only if $k_i < 1$ for all the points of regulation $a, b, c,$ and d, then $U_R(b)$ and the other points are Pareto inferior to $U_R(a)$. Thus, $U_R(a)$ is strongly Pareto superior to $U_R(b)$, $U_R(c)$, and $U_R(d)$, whereas $U_R(b)$, $U_R(c)$, and $U_R(d)$ are strongly Pareto inferior to $U_R(a)$. Therefore, $U_R(a)$ is the Pareto efficient point of regulation, while $U_R(b)$, $U_R(c)$, and $U_R(d)$ are the Pareto inefficient points of regulation.

Figure 4 The payoff matrix for the utility of regulation
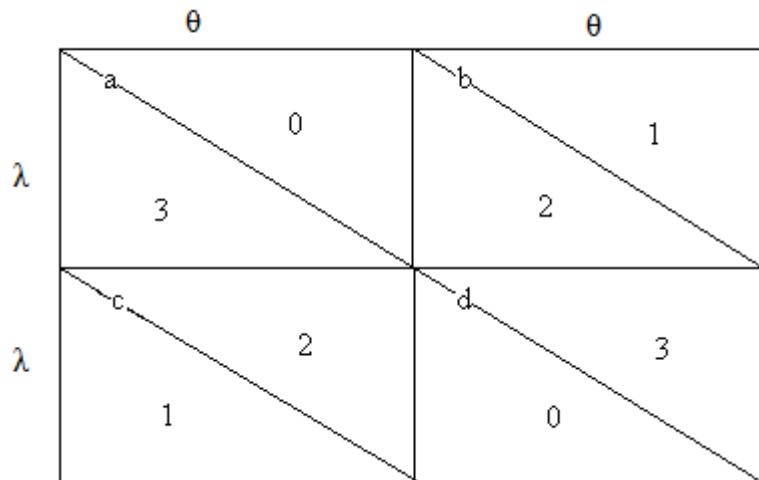
Even though $U_R(a)$ is the Pareto efficient point of regulation, this solution is not realistic. As elaborated above, it is not possible to reach regulation equilibrium at point $a - R$ with $U_R(a)$ because θ is inevitably positive in the real world and λ cannot be at the highest level due to the presence of a negative relationship between λ and θ. Therefore, the most efficient or Pareto superior regulatory policy is a utopian and hypothetical equilibrium for a regulatory process in the real world. In other words, this is a Pareto-efficient regulation outcome from the perspective of neoclassical economics. Instead, points $b, c,$ and d where θ is positive represent

more realistic regulation equilibria. However, the expected utility of regulation $U_R(a)$ is positive only at point b where λ is still higher than θ. Conversely, the expected utility of regulation in other regulation equilibria $U_R(c)$ and $U_R(d)$ at points c and d where λ is less than θ is negative, as illustrated in Figure 4. Accordingly, the realistic decision point for regulation corresponds to $U_R(b)(\lambda^1 R(b) - \theta^1 R(b))$ rather than $U_R(a)(\lambda R(a) - \theta R(a))$. This is a Pareto-efficient regulation outcome from the perspective of institutional economics.

Even though this refers to the second-best regulatory policy in our model, it still represents a Pareto superior equilibrium of regulation. Note that $U_R(b)$ is Pareto superior to $U_R(c)$ and $U_R(d)$ because $U_R(a)$ is not an achievable equilibrium. If regulation equilibrium at point a is excluded from the set of achievable equilibria by accepting that the political institutions of regulation cannot reach point a in the real world, the set of probable outcomes will consist of $U_R(b)$, $U_R(c)$, and $U_R(d)$. Now, these probable outcomes refer to the set of achievable outcomes for regulation from the perspective of institutional economics. In that case, $U_R(b)$ is Pareto superior to $U_R(c)$ and $U_R(d)$. Hence, the first-best regulatory policy should be evaluated by making a distinction between the utopian and realistic Pareto superior equilibria. This result suggests that the first-best Pareto superior equilibrium may not exist for a regulatory policy in the real world. Instead, the first-best regulatory policy of the real world is the second-best Pareto superior equilibrium of regulation[15]. In other words, while the regulatory policy corresponding $U_R(b)$ is hypothetically Pareto inferior to $U_R(a)$, it is realistically a Pareto superior equilibrium to $U_R(c)$ and $U_R(d)$. This finding suggests that

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[15] In fact, in the previous literature, the idea that regulation might only achieve a second-best policy outcome has already been shown by Laffont and Tirole (1993) and Laffont (1994). This approach was called as the new economics of regulation. However, our model and outcomes differ from the new economics of regulation. They only focus on the interaction between regulator and the regulated firm and show that optimal regulation is not possible due to the asymmetric information problem between them. The new economics of regulation also tries to explain supply side of regulation, but it is not interested in the institutional structure of regulation as in this paper. Differently, this paper tries to explain the supply for regulation by analyzing the interaction among the institutions of regulation. For that reason, the results in this paper are different from the new economics of regulation.

regulation is inevitably sub-optimal in the presence of institutional constraints from the perspective of institutional economics.

4.3 Nash equilibria for regulation

Lastly, I combine the conditions of Pareto optimality with the standard game theory terminology to explain equilibrium regulations in detail. Although I do not define the preferences and actions clearly in the model for simplicity, the necessary assumptions and framework to analyze the Nash equilibrium of the game are attained. Note that I have already defined the Pareto superior/efficient and inferior/inefficient equilibria of regulation. Also, remember that each player aims to maximize both its own utility and public interest through regulation. Accordingly, when the institutions of regulation carry out the first-best regulatory policy, they will maximize both their own utility and public interest.

The Nash equilibrium of this cooperative game is point a at which there is no reason for a single deviation and public interest is maximized. Because each player at point a is better than the other points $b, c,$ and d, players determine their own strategy at this point. No institution may increase its utility without decreasing the utility of other institutions at point a. Because this is the standard equilibrium notion for a cooperative game, point a is a Nash equilibrium. On the other hand, because $U_R(a)$ is strongly Pareto superior to $U_R(b), U_R(c),$ and $U_R(d)$, point a represents a Pareto superior Nash equilibrium. Therefore, point a at which θ is zero and λ takes its highest value refers to the first-best Pareto optimum Nash equilibrium. This is the first-best institutional structure for regulation policy that the Constitution aims to design.

However, point a, which represents a utopian and hypothetical equilibrium, is the equilibrium of neoclassical approach to regulation game because θ is zero. This outcome is not realistic from the perspective of institutional economics. In this sense, point b represents the Pareto border of the institutional design of regulation since point a is an unachievable outcome. This Pareto border separates the achievable and unachievable states for regulation

under the various institutional structures designed by the Constitution. Points b, c, and d refer to the set of achievable Pareto efficient states, $U_R(b), U_R(c)$, and $U_R(d)$, whereas point a represents the unachievable regulation policy $U_R(a)$ in the real world. Point a should be excluded from the set of possible outcomes. The decision for the regulatory policy has to be made at another point where θ is not 0. At this point, the utility of regulation still has to be positive as in a, but not zero or negative as in c and d. For that reason, the value of λ should be higher than the value of θ for $k_i > 1$. Otherwise, regulation is not accepted because its utility is negative. Consequently, the achievable and acceptable outcome for regulation in Figure 4 is sphere b in which $\lambda(2)$ is larger than $\theta(1)$.

Point b as the second-best regulatory policy is the Pareto efficient Nash equilibrium of regulation from the perspective of institutional economics. There is no single deviation from point b for any agent because the deviations to point a are not allowed and the deviations to points c and d are not beneficial. Because θ and λ will not change unless players deviate, the expected utility for regulation is maximized in the equilibrium at point b. This result shows that the best institutional design of regulation would exist only in the second-best Pareto superior Nash equilibrium as the best political outcome since the institutional design of regulation will never be possible in the first-best Pareto superior Nash equilibrium. In other words, the institutional theory of regulation suggests that the Constitution cannot design an institutional structure maximizing public interest in the regulatory process even though it establishes a separation of powers system. Consequently, there is no optimal regulation in the real world with positive transaction costs, even if the institutions of regulation try to maximize public interest rather than their own private interests. Or, regulation is inevitably sub-optimal even if the institutions of regulation are designed to pursue public interest by the Constitution under the separation of powers.

5 Conclusion

In the real world, there are inevitably institutional constraints such as coordination problems, uncertainty, opportunism, and asymmetric information in the interaction among institutions from the perspective of institutional economics. Those institutional constraints lead to an institutional incompleteness in the policy-making processes. Regulation policy is not exempt from this fact. While institutional incompleteness gives rise to a weakness in the institutional design of regulation, an ill-designed institutional structure brings about a limited credible commitment and high transaction costs in the regulatory process. Even though the Constitution establishes the separation of powers and designs the legislature, the executive, and the judiciary as the political institutions of regulation to pursue public interest rather than their-own interest in regulation game, the presence of institutional constraints makes the first-best regulatory policy unachievable. This result suggests that the first-best policy outcome for regulation is not possible. As a result, the institutional theory of regulation rejects the notion of "optimal" regulation because an institutional structure designed by the Constitution cannot ensure the first-best regulation policy in the real world.

Conversely, the first-best Pareto-optimal Nash equilibrium of regulation is only possible from the perspective of neoclassical economics. However, because the role and effect of institutions and institutional components in a regulatory process on regulation outcome are neglected in this equilibrium, the approach of neoclassical economics to regulation is utopian and hypothetical. In other words, the claim that the Constitution can design a regulatory institutional structure, which maximizes public interest through regulation, is a neoclassical argument and not realistic. Regulation is inevitably sub-optimal since the institutional structure of regulation can only be designed at the second-best Pareto efficient point even under a constitutional setting with the separation of powers system. Consequently, including the effect of institutional components into the analysis of regulation, this paper presents an institutional theory of regulation, which is more realistic. Thus, it opens the supply side of

regulation as a black box left in the previous literature. However, this is a first step. The next step is to develop the outcomes of this study.

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