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A Public Goods Approach to Regulation of Utilities

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May 2001

Abstract

The objective of this paper is to broaden the discussion on regulation in general and on the regulation of utilities in particular. Beyond the technical complexity involved in designing and implementing regulatory interventions, we focus our attention on the conditions for achieving a fair process of regulation. Such a process takes into consideration the interest of consumers as well as those of the investors and the government. We conceptualize the problem of regulation as a problem of provision of a pure public good. Failure to provide this public good results in capture, when regulation favours implicitly or explicitly one of the incumbent parties, namely private utility operators.

We consider the nature of the utilities markets after privatization which justifies the creation of regulatory bodies. We examine the cases of telecom and electricity in Argentina, Bolivia and Peru. We then introduce the notion of regulation as a pure public good. We use the standard public good framework to highlight the determinants of the supply of regulation and we further look at regulation with an institutional perspective. We next present the model of regulation by an independent agency, which is widely followed in Latin America. In this framework we also consider the tradeoffs between discretion and accountability, and introduce the notion of conflicting interest among the different actors in the process of regulating utilities. We conclude with a consideration of the limits to the formulation of regulatory policies in the context of the Latin American countries under study.

Keywords: publicly provided goods; economics of regulation; utilities; Latin America

JEL classification: B25, H4, L1, L33, L51, L94, L96, L97, L98, N46

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1 Introduction

In spite of not being ‘public goods’ in the strict sense of the term, public provision of utilities has grown in importance over the years. Among the major reasons underlying the dominant position of the public sector as the provider of infrastructure are the recognition of the economic and political importance of infrastructure for development, and the faith that government provision could offset market failures characterizing the utilities market. However, following a period of increased macroeconomic imbalances, public provision of utilities became increasingly inefficient. Despite the commitment of governments to universal access to the services, large sectors of the population remained excluded. At the same time, the financing of services became a heavy burden on government budgets. Prior to privatization, the utilities sector was characterized by government’s direct intervention on pricing and investment decisions and by non-transparent regulatory systems. As a result, the tariff structure associated with infrastructure services was severely distorted, notably, average tariffs were set below the long-run average costs. The results were disastrous for the financial viability of the enterprises, bringing the problems of underinvestment, congestion and exclusion that we know.

Privatization represents an important change in the provision of infrastructure. A desire to raise the efficiency of service delivery moved governments around the world to seek private involvement in sectors formerly dominated by state ownership—telecommunications, gas, electricity, water and sanitation, etc. For Latin America as a whole, one of the main motivations underlying the privatization drive was to attract private financing in order to alleviate the burden of public services on the budget. In many cases, telecommunications, power, and more recently, the water sector, have attracted substantive inflows of foreign direct investment, strengthening the foreign exchange position of the recipient countries.

However, as the process of privatization evolved, the evidence pointed to the fact that ownership *per se* could not solve all the problems associated with the provision of utilities, especially those related to ensuring affordability to the poor and more vulnerable in society. Competition needed to be strengthened. The problem became how to enforce competition in markets characterized by failures motivated by the nature of the goods provided.¹ The solution is the establishment of regulatory mechanisms to tackle monopoly power and to ensure that the benefits from liberalizing the markets reach all consumers. As of today, most countries in Latin America are in the process of improving regulatory tools. Facilitating access by low-income groups to the services is one of the major tasks of regulation; making services affordable to impoverished populations is another. Thus, access and affordability are challenges to competent regulation throughout the region.

The objective of this paper is to broaden the discussion on regulation in general and on the regulation of utilities in particular. Beyond the technical complexity involved in designing and implementing regulatory interventions, we focus our attention on the

¹ For instance, utilities are characterized by important sunk costs that hinder competition, making it difficult for new suppliers to enter the market; distribution activities are natural monopolies, etc.

conditions needed for achieving a fair process of regulation. Such a process will take into consideration the interest of consumers as well as those of the investors and the government. The political economy approach to regulation has warned against the negative effects of government's opportunistic behaviour. For instance, government's failure to commit to a credible regulatory policy would, among other factors, deter private investment. Private operators would then hesitate to invest in places where there is considerable uncertainty about the conduct of future economic policy. In this paper, we also consider the possibility of opportunistic behaviour of private firms. After all, 'Regulated firms are neither saints, nor naive' (Spiller 1995: 75). They are able to design strategic interventions that may well counterbalance the actions of governments. Consumers can also behave opportunistically and capture regulators. This may be the case when regulators are directly elected.² However, in Latin America regulators are appointed by the authorities. In this framework, the consumer's ability to influence the process of regulation is more restricted. We intend to conceptualize the problem of regulation as the problem of the provision of a pure public good. Failure to provide this public good will result in capture—when regulation favours implicitly or explicitly one of the incumbent parties, namely private utility operators.

In the second section, we consider the nature of the utilities markets after privatization that provides justification for the creation of regulatory bodies. We consider the cases of telecommunications and electricity in Argentina, Bolivia and Peru. In the third section of the paper, we introduce the notion of regulation as a pure public good. We use the standard public good framework to highlight the determinants of the supply of regulation and we look further at regulation from an institutional perspective. In the fourth section, we present the model of regulation by an independent agency, which is widely followed in Latin American countries. In this framework we also consider the tradeoffs between discretion and accountability and introduce the notion of conflicting interest among different actors involved in the process of regulating utilities. The fifth section—considering some limits to the formulation of regulatory policies in the context of the Latin American countries under study—concludes the paper.

2 Why regulation? The nature of the utilities markets after privatization

Utilities are not public goods in the economic sense of the term. According to their consumption characteristics, telephones, electricity, and water can be classified as private goods. Private goods are excludable and rival. For instance, electricity and water are delivered through networks (water pipes, electric grids, etc.) designed to satisfy the demand of several users. Access/exclusion depends on being connected to the network. The degree of rivalry depends on the additional costs imposed on other users or on the provider when an additional unit of service is consumed. In addition, as networks operate close to full capacity and natural resources like water are scarce, consumption of the services becomes rival.

² For a theoretical treatment of the appointment of regulators versus their election, see Besley and Coate (2000).

Can the markets for telecoms, electricity, water, etc. be competitive? The presence of economies of scale, economies of scope and sunk costs in the production/delivery of utilities is in principle detrimental to competition. On one hand, utilities have been long characterized as *natural monopolies* because the presence of economies of scale made the operation of more than one supplier in the market inefficient. On the other hand, economies of scope are also verified. This means that it is cheaper for the producer to supply not just one service, but a bundle of them—long distance calls (international and national), the generation and distribution of electricity, etc. This is a major reason underlying the *vertical integration* of these industries. Finally, the production and delivery of all the services entailed *sunk costs*. In the case of electricity, telecoms and water, sunk costs arise because the investment in pipes or wires needed for distribution of the service is neither recuperable nor usable for other purposes. The presence of sunk costs made it difficult for new suppliers to enter the market.

However, over the last years, innovation and technological progress have allowed the disaggregation of one sector into a range of activities, some of them offering greater possibilities of entry into the market. In the case of electricity, generation is becoming increasingly competitive. There is also increasing scope for competition in activities related to water treatment, metering, etc. Another aspect of innovation is seen in telecommunications, where optic fibre cables, although specific for carrying telecommunication signals, are not longer restricted to fixed communications and data transmission. Finally, the emergence of cellular telephones introduces the possibility of substitution for telephones in a market previously dominated by fixed technology.

As Armstrong, Cowan and Vickers (1995) point out, although no two industries are alike, utilities have important elements in common. They combine two types of activities: the so-called type-I activities, which are naturally monopolistic and type-II activities which are *potentially* competitive. For instance, in electricity, type-I activities include transmission and distribution, and type-II activities include generation and supply to large users. Following this, authorities in charge of designing a privatization strategy first need to identify the industry structure and the scope for competition in order to implement privatization and regulation policy. In the utility sectors, there are obvious limits to competition especially in the distribution elements. The presence of rival firms in markets with natural monopolistic characteristics such as networks can cause (rather than correct) a market failure for two reasons.³ Regulation is thus needed in these industries to prevent monopolistic gains from non-competitive activities.

In the context of Latin American utilities, regulation was needed not only because of the monopolistic nature of the activities related to service distribution, but also because privatization agreements granted incumbent firms periods of limited competition in the market. This was the case in the privatization of telecommunication in Peru where exclusive rights were given to Telefónica del Perú to operate basic telephony services

³ Although direct competition in the market is not possible, it is possible to compete for the right to operate in the market. There is a whole array of mechanisms ranging from simple contracts for specific services, leasing, etc, to concessions that can be used to foster competition before a contract is signed or renewed.

for a period of five years.⁴ Other services—mobile telephony, data transmission, e-mail and cable television—were open to competition (see Pascó-Font and Torero 2000). In Argentina, licence to operate in the market for basic telephone services was given to two companies, Telefónica S. A. in the southern part of the country, and Telecom S. A. in the north. Exclusive rights of operation to these two regional monopolies were granted for seven years with an option of three additional years, conditional on reaching certain targets (see Delfino and Casarin 2000). In the case of electricity, governments have created regional monopolies in transmission and distribution both in Argentina and in Peru. Competition has been enforced in electric generation in Argentina where, after privatization, about 40 generation companies operate across the country. In Peru, privatization/restructuring of electricity generation has not yet been concluded. As a result, there are five private companies supplying 51 per cent of the total generation in the country. The biggest generation company operating in Lima and comprising five hydroelectric and one thermal generator, was privatized as a single entity. Free entry to the generation market exists in Peru but opportunities for competing are hindered by the high investments needed to establish new generators, especially hydroelectric plants.

There are a few reasons underlying the government's adoption of the strategy of competition for the market and the creation of regional monopolies instead of the enforcement of direct competition when possible. First was the need to maximize revenues from the sale of enterprises. As mentioned before, privatization took place in the midst of severe macroeconomic imbalances that were affecting many countries of the region, which created the necessity to maximize revenues to alleviate budget deficits. Bolivia is a noticeable exception: privatization of infrastructure took place at the time when macroeconomic stability had already been achieved. Revenue maximization was not the objective of the Bolivian government, which adopted a modality of privatization called 'capitalization'. With capitalization, 50 per cent of the enterprise shares were sold to the highest bidder, a strategic international investor, and the proceeds from the sale were paid to the enterprise itself, not to the government. Thus, enterprise doubled its net worth, and the money was used to finance future investments (see Ewing and Goldmark 1994, and Barja and Urquiola 2000). The remaining 50 per cent of the shares, initially in government hands, were distributed to the country's adult population.

Periods of limited competition were also adopted in order to achieve certain targets for service expansion and quality improvement. Privatization of the utilities took place in an environment of huge unsatisfied demand. For instance, at the time of privatization of the state-owned companies operating in the Peruvian telecom market in the early 1990s, the penetration rate for fixed telephones was under 2.5 per 100 inhabitants, one of the lowest in South America and far below the penetration rate corresponding to its level of income. There were also several service-quality factors that needed to be improved. This was done through the digitalization of the service. The expansion and modernization goals in the concession contract projected a total of 1,197,600 new lines (see Pascó-Font and Torero 2000), meaning that the investment requirements to up-

⁴ In reality, the period of exclusivity lasted only four years. Telefonica del Perú terminated its exclusive rights a year before it was legally required to do so.

grade the existing network were sizeable. Thus, in order to make the operation attractive, the Peruvian government granted exclusivity rights to reduce the risk for the investor. The accumulated investment, since privatization, is estimated at 3.8 billion USD, and the penetration rate (including cell phones) is now 10 per 100 inhabitants (OADB 2001). Furthermore, the concession contract included the goals of connecting 1,486 communities of more than 500 inhabitants to the network and of installing 19,000 public pay phones (Macroconsult 2000).

3 Regulation and public goods

Regulation is a set of enforceable mechanisms designed to circumvent the monopoly power of utility operators. In addition, regulation defines the standards of service provision. The regulator's problem is determining the quantity and the price of the services in order to maximize the society's welfare utility function. Regulation touches on three aspects which are crucial determinants of consumer's welfare: price, quality and access to services. Regulation shares the attributes of public goods: non-excludability and non-rivalry. Regulation ought to be non-excludable. However, this attribute of publicness is not a fixed attribute. It depends on policy design. It is sometimes difficult to characterize regulation as a public good because more often than not, the public bad—regulatory capture—is present. For regulation to be a public good, regulatory tools—the rules, their meaning and expected outcomes—should become a matter of public concern. They should enjoy broad public acceptance and, more importantly, they should apply to everyone. When regulation is captured by the utility operators group, it becomes a public bad. In the utilities' regulatory process, we can distinguish three main groups or actors: the government, private utility operators, and consumers.⁵ We recognize that the government and private companies have enough bargaining power to transfer the balance of regulation to favour their own interests. Consumers in general are less organized as a group and therefore face more difficulties in having their demands translated into policies.

Regulation should be non-rival. The existence of an additional consumer being subjected to the same regulation does not entail any disadvantage to existing users. On the contrary, when regulation is extended to additional consumers, it creates positive externalities. For instance, regulation that improves access to water and sewerage benefits not just the individual, but the entire community by lowering health risks. Regulation that ensures electricity supply in deprived urban areas lowers crime incidence. There is also a particular type of externality known in the telecom business as network externality. For instance, regulation that ensures universal access to telephones benefits all existing consumers because they are able to communicate with more users.

⁵ We can further distinguish private utility operators as foreign or local companies. In the case of consumers, we can distinguish low-income and high-income consumers. For the purpose of this paper, we treat private companies as a homogeneous group. In the case of consumers, we assume that the interests of high-income consumers are aligned either with the government or with private companies.

3.1 How is the optimal supply of regulation determined?

The theory of public goods also provides an useful way to conceptualize the supply of regulation and eventually the problems that policy-makers may encounter in designing regulatory mechanisms. First, let us assume that regulation is provided by a government that has perfect information about the preferences and needs of the users. The government has also the possibility of levying a lump-sum tax. Let us also assume that the individual's utility is defined in terms of the consumption of one 'private' good (telephone connection) and one 'public' good (regulation of the telecom industry). According to Samuelson (1954), the optimal supply of public goods is determined by the sum of the marginal rates of substitution between regulation (public good) and telephone connection (private good). Since one individual benefiting from regulation in the telecommunications market does not exclude another individual from enjoying it, the benefits of regulation can be summed up across individuals to calculate the optimum supply. In this framework, private goods have a market-determined price and public goods have to be financed through taxes. The Lindahl mechanism allows to identify a vector of 'personalized' prices for the public good. It distributes the burden of financing the public good (regulation) across individuals. Each individual faces a tax share. The sum of the tax shares of all individuals ensures a balanced budget. In other words, regulation is available to all in the same way, but for each individual it has a different price tag.⁶

Why pay for regulation—why vote in favour of a certain distribution of the tax burden—if regulation is a public good? If sound regulation is in place for the benefit of all users, users would have the incentive to avoid payment (free riding), and to let someone else assume the burden. However, there would be the incentive to free ride, but only when regulation is already provided. In other words, even a selfish individual may vote in favour of regulation in the event nobody else does. The provision of regulation corresponds to a public good game. In contrast with the Prisoner's dilemma where it is better to be selfish whether others are selfish or not, in the public good game non-cooperation is not the dominant strategy. The selfish individual will have to contribute to the public good in the event nobody else does. Capture being the default circumstance in the absence of regulation, individuals would favour regulation even if they have to pay for it.

The two attributes of regulation, publicness and non-rivalry, can also be associated with the existence of institutions. According to North, institutions are the rules of the game in a society. They are composed of formal rules, informal constraints, and of their enforcement characteristics. Formal rules can be changed overnight by the polity, while informal constraints change very slowly (North 1997: 1). Institutions enhance efficient market exchanges by lowering transaction costs and lending credibility to commitments.

⁶ The costs entailed by the regulation process can be of different nature. We consider here only the so-called direct costs associated with the establishment of the system. The other costs refer to the imperfection and flaws of the regulatory system, especially those induced by incentives (e.g. excess investment); costs associated with the regulatory lag, slowness of the process, or coordination flaws, which cause risk aversion behaviour on the side of the providers; costs associated with the speculation to capture gains, etc. (Corrales 1998).

Institutions fulfil a dual role: to provide discipline and to license. Institutions curb opportunistic modes of action and provide actors with socially validated standards (Offe 1996).

According to this, regulation is an institution designed to lower transaction costs in the utilities markets. But what are the transaction costs involved in the operation of these markets? Transaction costs encompass anything that impedes the specification, monitoring or enforcement of an economic transaction (Dixit 1998: 38). Economic transactions are summarized by contracts, but contracts applied in the utilities market are fairly incomplete because it is very difficult to predict the development of technology, input prices, demand behaviour, etc. Furthermore, asset specificity often characterizes the production of these services. This means that once investment is effected, it is not non-reversible and difficult to divert assets to alternative uses. The presence of bulky investments and sunk costs are also aspects of transaction costs. The irreversible nature of investments make these sectors prone to 'opportunism'.

Let us take the case of electricity industry: transaction costs include the costs of drafting, negotiating and safeguarding an agreement between the electricity generator and the company in charge of distribution. Another source of transaction costs are those associated with modifying agreements to reflect some unexpected changes affecting the demand or supply side of the market. But what is the source of opportunism in this case? Let us consider the case of an electricity generator competing with others to sell electricity to a monopolistic distributor. The generator has to undertake a major investment to establish a power plant. Once the investment is made, the generator is at mercy of the monopolistic distributor, who may decide to pay just the operating costs, leaving the generator unable to recover the initial investment. This is known in the literature as the 'hold-up problem'. It is in the interest of the generator to establish a contractual agreement prior to investment so that the returns are not expropriated by the distribution company. Similarly, opportunistic behaviour can be verified on the side of the generator if the market for generation has not been liberalized and the distributor faces only one potential supplier. Thus, long-term contracts need to be devised in order to motivate an adequate amount of investment on both sides. On the other hand, safeguard mechanisms to enforce the contracts also need to be in place in case of disputes or disagreements between the incumbent companies. The regulatory framework of the sector needs to be designed to foresee these eventualities and to minimize economic transaction costs.

The utilities market and its regulation also suffer from transaction-cost politics. For instance, the government can influence the regulator to favour the utility companies. These, in exchange, will make contributions to political campaigns. 'In the transaction cost politics, the basic relation is a political transaction, trading votes (or contributions) for promised policies, or sometimes simply votes for votes' (Drazen 2000: 97). Here the problem of dynamic inconsistency is more acute because votes are given in exchange for future policies, so opportunism is likely to occur in absence of safeguards.

4 Who should provide regulation? The model of regulation by an independent agency

... it is not self-evident that simply because the good is 'public', [...], it should be provided by the government (Drazen 2000: 373)

So far we have considered implicitly the case in which the government is the regulator. This is not exactly the most common practice. Latin America, by establishing regulatory agencies, has in general adopted the UK model of regulation. In cases of regulation by an agency, the government is one of the actors in the regulatory process.

The regulatory agency is an independent body that centralizes the tasks of regulation. The agency is created by law which outlines its mandate: gather information on production costs and investment, calculate prices and tariffs, evaluate the behaviour of different players in the market, provide operating licenses, etc. In addition, the agency bases its actions on the sector's legal framework. This legal framework introduces a valid code of provider conduct, against which their performance will be assessed. The regulatory agency also provides incentives for efficiency through its tariff system which is revised periodically.

But how independent should the agency be, or more exactly, independent of what? As we see below, the definition and degree of independence of the regulatory agencies vary across countries and are also a matter of heated debate. Following Blinder (1997 and 1998), we consider that independence in this context means detachment from (partisan) politics. If the regulatory agency is not independent from politics, the objectives of regulation may get confused with other aims.⁷ Two important reasons are given by Blinder (1997) for isolating policymaking from politics. These apply to the regulatory bodies as well. First, the regulation of utilities is a technical field where specialized as opposed to political knowledge is needed. And second, policy decisions taken by expert regulators would require a long time to bear results, but long time-horizons are not usually associated with politicians.

For instance, in countries with high political instability, as in Latin America, one of the aims of regulation is to protect private investors from the risk of 'administrative' expropriation (Spiller 1995).⁸ In this framework, the regulator's lack of political detachment implies that in the long run, the (government's) gains from privatization would be smaller as private investors, expecting lower profits, would bid less for public companies. Expectations of political interference in the process of regulation would also limit the investments utility operators are willing to commit to specific assets, which subsequently causes inefficiency and higher prices. Finally, low and inefficient investments would build up pressure to reverse the privatization process, as prices for services would increase but the problems of exclusion and congestion would not be solved.

⁷ For example, if the regulator is not independent, the objective of regulating tariffs may be the fight against inflation. Although perfectly valid, the latter can be achieved through other means. See Fernández Ordoñez (1997).

⁸ Tariffs, when set below long-run average costs, *de facto* expropriate the companies' sunk costs.

There are some factors that can increase the probability of independent action by a regulatory body. These include (i) a clear mandate established by law; (ii) formal procedures involving both executive and the legislative powers to appoint top officials; (iii) protection for regulators against arbitrary removal; (iv) a system of remuneration to attract and retain competent and well-qualified staff; (v) mechanism for autonomous and reliable financing beyond central budget control, etc. In view of this, independence is relatively easy to achieve in constitutional regimes where parliament plays an important role, or where there is some balance of power. The USA Federal Reserve Board is one of the most famous examples of an independent policymaking body. The members of the board of directors of the FED are designated by executive appointment and confirmed by Congress. However, once the board members take up their functions, they are neither obliged nor expected to obey the president nor Congress. Independence is more difficult to achieve in the presidentialist regimes of Latin American countries, where executive power is very strong.

We have attempted to verify the above mentioned factors in the case of Argentina, Bolivia and Peru. In these countries, as part of the reform of the sectors, regulatory agencies were created and given a clear mandate and full autonomy. The Appendix Table summarizes some of the features of the regulatory bodies in the electricity and telecommunications sectors. As can be seen from the table, the regulatory bodies are provided with autonomous sources of financing which makes them independent of the central government budget. Regulators are appointed for a fix term and can be removed from office before the end of the term only in the event of proven misconduct. With regard to the system of remuneration, regulators are not affected by civil servant wage-scales, which leaves room for salary adjustment according to performance. However, the designation of the members of the board of directors is vested with the executive power of the country. Only in Bolivia does the law explicitly stipulate that the candidates first be voted by majority at the *Senat*. There also appears to be some difficulty in achieving a restriction on ministerial control over the process of regulation. This is true in the Argentinean telecoms sector where, in spite of regulatory responsibilities being assigned to a newly created agency, the Secretariat of Communications (Comisión Nacional de Telecomunicaciones) previously in charge of regulating the sector, has managed to retain some power (see Delfino and Casarin 2000).

4.1 Discretion and regulatory capture

There are, however, risks associated with regulatory independence as well, especially in countries where there is limited tradition of independent policymaking bodies. First of all, independence should not be confused with lack of accountability. A system of checks and balances should be in place to prevent the regulator from deviating from its mandate. Once again, there are a few measures which make it easier to strike a balance between independence and accountability. These include (i) transparency, open decisionmaking and publication of decisions; (ii) prohibiting conflicts of interest; (iii) effective arrangements for appealing decisions of the regulator; (iv) external audit and scrutiny of the regulator's budget by the legislative, etc. (see Smith 1997).

One of the risks of too much discretion given to the regulator can be regulatory capture, e.g. when the regulator acts on behalf of the incumbent industry and not on behalf of consumers or potential entrants in the industry. The problem of capture can be easily understood with a simple example of how regulation is produced. We recognize first that there are three actors in the process of regulation—the government, the firms, and consumers. Regulation is produced through the inputs of each actor. This input is the amount contributed to the public good or ‘voice’ in the regulatory process. It is important to keep in mind that the contribution to the public good by each actor is related to its level of income or initial endowment. Let us suppose that regulation affecting the group i is given by the following expression:

$$R_i = \left(\frac{x_i}{X} \right)^\theta X^* \text{ where } i = \text{government, firms, consumers}$$

x_i is the voice by each of actors involved in the process. X is the total sum of actions chosen by the players. X^* captures the total gain from regulation. Regulation would be a public good when R_i is equal for the three actors in the process. This happens in two cases: when the parameter θ is zero, or when x_i , the contribution to the public good by each actor involved would be exactly the same. Otherwise, the actors would appropriate a larger share of X^* proportional to the initial contribution to the sum, which is implied by the term within brackets. Thus, if participation by the firms or the government in the process is given more importance or simply if consumers are not given voice in the process, regulation is prone to capture.

In most of the cases we are studying, consumers are not represented in the regulatory agency (Parodi 1997). We can observe from the Appendix Table that the board of directors is formed by representatives of the government through the Council of Ministers, and representatives from the line Ministry. The utility operators are also represented, but there is seldom any representation of consumers.⁹

4.2 Time-inconsistency

For instance, suppose the regulator confronts a tradeoff, wishing on one hand to encourage the entry of new consumers to the market, and for this purpose, it should keep tariffs low in order to attract low-income consumers. On the other hand, the regulator faces the demands of the utility operators who want to maximize profits through higher tariffs. The goal of the regulator is to minimize a loss function. This loss function is the weighted average of two gaps: the gap between the connection target considered socially desirable and the existing level of coverage. The second gap is the difference between the rate of increase in tariffs and the one seen as efficient.

⁹ This, however, has started to change in Peru. The new legal framework for the regulatory bodies enacted at the end of the year 2000 includes the appointment of one representative from consumers' associations to the board of directors. This legislation has also brought some uniformity across the sectors in the procedures for appointing top officials, as well as in the methods of financing the regulatory bodies.

Minimization of the loss function is subject to a relation showing that the number of connections decreases with an increase in tariffs. In other words, the regulator faces an efficiency-equity tradeoff in determining the level and the increase in the tariffs. The problem of the regulator can be expressed as:

$$\text{Min } L = \alpha(C^* - C_t) + \beta(\pi^* - \pi_t) \quad (1)$$

Subject to:

$$C_t = a - b\pi_t \quad (2)$$

The problem of the regulator is further complicated by the presence of a pre-existing distortion: in the case of utilities, the number of households not connected to the network. As is well known, Latin American countries exhibit abysmal differences in service access between rich and poor areas. At the same time, ex-post heterogeneity is also verified in the sense that the incumbent parties in the regulatory process—the government, private utility operators and consumers—may have the same utility function and discount rate (e.g. each party wants, for different reasons, to maximize the number of users in the network). However, they have different opinions regarding the distribution of outcome (e.g. government and private firms hope for higher tariffs, consumers lower tariffs).

Time inconsistency in this framework would mean that the regulator announces a certain increase in tariffs, but the actual increase is different than that announced. Heterogeneity may make it difficult to circumvent time inconsistency. Moreover, since the regulatory agent is a committee, where different interests are represented, these diverging interests would trigger an increase in tariffs rather than the opposite. One way of correcting this ‘inflationary’ bias is to establish a system of negotiations according to which the interests of ‘the winners and the losers’ are represented by giving equal representation to all parties. This has been shown, at least in theory, to have a deflationary effect (Drazen 2000). Failure to commit to a pre-announced target would discourage consumers, especially from low-income groups, from seeking a network connection for fear of price increases.

5 Are there limits to regulation in LDCs? Institutional and political factors

Given that regulation is such an important element for the success of the overall privatization experience, it must be asked what conditions are necessary for achieving successful regulation. Some of the ideas we present throughout this paper should be scrutinized in the light of empirical evidence.

There is no tradition of regulatory institutions in Latin America. Some of the difficulties may arise because regulation had to be built from scratch. In addition, the regulation experience is relatively recent in these countries and there are signs of the need to improve the process.

First, administrative capacity is needed to devise and implement regulation. Regulating public services involves a complex array of factors: licensing, contract design, as well as the presence of statutory powers. Mechanisms for conflict resolution and dispute settlement need to be established if they do not exist. Second, uncertainty about future sector/economy-wide policy should be minimized in order to secure private investors and to guarantee fair regulatory processes. In other words, regulation needs to be isolated from the political cycle. Third, regulation needs to incorporate consumers as stakeholders in the reform process. Additional mechanisms to empower and protect consumers are also welcome. Citizens should be able to take action in case their expectations are not fulfilled.

We would like to stress that the difficulties of regulation are, in part, due to the complex nature of the actors involved in the provision of services. In the first place, the state in many lesser developing countries no longer has a central government or an incumbent ministry. The relatively recent experiences of decentralization and devolution of responsibilities to lower levels of government have assigned responsibility for service provision to local governments. Second, the private sector can be either national or foreign, for-profit and non-profit. It is therefore a real challenge for the authorities to devise fair regulatory mechanisms and to strike a balance among the sometimes conflicting interests of all these actors and consumers. The provision of regulation is the result of coercion or cooperation, not of market competition. Efforts to supply public goods such as regulation may produce conflict over the sharing of costs or over the scale of the public good.

It is important to recognize that regulation is not designed nor does it operate in a vacuum. It reflects a number of elements emerging from the political arena. Many countries introduced reforms without prior democratic consultation, and the way privatization took place did not help to build up political support for regulation. The case of privatized companies being owned by employees and the public at large is said to give strong political support for privatization. It motivates the public to monitor the company's financial performance. However, even in this situation reforms in the utilities sector were affected by pressure from international organizations that clearly influenced the shape and the speed of the reform process.

Given the rapid process of transformation experienced by the utilities sector, it is impossible to foresee all the alternatives that may parallel the transformation of the sector. Under these circumstances, the regulatory framework should contain general guidelines, leaving some room for discretion by the regulatory agency. However, this discretion needs to be complemented by the existence of transparency, meaning that the decisions taken by the regulator should be made public. Transparency should also include a mechanism to facilitate the exercise of voice by the incumbent parties. A well functioning judicial system is also needed in the event of disagreement between the regulator and other parties. Finally, a system of external audit to mediate the actions of the regulator by a competent body would complete the system of checks and balances. Measures to enhance transparency of the whole regulatory process would also help to infuse a more democratic feeling to it. This would also serve to counterbalance the complaint of policy decisionmaking (which affects everyday life) being left in hands of non-elected technocrats.

Regulating utilities is clearly influenced by international activities—notably, by foreign investment. Thus, taxation and regulation, usually seen as domestic issues, can no longer be treated in isolation at the national level. More policy harmonization among countries is needed.

The transformation of SOEs into private utilities having a ‘multiparty’ regulator has great democratic potential. It may help to circumvent the power of strong executives. However, we have to be aware that the propensity to participate in most forms of public activities, including regulation, increases with income and education. All the arguments presented in this paper are static. We do not consider that in a dynamic context, income inequality and voice in the regulatory process are endogenous factors, tightly linked to access to the services and the accumulation of human capital. Regulation in a dynamic context is both the end and the means, as strategies to avoid public bads are usually short-lived and highly inefficient.

Appendix Table
Features of the regulatory agencies, by country

Agency	Created in	Appointment procedure for executive positions	Obstacles to appointments	Terms of office	Source of funds	Voting rules
ARGENTINA	Comisión Nacional de Telecomunicaciones CNT	1990	B of D: 5 members by executive appointment. These include the president and 1 member designated by the Federal Council of Telecommunications.	Individuals having any links with companies in the sector at least a year before and after appoint. This also applies to close relatives.	5 yrs, with one re-election possible.	Through the creation of the National Fund for Telecommunications, which is funded by a 0.5% tax levied on the net revenues of firms.
	Ente Nacional Regulador de Electricidad ENRE	1992	B of D: 5 members by executive appointment. Two designated (needing congressional approval) by the Federal Council of Electric Energy.	Individuals having direct or indirect links with companies in the sector.	5 yrs, with re-election possible.	Through taxation on firms engaged in generation, transport, and distribution.
BOLIVIA	Sistema de Regulación Sectorial (SIRESE) SIRESE law is the legal framework for regulation in electricity, telecommunications, hydrocarbons, transport and water.	1994	Superintendent by executive appointment. Three members designated by 2/3 vote in the <i>Senat</i> .	Individuals having direct or indirect links with companies affected by SIRESE law. Individuals being reviewed by a judicial process. Individuals related to the president, or any of the sectoral superintends.	7 yrs, immediate re-election not possible.	The General Superintendency financed through contributions from sectoral superintendencies, which in turn are funded through taxes and other resources established by sector law.
	Superintendencia de Telecomunicaciones SITTEL	As above	As above	As above	5 yrs, immediate re-election not possible.	Through a regulation tax levied on revenues of individuals or firms holding concessions or operating licenses. If there are no taxable revenue, tax is levied on the value of equipment.
	Superintendencia de Electricidad	As above	As above	As above	As above	Through taxation on all firms. Maximum rate 1% of revenue from sales before indirect taxes.

Table 1 (con't)

Agency	Created in	Appointment procedure for executive positions	Obstacles to appointments	Terms of office	Source of funds	Voting rules
Organismo Supervisor de Inversión Privada en Telecomunicaciones OSIPTEL	1994	B of D: 6 members, including 1 member designated by the president from 3 candidates proposed by the Council of Ministers; 1 member each (needing presidential designation) from the Ministries of Transport & Telecommunications and of Economy & Finances; 1 consumer association representative (needing presidential appointment) as designated by the Ministry of Industry and 2 representatives from the firms.	Directors, managers, and representatives of entities being reviewed under bankruptcy procedures. Individuals holding more than 1% share in effected firms (persons appointed as firm representatives excluded from this ruling). Those barred from public office due to criminal charges.	3 yrs; re-election possible.	Through taxation of 5/1000 over the total gross revenue from operations.	The presence of the president or vice-president necessary to validate session. 4 members constitute a quorum, and decisions are taken by a majority, with at least 3 votes in favour.
Comisión de Tarifas Electricas CTE	1992	B of D: 5 members, including 1 member each from the Ministries of Mining & Energy, of Finance & the Economy, of Industry, plus 1 representative each from the electric generation firms and distribution firms.	Public and civil servants, shareholders, directors, employees, and consultants working in the firms or in an advisory capacity to CTE. Relatives to other members of the Board.	5 years	Through taxation of firms supply the regulated market.	
Organismo Supervisor de Inversión Privada en Energia OSINERG	1996	B of D: 5 members by Supreme Resolution appointment, and authenticated by the Minister of Mines & Energy, including 2 designated by the above-mentioned Minister, 2 appointed from 3 candidates proposed by the president of the Council of Ministers, and 1 appointed from 3 candidates proposed by the Minister of the Economy.	Directors, managers, employees, advisers and attorneys with shares in the sector. Those barred from public office due to criminal charges.			

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