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Regulation policies concerning natural monopolies in developing and transition economies

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Abstract

Network industries are often organized as vertically integrated public monopolies. Recent trends indicate the participation of the private sector. Developing and transition economies need to establish adequate regulatory policies and institutions to provide incentives for private sector participation and to protect public interests. New regulatory policies entail the creation of market competition in such industries or alternatively the creation of competition for the market. Natural monopoly sector privatization is a relatively new and still-evolving field, and it would be premature to venture definitive conclusions as to the "best practice" privatization and regulation models for natural monopolies. Nevertheless, we will offer some recommendations concerning natural monopoly privatization and regulation.

Introduction

Recently, there has been a significant transformation in the style of natural monopoly regulation policies away from the previous almost exclusive reliance on public ownership. Once public ownership was hailed as a “reform”, but now privatization has become a “reform”. “Reform” today means deregulation, competition and privatization.

Privatization and restructuring of network industries traditionally viewed as natural monopolies have been gaining ground rapidly around the world since the early 1980s -- implying a radical shift in the focus of state intervention and a re-evaluation of the State’s role even as a provider of core public services.

Why then this change? And to what extent did this change take place, in particular in transition and developing economies? What are the empirical trends of natural monopoly sector development and regulation in these countries?

Where are the current natural monopoly regulation models in these countries heading? What are their recent experiences in the domain of natural monopoly regulation? After a discussion of what natural monopoly means and the major issues that are currently being debated in the area of natural monopoly regulation, we will examine the changes taking place in various network industries.

Natural monopoly sector privatization is a relatively new and still-evolving field, and it would be premature to venture definitive conclusions as to the “best practice” privatization and regulation models for natural monopolies. Nevertheless, we will offer some recommendations concerning natural monopoly privatization and regulation.

Defining Natural Monopoly and Its Current Regulation Policy Agenda

Many network industries have been predominantly provided by a vertically integrated, often public, monopoly. However, since the early 1980s the paradigm of public monopoly has been losing ground with the steady breakup of the activities traditionally regarded as natural monopolies (demonopolization) due to globalization of markets and technological progress. At the same time, growing dissatisfaction with public enterprise performance, ever-tightening government budgets, and the explosion of investment needs in utility and other network industries worldwide have caused policymakers to turn increasingly to private sector participation.

This often intertwined reform process of privatization and demonopolization of these industries initiated in the developed countries is also sweeping across the developing countries. In the wake of this change, the current agenda of regulatory policy concerning natural monopoly is not limited to the traditional price and entry regulation issues. Rather, it includes the issues related to the design of regulatory institutions accompanying the restructuring, privatization, and expansion of competition in the area formerly occupied by regulated, often public, monopolies.

The concept of natural monopoly, traditional regulatory practice and rationale

A natural monopoly exists when economies of scale are so substantial that a single firm can produce total business output at a lower unit cost, and thus more efficiently than two or more firms (Sherer 1980). In effect, the long-run average costs are falling over such a wide range of production rates (relative to demand) that only one firm can survive in such an industry. A more specific criterion is the subadditivity of the cost function.

Natural monopoly gives rise to a potential conflict between cost efficiency and competition, with an increased number of competitors leading to some loss of scale efficiencies. The typically quoted examples of natural monopoly are utilities (electricity, telecommunication, water, gas, and oil), transport (railways), with natural monopoly elements being centred on networks (Yarrow 1994).

An electric company is a classic example of a natural monopoly, where competition may lead to an inefficient market outcome. Once the huge fixed cost involved with power generation and power lines are paid, each additional unit of electricity costs very little. Having two electric companies split electricity production, each with its own power source and power lines, would lead to a near doubling of price, because of low marginal costs, high sunk costs and declining average costs.

Natural monopoly thus poses the difficult dilemma of how to organize these industries so as to gain the advantages of production by a single firm, while minimizing all the vices resulting from non-competitive markets.[1]

Traditionally, countries around the world, assuming the "inevitability" of monopolization, either regulated private enterprises or nationalized natural monopolies in order to deal with this dilemma.

A natural monopoly situation usually arises when there are large fixed costs and small marginal costs. The existence of a natural monopoly gives rise to the following problem: Allowing a natural monopolist to set the monopoly price is undesirable due to the Pareto inefficiency, and forcing the natural monopoly to sell at the efficient price (i.e., marginal cost-based price) is infeasible due to negative profits. The solution to this problem was then to let the government operate the service, for example, at price equal to marginal cost and to provide a lump-sum subsidy to keep the firm in operation. This practice rests on the *assumption* that the imposition of public interest prices and standards may be achieved more effectively by the flexible decision-making inherent in the public ownership framework—considerable internal discretion, subject only to political accountability—than by legal controls of private firms (Ogus 1994, pp. 267-68). Otherwise, regulation of private monopolists has usually involved some form of price regulation and/or entry and quality regulation.

These regulatory practices were *theoretically underpinned* by the market failure argument, which provided the central economic argument for state intervention in industries with natural monopoly characteristics.

Alongside other conditions such as public goods, positive and negative externalities, incomplete markets and imperfect or asymmetric information, natural monopoly is an important market failure situation (under which a market economy fails to allocate resources efficiently) that warrants regulation and nationalization.

In fact, it is argued that the most serious market failure problems are likely to occur in network industries with natural monopoly characteristics. According to Yarrow (1994), this is because natural monopoly is combined with high-entry barriers. These industries are typically capital-intensive and require significant investments in long-lived, sunk capital facilities. Most assets are specific and durable, giving rise to high-entry barriers via extensive sunk costs. At the same time, the economies of scale in some industries such as water distribution or electricity are so great that the largest firm with the lowest costs could drive all other competitors out of the market.

It is important to note that regulation of natural monopolies also occurs for reasons other than market failure (generally considered a *static* efficiency problem). In fact, many real life regulations have been motivated by the concern for *dynamic* efficiency, distributional considerations and other considerations, including even "moral" considerations—such as fairness.

In particular for developing countries, dynamic efficiency (or in other words, developmental) objectives such as growth are often more important than static efficiency. The most important dynamic efficiency consideration is, as Bradburd (1992) points out, whether an unregulated private monopoly will make the investments necessary to offer the quality of service appropriate to the country's changing needs over time. Natural monopolies' services are an important part of a nation's infrastructure, and if they are suboptimally provided, this can be an impediment to growth.

Thus, the new regulatory reform should give adequate attention to considerations of "dynamic" efficiency. Some countries conduct

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1 These vices range from 'deadweight welfare loss' due to allocative inefficiency, productive inefficiency (or x-inefficiency) due to lack of competitive pressures, increased possibility of collusion among firms, increased possibility of 'predatory pricing' or 'pre-emptive investments' and other 'wasteful' behaviour to increased possibility of exploitation of consumers and of input suppliers by the dominant firms (Chang 1997, pp. 707-708).

their deregulation-based reform purely in terms of static efficiency, and the impacts of regulatory reform on productivity and growth are not duly considered when reforming the existing monopoly regulation policy. This is a highly inadequate approach, as Chang (1997) points out, as higher static efficiency will not necessarily lead to higher dynamic efficiency. In addition, removing "distortions" in more, but not all, markets does not necessarily improve even the static efficiency of the economy. Schumpeter (1987) argued that monopoly rents provide the incentive to innovate and, in the modern age of large-scale R&D, the resources to innovate. If this is true, there may even be trade-off between static and dynamic efficiencies. If the regulatory reform involves reductions in market power and the associated monopoly rents (e.g., by intensifying anti-trust regulation), the rate of innovation and productivity growth may be adversely affected.

Regulation practice is driven not only by normative considerations of reducing and controlling rent-seeking behaviour. The positive theory of regulation, based on public choice theory, treats the existence and forms of regulation as responses to the demands of politicians and other interest groups.

In summary, the traditional rationales and a wide range of (non-static efficiency) issues that traditionally belong to the realm of natural monopoly regulation policy may still remain valid and require adequate attention when "reforming" the existing regulatory regimes. While reforms may be necessary to make services more efficient and economical, the usual public service *raison d'être* of many natural monopoly industries also remains essential. Particularly in the developing world context, it is important to keep in mind that the ultimate objective of these industries is sufficient and sustainable provision of their services.

Forces of change, new regulatory agenda and theoretical alternatives

Recently, new developments such as technological progress, which offer *means of contesting* a monopoly, have fundamentally challenged the traditional regulatory practices based on the concept of natural monopoly. The steady breakup of "intrinsically monopolistic" network industries into separate elements has largely *obviated* the justification for the existence of large, vertically integrated monopolies.

There are increasing doubts whether some of the industries traditionally regulated do in fact have the structural characteristics of a natural monopoly. Many traditional natural monopolies have been shown to be less naturally monopolistic than was once thought to be the case.

The degree of natural monopoly of many industries has also been drastically reduced, due to technological progress and globalization of markets, though not eliminated entirely (World Bank 1997). Some even argue that there is nothing "natural" about "natural monopolies", challenging the very concept of natural monopoly (see for example Becker 1997).

The most important challenge is technological progress, which changes the cost curves, hence enabling countries to re-examine the hitherto characteristic forms of natural monopoly regulation, i.e., price and entry regulation, based on the concept of natural monopoly.

New technologies evolved that are efficient at much lower levels of output than older methods of production. These have substantially reduced economies of scale and barriers to entry in many sectors, making at least some degree of competition for many natural monopolies a real possibility. Development of new technologies such as wireless telephony and optic-fiber cable has created new scope for competition even with regard to basic line networks. In electricity, with combined cycle turbine generators, we have a low-capital-cost source of power, which cancels out economies of scale in generation and voids any argument that electricity generation is a natural monopoly. As a result, even in some traditional natural monopolies such as telecommunications (e.g., long-distance and wireless telephony networks) and electricity generation, market competition has become both possible and desirable.

The possibility of extending the market size due to globalization has undermined the economic rationale of monopoly retention

policy. As Yarrow (1994) points out, whether or not an industry is a natural monopoly depends upon technology/costs and demand. Thus, natural monopolies can disappear or emerge as demand expands or contracts, even if production conditions do not change. According to Becker (1997), the growth of global competition implies that when large-scale production is most efficient, companies in small nations are no longer restricted to the inefficiently small scale of their limited domestic market. They can increase production enormously by operating in several nations.

What then are the consequences of these new developments for the natural monopoly regulatory policy debate? Which new issues and changed regulatory demands are then brought into the domain of regulation policy concerning natural monopolies?

The focus of regulatory policy concerning natural monopoly has clearly shifted with the evolution of technology and globalization of markets, which led to a steady breakup of natural monopoly and made more competition technically feasible. Instead of merely focusing on problems surrounding "inevitable" monopolization such as the pricing problem, the current regulation policy hence encompasses, above all, issues related to the design of regulatory policy accompanying the restructuring, privatization, and expansion of competition into the area formerly occupied by legal monopolies. In particular, the issue of how to replace regulation with competition, which is deemed as the best regulator, now occupies a central place on the current agenda of natural monopoly regulation.

Part of the debate over regulation concerns the limits of natural monopoly in the face of technological change. The vertically integrated, often public, monopolies have now been shown to be no longer monolithic entities. Rather, they encompass services that are arguably natural monopolies as well as services that are potentially competitive but need access to bottleneck monopoly or certain essential facilities to make competition in these supply segments feasible (Joskow 1998).[2] In particular, "unbundling" of monopolistic firms is considered as one of the most exciting ways to accelerate competition. Unbundling isolates residual sunk-cost facilities (e.g., the local loop in local telecom), leaving the contestable part of the industry under the control of market forces (see Teece 1995).

In practice, determining where the boundaries of natural monopoly is a difficult exercise, which requires detailed information on what may be quite complex cost conditions (Yarrow 1994). Nevertheless, a consensus has emerged for the need to revive the rules of market competition, whenever high fixed-cost activities cease to justify the presence of a single monopoly firm.

Consequently, out of this changed context, some issues have emerged as the new, important regulatory policy issues on the agenda. These are for example "unbundling" of a single monopoly, restructuring, and scaling back of monopoly protection through demonopolization to remove artificial monopoly privileges, while limiting legal, generally public monopoly protection to those aspects of the activity that justify the "natural" monopoly.

Additional recent developments on the *theoretical* front have enforced this *embrace of the competitive model*, as the right way to organize many network industries previously viewed as natural monopoly industries. Scholarly work has begun to emphasize that natural monopolies *do not necessarily* have to be regulated, since there are alternative ways to generate competition and discipline the firms, even if a natural monopoly structure exists within a market (Brauetigam 1989).

According to this argument, there exist the following theoretical alternatives:

Competition *for* the market: One possibility is to retain the monopoly but to create competition between firms for the right of exclusive supply over a limited period, namely a franchise solution. This has been formalized as Demsetz-competition. The essential idea is that such competition *for* the market (i.e., the right to be the natural monopolist) may be an adequate substitute under some circumstances, where competition is not possible *within* the market.

2 Generally speaking, physical infrastructures tend to have monopolistic characteristics, and services competitive ones. See Guislain (1997, pp. 212-14) and Plane (1998, p. 14) on how to "unbundle" different sectors into their component activities. The organizational and institutional reform is then based on an economic analysis aimed at identifying the links in the technical chain where the cost function is sub-additive and the market is not contestable.

The outcome of Demsetz competition is in effect a contract between a franchiser (e.g., a governmental authority) and a franchisee. Monopoly franchises could be auctioned off to the bidder offering the most attractive terms, for example, the lowest price to consumers. Franchising schemes also may avoid pitfalls associated with traditional regulation of such industries or with their nationalization. Where competition cannot be introduced in the market, as tends to be the case for water supply, for example, it should at least be introduced for the market. Properly structured tenders or auctions will allow the government to extract part of the monopoly rents for the benefit of the treasury and the consumers (Dnes 1995, Brauetigam 1989, Guislain 1997).

Contestable markets: A second way to introduce competition has been formalized with the concept of "contestability". According to this concept, if an industry behaves as if it is contestable (due to the relatively costless entry into and exit from the industry), most of the benefits of perfect competition can be attained without government intervention. The essential idea is that the *threat* of entry into an industry and potential competition may give an incumbent monopolist effective incentives to behave as if there were a competitive market. The key aspect of a contestable market and the key to guaranteeing competitive outcomes is therefore the existence of conditions enabling entry. According to Baumol, Panzar and Willig (1982), if one lowers artificial entry barriers and new entrants need not incur significant sunk costs, then all the benefits of competition will be available regardless of the market share of the incumbent. The *degree of contestability* of a market can then be measured by the share of the investment that is composed of sunk capital. Industries with substantial sunk costs such as the railroad industry are therefore not likely to be contestable, whereas industries in which capital is highly mobile may be contestable. For example, in the case of the airlines industry, it has been argued that airline markets are contestable since entry and exit is quite easy and there are virtually no sunk costs in the industry (Braeutigam 1989, Teece 1994, UNCTAD 1995).

Intermodal competition: A third way to introduce competition is through intermodal competition. For example, in the transportation sector of the economy, monopolistic competition among various modes of transport (e.g. railroads and road transport) is often referred to as intermodal competition. The essential idea is that if intermodal competition is strong enough, it may become a basis for deregulation even if one or more of the modes of transport appears to have the structure of a natural monopoly. In recent years the move toward deregulation of the railroad industry partially results from pervasive intermodal competition among the railroads and other modes. In other industries similar types of competition have occurred. For example, cable TV, a once heavily regulated industry, has largely been deregulated, in part because of heavy competition from over-the-air broadcasting. The same also applied to telecommunication industry with competition across market segments such as mobile and land-based communications. For example, in contrast to the sluggish growth and small size of the state-owned wireline network, wireless technology has taken off in Africa, fueled largely by private investors (Braeutigam 1989, Teece 1994).

In addition to these alternatives, there also exists the possibility of introducing "yardstick competition", which does not obviate the need for regulation, but facilitates the regulators' task. Yardstick competition is creation of entities whose performance can be measured, since the performance of one entity can be compared with that of another. According to this method, a firm with a natural monopoly is broken up into separate entities which supply different regions. Each entity retains its monopoly but only in relation to its own region. Yardstick competition can then be used as a regulatory tool to compare the performance of the monopoly operator with that of operators in other regions of the country and with international norms; the regulator can use such comparative information to justify tougher performance targets or tariff adjustments at the time of regulatory review (Ogus 1994, Foster 1992).

Would these alternative measures then completely obviate the need for regulation? According to Joskow (1998), 'complete' deregulation policies are not likely to be realistic or effective policy options in most network

industries. In most of the network industries subject to reform, certain important segments continue to be natural monopolies, and thus 'competition in the market' cannot be relied upon to yield satisfactory performance. In practice, 'competition for the market' through concession or franchise contracts must also confront problems resulting from significant sunk costs, asset specificity, and incomplete contracts. Moreover, the effectiveness of competition will depend on policies governing the initial structure of the competitive segments, the conditions of entry into the market, and the price and non-price terms and conditions of access to 'bottleneck' monopoly network facilities for competing suppliers, who need such access to compete effectively.

It is important to note, therefore, that market liberalization is not the same as deregulation (meaning that governments are relinquishing their regulatory powers). Regulation of natural monopoly industries is still crucial. Vogel (1997) finds that there is no logical contradiction between more competition and greater government control.

What is necessary is the redefinition of the regulation policy: liberalization requires re-regulation, which implies the reformulation of old rules and the creation of new ones. In fact, market liberalization and currently on-going privatization processes around the world themselves bring new regulatory issues to the fore. An example is the need for regulation to address the common interconnection problem, for instance in telecommunications. Also in electricity, as competition moves from the generation side to the wholesale or even retail side, issues of third-party access will more and more come to the fore.

In addition, countries now have to grapple more explicitly with distributional impacts, which have to be carefully considered if they want to increase the chance of success of competition reform. Public ownership may have been selected specifically because it was considered the most appropriate legal form to achieve distributional goals (Ogus 1994). This applies most obviously to utilities, where it may be felt desirable to supply certain categories of consumers at below-cost prices so as to provide a universal service. Distributional effects resulting from "economies of density" following increasing competition or privatization driven mainly by efficiency (and budgetary) considerations make it necessary to introduce distributional considerations more explicitly into the design of regulatory reform, so as to minimize distributional side effects.[3]

How did developing and transition economies then manage to bring regulatory systems in line with these new developments and complex regulatory demands and to find regulatory approaches that match both their specific, new regulatory needs and capabilities? To what extent did these new issues then actually reach the political agenda in developing and transition economies and result in reforms? The following chapter investigates recent responses and experiences of developing and transition economies in the area of natural monopoly regulation.

Actual Responses and Experiences in Developing and Transition Economies

The actual speed with which the competitive model is being advanced in developing and transition economies has been rather slow, especially when compared with the privatization process itself.

Widespread privatization, but ambivalence towards real reform

The recent public finance crises in many countries, combined with huge investment requirements, have made private-sector participation necessary. Furthermore, the poor

3 Economies of density means that costs of supplying a particular customer are significantly influenced by the spatial density of surrounding customers. Since competition tends to generate price structures that reflect underlying costs of supply, one consequence of competition in network industries is that the prices of physically similar products will tend to exhibit quite considerable place-to-place variations, often creating problems in the pursuit of distributional goals (Yarrow 1994).

performance of most public enterprises and their inability to offer a quality service and meet demand have encouraged many governments to turn to the private sector for the provision of infrastructure services, leading to the need for reforms. However, large companies in developing and transition economies that were privatized were often sold as monopolies or near-monopolies. Instead of creating greater competition in the concerned sectors *before* privatization, all that has been accomplished is substitution of a private monopoly for a public one.

Ideally, privatization of large network companies offers the government a unique opportunity to rethink and reform the entire organization and structure of the sector. Activities or services that were provided by an integrated, monolithic enterprise will have to be unbundled and competition introduced in those segments that can sustain it. Divestiture will very often be less important in itself than effectively demonopolizing and opening up the sector to competition (Guislain 1997). After all, the efficiency impact of privatization depends on the quality of government regulation and its ability to harness competition for sectoral reform.

While some may be convinced that private ownership leads to greater productivity, many authors such as Stiglitz (1998) find that an enterprise's efficiency is determined not so much by its *public* or *private* ownership as by the regulatory structure and the degree of ompetition under which it operates. By looking at the example of China vis-à-vis the former socialist economies, he concludes that effective competition and regulatory policies are important, rather than privatization *itself*. China had shown that an economy might achieve more effective growth by focusing first on competition, leaving privatization until later. In contrast, competition remains thwarted in many of the former socialist economies that pursued privatization first, demonstrating that without effective competition and regulatory policies, private rent-seeking can be every bit as powerful, and perhaps even more distortionary, than public rent-seeking. Moreover, there are those instances in which public enterprises have operated at a level of efficiency comparable to, or greater than, that of similarly situated private enterprises; typically these are associated with firms subjected to competition, either in exports (as in the case of Korea's steel industry) or domestically (as in Canada's railroads).

In practice, while privatization of traditional natural monopolies has become widespread in many developing countries over the past 10 years, their policies towards real sector reform have often been ambivalent. Certainly, there is much privatization, yet the actual degree of commitment to competition-based reform and the measure chosen vary considerably among countries and industries.

Some alternative measures to introduce greater competition have taken root in the developing world. Table 1 summarizes different modes of privatization and sector reform measures in some network industries.

A measure to introduce competition for the market via competitive bidding of concessions for instance, has taken root in power, telecommunications, railway, and water enterprises in developing countries as diverse as China, Guinea, Hungary, and Mexico. Countries like Argentina and Chile not only actively introduced competition in the market through vertical disintegration of their telecommunication or electric power enterprises, but also adopted yardstick competition measures in several industries to supplement their sectoral reform efforts. Nonetheless, the *breadth*, *depth,* and *methods* of the private participation as well as of the sector reform remain highly uneven among countries and industries. For instance, Argentina and Hungary have chosen to unbundle the gas sector before privatization, introducing greater competition, whereas privatization has not yet been accompanied by unbundling or greater competition in the gas industry in Russia.

A sectoral and regional breakdown of this highly uneven process of privatization and reform in the developing world concerning natural monopoly sectors reveals the following overall picture.

Telecommunication and electric power lead the way

The bulk of privatization and demonopolization has taken place, above all, in telecommunications and then in electric power. Electricity has also become a leading network sector in attracting private participation and has

been undergoing increasing restructuring based on deregulation of key parts of the industry and breakup of vertically integrated organizations and systems, through the separation of generation/transmission/distribution. This has for example already occurred or is planned in Argentina, Chile, Peru, Bangladesh, India, and the Philippines (Paddon 1998). Private sector involvement in water industry is yet a relatively recent phenomenon. Before 1990 private participation in water was rare, except in francophone countries, and it still remains small relative to private participation in other network industries (Silva, Tynan and Yilmaz 1998, Izaguirre 1998).

As for the forms of private participation, there is also a significant sectoral variation. Divestiture of public water and railway assets is comparatively rare. Few railways have been truly privatized. Instead, most governments have preferred to concession or franchise their railways. In water, concessions are the most popular form, where concession contracts have allowed governments to maintain ownership of sector assets while delegating substantial responsibility and risk to the private sector. Most water and railway assets remain in the public sector, and governments are resistant to giving them up. This highlights the sectoral difference in asset ownership between water and railway on the one hand and energy on the other (Silva, Tynan and Yilmaz 1998, Thompson and Budin 1997).

Table 1: Network industries: Modes of privatization and sector reform (Selected developing and transition economies)

Mode	Divestiture	Concession and leasing contracts	Introduction of competition *in* the market	Yardstick competition
Sector		(periodic introduction of competition *for* the market through competitive bidding)	(e.g., through vertical breakup of integrated companies)	
Telecom (wireline voice) Active privatization and competition-based reform	Argentina, Chile, Cuba, Guinea, Hungary, Jamaica, Mexico, Peru, Venezuela	China, Cook Islands, Guinea-Bissau, Hungary, Indonesia, Madagascar, Mexico	Chile, Mexico, Philippines	Argentina (basic telephone services), Tanzania (basic telephone services)
Electric power (generation) Active private participation and unbundling	Argentina, Bolivia, Chile, Hungary, Pakistan, Peru	China, Ivory Coast, Guinea, Hungary, Mexico	Argentina, Bangladesh, Bolivia, Chile, India, Peru, The Philippines	Argentina (distribution) Chile (distribution)
Gas (transport and distribution)	Hungary, Latvia, Russia	Argentina	Argentina, Hungary	Argentina (distribution)
Railways Mainly franchising	Bolivia	Argentina, Brazil, Ivory Coast-Burkina Faso, Chile, Mexico		
Water (distribution) Relatively small private participation; concession preferred		Argentina, Brazil, Chile, China, Colombia, Ivory Coast, Guinea, Hungary, Macao, Malaysia, Mexico, Senegal		

Note: The table includes only countries that have privatized by transferring existing public-sector facilities to the private sector, not those that have opened up the sector in question through greenfield concessions or BOT and BOO contracts only, such as Thailand (telecommunications) and China (power generation).

Source: Dnes (1995), Guislain (1997), Nells and Roger (1994), Otobo (1998), Paddon (1998), Plane (1998), Thompson and Budin (1997).

BOX 1: Importance of ensuring real competition:
Comparative experiences of Chile and Argentina (electric power)

Argentina is the country that has gone furthest in introducing full competition and vertical disintegration in the electric power industry. Chile is also a path-breaker of privatization in the developing world—alongside Argentina. Yet in the electricity sector, the restructuring of enterprises prior to privatization fell short of what was needed to ensure competition. Despite the comparatively advanced Chilean regulatory framework, it could have paid more attention to the property structure, to ensure real competition.

- Chile: In the case of electricity, Chile was committed to vertical disintegration, but *to a lesser extent to competition*. In Chile, there were no restrictions on cross-ownership of assets in different segments, unlike Argentina (and Peru), which has prohibited any company or group from controlling more than one of the market segments (e.g., electricity generation, transmission, and distribution). One investment group controls most of the system's generating capacity, the largest distribution company, and the transmission assets. Cross-ownership and consequent conflicts of interest have hindered the development of a more competitive generation market.
- Argentina: In Argentina, the power sector was restructured radically in 1992 by unbundling generating, transmission, and distribution activities and organizing them under separate companies. Joskow (1998) describes Argentina's approach to electric power as a "big bang-approach", in which privatization, restructuring, and the introduction of competition were all accomplished in one big step.
  Argentina, privatizing much of its power system more than ten years after Chile, benefited greatly from observing that country's problems associated in particular with cross-ownership. Argentina separated monopoly transmission and distribution segments from the competitive generation segment. It adopted a *mandatory* separation principle. No generator is permitted to control more than 10 per cent of the system's capacity, and restrictions on reintegration and cross-ownership are enforced. The resulting diversity in ownership ensured a more competitive environment for generation than in Chile. The restructuring programme in Argentina created a large number of private generating companies, and competition at the generation level has been intense. Transmission and distribution became regulated private monopolies. Retail tariffs are regulated through a price cap mechanism (essentially RPI-X, where RPI is the retail price index and X is productivity gains, with X adjusted after five years). The Argentine privatization has been a clear success in electricity industry.

Source: Bitra and Serra (1994), Chisari, Estache, and Romero (1997), Guislain (1997), Joskow (1998), Labor and Garcia (1996).

Latin America and East Asia dominate

In most network industries (such as energy, water, and telecommunication), Latin America and East Asia (including the Philippines and Malaysia) dominate private sector participation trends and restructuring process; and within each region, a few countries lead the way (Silva, Tynan and Yilmaz 1998).

1) In particular, the Latin American region has a rich fund of experience in privatization and restructuring of natural monopoly industries. A few leading countries, such as *Argentina, Chile, and Peru*, privatized major network industries relatively early on as part of broader economic reform programmes, in order to overcome major bottlenecks caused by the inadequacy and poor state of public utilities (Guislain 1997). Among Latin American countries, Argentina is the country that has gone furthest in matters of privatization in Latin America since 1990 and has been at the forefront of various network industries' reform process, by introducing competition in the market through vertical disintegration.
2) In Asia, despite its clear dominance of investments in projects with private participation, the divestiture trend has not been as pronounced. Few countries there have adopted or implemented large *full-scale* privatization programmes. Even in telecommunications, divestiture of the dominant operator has been partial with the

government continuing to be the controlling shareholder (e.g., Telekom Malaysia with a public floatation of 25 per cent of the shares in 1990) (Guislain 1997). China has also taken a cautious approach to opening certain sectors such as electricity to private investment, and mainly relied on joint ventures between private sponsors and state-owned enterprises (Izaguirre 1998). The major rationale given for network industry privatization in the region has been the need to introduce the additional resources necessary to extend access to the service, improve service quality and modernize the system (Paddon 1998). There is little substantive evidence in the region of an improvement in the quality of utility services after privatization, leading to questions regarding the guarantees for adequate service quality and pricing written into privatization arrangements.[4]

3) In Africa, a number of supplements to privatization have been explored. In particular, leasing contracts and concessions are viewed as promising arrangements, which provide an inducement in that they place an appreciable part of the risk on the private operator. Some African countries such as Ivory Coast already provide some examples of these forms of privatization. African privatization has been most of all motivated by the new financial constraints. Insufficient public money is forthcoming, putting African governments in difficulty in financing the development of utilities, with the result that African governments are unable to improve their public services. For electricity alone, according to the World Bank, those governments will need to invest a total of US$17 billion between now and the year 2005. African States themselves will not be able to provide more than US$5 billion and funding sources US$2 billion (Plane 1998).

4) In transition economies, privatization in general has been a tool of transition. It has been used to establish property rights, to form a private sector and the basis of a market economy, to enable efficient governance and management of formerly state-owned enterprises. Yet, privatization of natural monopoly sectors was usually not featured during the early years of reforms. Instead, reduction of price subsidies has been a feature of transition in some countries (e.g., Lithuania), partly in preparation for privatization. In particular, increasing energy prices to cover costs, and increase profits, has been a painful process in many transition economies. The general trends with regards to energy privatization for transition economies are to move towards increasing prices; decentralizing distribution to local authorities; and some privatization, especially production. Private participation in electricity has been concentrated in the Czech Republic, Hungary, Kazakhstan, and the Russian Federation with some vertical unbundling of existing firms. Privatization of water in the region has so far been restricted largely to two countries, the Czech Republic and Hungary, with a couple of cases in Poland. Restructuring by decentralization has taken place more extensively, though this decentralization has probably reduced efficiency. In particular, the problems encountered by competitive restructuring initiatives in Russia point out the following barriers to reforming natural monopolies that are particularly important in Russia and, by extension other transition economies: the first is political opposition from the management of the firms themselves (e.g., Gazprom). The second obstacle to reformed natural monopoly regulation lies with the subnational authorities. The regional authorities' dual role as owners of regulated firms and as the principals to which the regional regulatory commissions are subordinated has not worked well. Moreover, much of the so-called "privatization" has really been the transfer

4 In Manila's water privatization, NGOs claim that the contracts with concessionaires provide for inadequate health standards, and lack appropriate environmental standards. In Pakistan, there are complaints about electricity privatization resulting in doubling of electricity prices in one year so as to accommodate demands by foreign investors for higher profits paid in foreign currencies. There are also the concerns about the pricing agreements reached by the Pakistan Government with transnational corporations to induce them to invest in new independent power producers. As far as the effects on price are concerned, in each of the utilities, the evidence from across the region is that privatization and restructuring are associated with increases in prices and charges for some consumers and have generally been disadvantageous to domestic consumers (Paddon 1998).

of ownership rights from the federal to regional governments. The problem is that such transfers have introduced additional elements of confusion into corporate governance, and created conflicting incentives for federal and regional agencies that function both as owners and as regulators. This confusion and the conflicting incentives have been a major obstacle to regulatory reform in Russia's natural monopoly sectors (Izaguirre 1998, Martin 1997, Slay and Capelik 1998).

How to better regulate natural monopolies: Highlighting some policy lessons and regulatory experiences

The efficiency and behaviour of a monopolistic enterprise, whether private or public, depends much on the framework in which it operates, and especially on the existence of performance-enhancing incentives and penalties (Guislain 1997). We should acknowledge that neither the superior performance of a public monopoly to a private monopoly nor the contrary has ever been proven empirically.

Which specific approaches and techniques need to be applied? This is the crux of the matter of designing natural monopoly regulation policy. In this section, we will highlight and analyze some regulatory practices and experiences of developing and transition economies, so as to draw some policy lessons.

Harnessing competition for regulation as a goal

We observe from the experience of many developing countries that competition is an efficient form of regulation. Where privatization has gone with strong competition in the market, the outcomes were positive, as is the case with Argentine electricity (see Box 1). Thus, whenever possible, harnessing competition in the market for regulation should be the main goal.

Try alternatively "competition for the market"

If competition in the market is not possible, as e.g., in the water industry, one should at least organize the sector so that it can take advantage of opportunities for competitive bidding.

In the water industry, network-related costs are a higher proportion of total costs than in gas, electricity, or telecommunications, and the gains to be made from introducing competition by splitting up ownership of the system are relatively small. Thus, most water will be supplied monopolistically at least for the time being, and franchising appears as a way of encouraging efficiency despite the monopoly (Klein and Irwin 1996). Argentina's positive experience with an international competitive bidding process for Buenos Aires water concession in 1993 is a case in point. In Argentina, water and sanitation competition has been introduced through a bidding process, closely resembling Demsetz-competition (Chisari, Estache, and Romero 1997).

In the railway industry, franchising is also a preferred practice. The success of the early concessions and the lack of credible alternatives have caused a snowballing of such franchise-based reforms in Latin America, spreading also to other regions. So far the experiences in Argentina, Brazil, Chile, Mexico, and Ivory Coast-Burkina Faso are encouraging (see Table 1 again) (Thompson and Budin 1997).

Yet franchising is no panacea. Introducing competition for the market requires careful supplementary regulation.

First of all, it requires a substantial government investment in the initial design of the concession. This also entails government's fundamental decision concerning the degree of flexibility of the concession agreements to be allowed (see Box 2 for some guidelines). Governments still have to deal with the familiar problem of price regulation. At the time of the concession, the regulator must try to estimate the right price e.g., for water (see the following section 2.3).

In addition, over the course of the concession, it inherently requires continuing government involvement in regulating safety, monopolistic behaviour, and compliance with the pricing and service requirements of the concession. It cannot simply walk away from its concessions once they are completed (Thompson and Budin 1997).

BOX 2: Designing the initial concession agreements—flexible or inflexible?
(Lessons from Guinea, Ivory Coast, Peru, and Venezuela)

It is not easy to find a balance for each country and each sector between restrictive rules and adoption of a more flexible framework that allows for evolution of the rules but adds uncertainty.

Generally speaking, detailed a priori regulation is better suited to relatively stable, technologically mature, and monopolistic sectors, such as water, than to sectors undergoing rapid technological evolution, such as telecommunications.

However, in developing countries with weak administrative and judicial systems or poor track records concerning credibility, the use of detailed and relatively inflexible concession agreements with fairly precise upfront regulation may be preferable to more flexible rules subject to more discretion on the part of the regulator. This may be more likely to reassure investors than the creation of an autonomous regulatory agency with discretionary rulemaking powers.

- Guinea and Ivory Coast both opted for the inflexible approach in privatizing their water supply and electric power sectors; the leasing contract and concession agreement were accompanied by a detailed schedule of obligations and conditions, leaving few aspects to be decided or agreed upon during execution of the contract. The results are so far encouraging.
  It may be desirable to anchor the regulatory framework securely in a law, which would give it a great stability, though little flexibility, as Peru did. Peru needed to establish a reputation for credible regulatory rules to attract investment to the sector. The terms and conditions of the initial regulatory contract are enforceable under commercial law, giving the regulator little discretion during the exclusivity period. It has been successful by and large, exceeding all of its major investment and service improvement goals. The regulatory framework, including the terms and conditions of concessioning can be spelled out e.g., as a sector-specific privatization law. This can be particularly useful for governments with low credibility and an inadequate track record, which will usually have to offer more guarantees to attract private investors.
- In contrast, the lack of such institutional and legal anchoring probably remains one of the major weaknesses of Venezuela's telecommunication franchising. In 1994 relations between CANTV telephone company holding a 35-year concession, on the one hand, and the regulator and government, on the other, became very tense. For political reasons, the regulator blocked the rebalancing of rates and did not meet deadlines to authorize some rate increases provided for in the privatization agreements; one of the quarterly increases was even denied. Even if the short-term effect is not clear, it is likely that this interference will be detrimental to continued private investment.

Source: Joskow (1998), Guislain (1997), Plane (1998)

Regulating monopoly price: Cost-based or price-based formula?

Setting the optimal price for natural monopolies e.g., at the time of the concession is not an easy matter. Difficulty with monopoly pricing results first of all from the problem of regulators not having access to good information, regarding demand and best practice cost conditions (Bradburd 1992). Secondly, there is difficulty in designing a system of price controls that gives a strong incentive for the regulated firm to invest more and to improve its efficiency.[5]

Three basic issues are involved:

1) the rate level issue—making sure that the total earnings of the firm are appropriately related to the costs;
2) the rate structure issue—the determination of the proportion of earnings between different services and different customers;
3) the quality issue, to ensure that price controls do not create incentives for firms to reduce the quality of products and services.

5 In particular, the main purpose of tariff regulation in most developing countries should be to foster investment rather than to control the level of prices per se. In these countries it may indeed be preferable to have relatively high tariffs. An enterprise could then self finance a large part of its investment programme, and contractual or regulatory mechanisms could compel it to reinvest the "excess" tariff in the sector to meet demand (Guislain 1997).

Of the various methods of monopoly pricing regulation, those applied often to concessions in developing countries are described below.

Rate of return (or cost-based) regulation

This "cost-plus-fair rate of return" regulation method (based on *average cost* pricing) allows tariffs to rise subject to a predetermined rate of return. Prices are adjusted so as to keep the company's rate of return on capital at a constant level. If the company's rate of return falls below that level, the regulator allows prices to rise. This was popularized in the United States and has been transferred to several developing countries. The telecommunications sector in the Philippines is one example. Under this approach, the tariff is calculated so as to cover the regulated firms' operating costs, plus a rate of return on the investment.

The problems with this price regulation method are that:

One must estimate cost of building capacity. The basis of the calculation may be inflated by means of unrealistic or spurious costs or investments. Under this approach, the utility calculates—and the regulator reviews—the expected operating cost for a normal year (*information problem*).

It is considered to provide very little incentive for the regulated firm to reduce costs and improve technology. This does not encourage firms to minimize cost, either. It also often encourages to overinvest in capital (*incentive power problem*).

It is complicated to administer. It requires extensive research into an enterprise's accounts--and thus plentiful human resources--to determine which costs should be included in the rate base, and which should be disallowed. It requires constant monitoring of management and continual negotiation between the two sides (*regulation cost problem*).

Its tendency to distort input choices, as well as its administrative difficulties, have made this method of regulation increasingly unpopular. In particular, in most developing countries where professional skills are scarce, the opportunity cost of scarce human capital devoted to regulation is too high to recommend its use (Jones 1994, Klein and Irwin 1996, Yarrow 1994).

Price cap (or price-based) regulation

This regulation method tries to avoid these problems. It emerged during the privatization of Britain's utility industries in the United Kingdom in the mid-1980s and is now used in developing public utilities in countries such as Argentina, Brazil (new law on concessions), and Chile.

Under a price cap, prices are allowed to rise by means of a formula, known as RPI-X, that increases the tariff by the increase in the retail price index adjusted by an efficiency factor, X, to account for expected productivity gains and other changes. Under this method, the company has an incentive to lower costs, since it keeps the resulting profits, because it allows the firm to hold on, at least for a designated period, to the profit gains from cost reductions.

The aim of this system is basically to give the regulated firm an automatic incentive to improve productivity, while at the same time enabling consumers to benefit from such improvements through the tariff cuts introduced at times of revision.

Fixing the initial tariff is accompanied by an automatic adjustment rule valid for a given number of years. During an initial period, the advantage of all such gains goes entirely to the concessionaire. In return, any real cost increases are not passed on to the consumer, except in unusual circumstances such as sharply higher purchase prices for energy.

The flexibility and the *relatively* greater ease of administration have made price caps a preferred form of regulation for governments. Price caps allow a company to adjust prices quickly when market or competitive conditions require it, because an extensive review of costs and earnings is not required. Instead, price cap provisions enable a utility to adjust prices as it wishes, provided the average price for a specified basket of services does not exceed some maximum value (Klein and Irwin 1996, Warrell 1997).

RPI-X price adjustments certainly seem far superior to rate-of-return price adjustments, *but the real difference between them is not as big as it might seem* (Ergas 1994, Jones 1994, Yarrow 1994). For example, according to Jones (1994), the incentive power of a monopoly-pricing scheme to induce efficiency does not depend on whether it is couched in cost-plus or RPI-X terms. Rather, it depends on the length of the regulatory lag and the expectations of how prices will be adjusted at the end of the lag. The regulatory lag is the period for which the price is set. The longer the lag, the higher the incentive power of the system. One advantage of RPI-X is then that it is typically associated with a relatively long lag. However, in practice, the point is that this dimension of choice can easily be added to cost-plus schemes. Allowing the price to vary with the rate of inflation promotes a longer lag before prices have to be established. But again, the adjustment can also be accomplished by choosing a price index that relates more specifically to the input price inflation experienced by companies, as seen in Chile (see Box 3).

This price regulation method raises complex issues about the level of the cap, the services to be covered and the monitoring of service quality; hence also imposing a heavy cost in supplementary regulation. For example, RPI-X formulas need to be reviewed every three to five years or so, since the regulator does not know exactly how large X should be and, in reviewing whether X was set appropriately, will take into account the profits being made by the firm.

There is additional trade-off confronting the regulator. Price cap regulation may be good

BOX 3: The two boundaries of possible spectrum of pricing techniques:
New Zealand (minimum) and Chile (maximum)

According to Jones (1994), New Zealand's effort represents the *minimum* that should be done, while Chile's is the *maximum* that should be attempted. Most countries fall somewhere in between, with a relatively long regulatory lag and X set using as much exogenous data as possible. *The precise point on that continuum would then be a function of specific country and industry conditions.*

1) New Zealand (model of "simplicity"): The system used in New Zealand (described as "regulation without regulators") is extremely simple. It is based on the RPI-0 pricing mechanism, which is extremely economical in terms of the cost of regulation. Its cost-incentive power is quite high because of the indefinitely long regulatory lag with a fixed price in relation to inflation. The primary emphasis is on cost-efficiency incentives, with considerably weaker controls on the allocative inefficiencies of monopoly pricing. It minimizes the costs of the major regulatory failures, though at the expense of allocative form of market failure.
2) Chile (model of "sophisticated specificity" *plus* yardstick pricing): The system can be described as cost-plus-fair-return because firms are allowed a rate of return equal to the risk-free rate plus a premium based on the systematic risk of the industry and the difference between the risk-free rate and the return on a diversified investment portfolio. (It could as well be described as RPI-X because the price cap is adjusted every two months to reflect inflation). Which phrase is chosen is immaterial because the real distinction lies elsewhere. The adjustment period is explicit and reflects a long lag of five years. Moreover, a range of regulatory technology is spelled out in law. In addition to the sophisticated fair-rate-of-return and inflation-adjustment mechanisms, long-run marginal costs are calculated in the context of a five-year investment plan (designed to minimize the system costs of meeting projected demand), markups from marginal to average costs are apportioned via Ramsey pricing, and so on. In addition, Chile used yardstick competition as the local best-practice benchmark as a complementary measure (e.g., in the case of electricity distribution). If the regulator and the firm disagree, they can also appeal to a technical arbitration board. Chile's system has resolved the market failure problem, but at an increased cost of regulation and at the expense of complexity and information requirements.

Source: Jones (1994)

BOX 4: Using yardstick competition as a "complementary" measure
(Examples: Argentina, Chile, Tanzania)

Argentina used this technique in several sectors. In addition to introducing competition in the market where it was deemed feasible, Argentines decided also to break up existing monopolies on a geographic basis to create benchmark (or "yardstick") competition in most infrastructure sectors. In the telecommunications sector, for instance, it was decided that direct competition should not be introduced immediately for basic telephone services previously provided by ENTEL. ENTEL was split between two geographic areas (north and south, with Buenos Aires divided into two zones), served by two separate privatized companies. Although direct competition is (initially) not authorized for basic services, this geographic division allows the regulator and the public to compare the performance of the two companies and exert pressure on the less efficient operator. The same principle was applied to power and gas distribution companies (Guislain 1997, pp. 214-15).

Another example is the power sector in Chile, where regulators have devised a pricing structure based on the cost structure of an "optimized" distribution firm. Distributors measure their costs against those of the model firm. This method is therefore particularly useful for encouraging efficiency (Nells and Roger 1994, pp. 10-11).

Tanzania also provides a good example of horizontal unbundling based on geographic location, for cellular services. The regulator has divided the country into four zones and allowed service providers in each. Millicom (Tanzania) Ltd. is licensed to provide service in Dar es Salaam and Zanzibar. TRI Telecommunications Tanzania Ltd. is to provide the coastal (Dar es Salaam) and Northern Zones. Tanzania Telecommunications Company Ltd. is to provide services in Northern, Central and Southern Highland Zones; and MIC Tanzania is providing mobile cellular telecommunication services in the coastal area of the country. This method allows competition by comparison, by forcing each of the regional operators to reveal much data on key areas of their operations (Otobo 1998, pp. 24-25).

for cost reduction incentives, but may be bad for quality incentives. Incentives for cost-reduction may translate into a tendency to chisel on quality, then leading regulators toward greater involvement in investment and product quality decisions, if not so much concerning the details of tariff formulation.

The challenge for the regulator is then how to balance and reconcile all these different problems such as information requirement and heavy cost of regulation. The choice of adequate pricing technique is complex and there is no best case for all circumstances.

The feasible choice for pricing regulation design lies on the continuum between New Zealand and Chilean pricing systems, which define the boundaries of what might be practical. New Zealand's model of extreme simplicity and Chile's model of sophisticated specificity mark the end points of the spectrum of the currently feasible pricing models. Many intermediate solutions are possible between these two models (see Box 3).

A complementary approach is then to use a benchmark or yardstick against which the enterprise measures itself, thus reducing information requirements from the regulated firm. Using yardstick competition can also reduce the undesirable incentive effects of both RPI-X and rate-of-return pricing models (Yarrow 1994, Klein and Irwin 1996).

Getting the relation between privatization and regulation right: A few guidelines

In addition to all these measures of introducing competition, it is equally important that one gets right the privatization sequence and coordination with regulatory reform.

Here are a few guidelines based on the observation of countries' experiences.

1) *Implementing related structural and regulatory reforms upfront and prior to privatization is important. The regulatory framework should be as little ambiguous as possible and must be completed prior to privatization.*

Regulatory reform and privatization processes need to be closely coordinated, and their sequencing and coordination will have to be thought through from the outset (Bitrain and

Serra 1994, Guislain 1997). The privatization of the Argentine telecommunications operator, ENTEL, in 1990 provides a good example of the importance of establishing a regulatory framework before privatization proper. Partially due to a conscious decision on the part of the Argentine Government to give priority to a speedy conclusion of the sale, the regulatory regime was not defined until the very end of the bidding process for ENTEL, following several major modifications during the process itself. This regulatory failure had a negative impact on the telecommunications sector, as shown by the problems with the revision of the tariff formula (UNCTAD 1995, p. 136). There are also other examples such as water privatization in Manila in the Philippines (see Paddon's case study 1998, pp. 77-79), which shows the establishment of a clear and effective regulatory framework as a pre-requisite for the success of a natural monopoly privatization programme.

2) *The emphasis and priority should thus be on the competition-based reform of the sector, rather than on the transactional aspects of the divestiture of one or more individual public enterprises.* Many privatization programmes appear to focus more on revenue generation than on the longer-term gains that more radical restructuring of the enterprise or sector concerned would bring (Guislain 1997). According to Paddon's study (1998), the privatization practice in Asian public utilities hitherto is generally dominated by gross figures of the overall transactions. In most cases, there is little evidence of specific assessments of a wide range of potential costs or benefits of the privatization of the utility

3) *Defining privatization objectives is an important exercise that should be undertaken as early as possible. This is particularly necessary, given the multiplicity and sometimes mutually incompatible nature of the objectives.* An understanding of the possible conflicts between allocative efficiency and other objectives is essential. For example, the sales proceeds to the government may be enhanced by selling a large enterprise as a single entity, whereas restructuring the enterprise into smaller units will improve the competitiveness of the sector and the economy but reduce the proceeds of the sale. Many privatization programmes have floundered when clear objectives were lacking or where conflicting objectives were simultaneously pursued (Guislain 1997, Bradburd 1992, Waddell 1997).

Dealing with the problem of regulatory capacity: Privatization of regulatory tasks as a solution?

Regulatory capacity is an essential prerequisite for managing privatization and implementing competitive restructuring of natural monopolies.

However, history teaches us that few countries have had the essential capacity to handle a complex regulation policy. Historically, the emergence of municipal ownership of the utilities was due, in part at least, to the lack of confidence in the early regulatory bodies; and one reason for the nationalization of the railways was the failure of the pre-war regulatory system to meet the needs of the industry. More recently, even the relatively sophisticated regulatory agencies, established to control the prices set and the profits earned by the industries privatized under the Thatcherite programme in the United Kingdom, have been beset by difficulties, and their decisions have been widely criticized (Ogus 1994).

There are plenty of examples of the fundamental problem with lack of regulatory capacity, which hampered privatization and reform initiatives (e.g., the privatization of Sri Lanka's bus transport, Wanasinghe and Wanasinghe 1991).

Indeed, setting up and choosing the appropriate institutional framework of regulation presents a major challenge for developing and transition economies.

For example, a choice has to be made between multisectoral regulatory agencies (as in Jamaica and Malaysia) and single-sector regulatory agencies (as in Argentina), which created a regulatory agency for each industry. Most experts agree that a multisectoral agency offers advantages over the alternatives. It pools scarce regulatory resources such as regulatory economists and lawyers, especially important in countries with limited regulatory capacity. Also, by pitting interest groups against one another, it obviously tends to increase resistance to regulatory capture and political interference and facilitate a more harmonized approach in different sectors (Estache 1997).

Even so, whether or not a country should adopt one or the other model of regulation should be based on a number of considerations such as the number of operators in the sector; the size of market, the availability of regulatory resources, the complexity of regulatory rules to be monitored and enforced, and the political disposition regarding degree of autonomy for the regulatory agency. This means that the choice of regulatory institutional framework to be adopted should be guided by its good fit with the national context. In general, the larger the economy, the greater the number of operators in the sector or the more complex the regulatory rules for a sector, the greater the need for an independent sector-specific regulatory agency (Otobo 1998).

Additional issues facing governments concern the form of the regulatory body, funding and legal authority, in particular in connection with the important issue of ensuring effective independent regulation.

The importance of independent regulation cannot be stressed too strongly. The experience of the Hungarian electricity sector—where regulatory agencies in 1996 reneged on preprivatization promises guaranteeing foreigners an 8 per cent real dollar return on investments made in 1995—is instructive in this regard (Slay and Capelik 1998). Even governments with an ambitious privatization initiative like Malaysia could not resist political interference (see Box 5).

An independent regulatory authority is certainly the most attractive solution for investors, as it offers a more stable environment for privatized natural monopoly firms. However, it may not be applicable to all countries, particularly in many developing and transition economies where there is no tradition of independent institutions, free from political interference. It is particularly important that the authority be granted an independent source of funding. Independence also requires that, where state-owned enterprises are operating in the sector, the regulatory function be clearly separated from the exercise by the government of its ownership functions. Where sectors were run as public monopolies the confusion from combining operating and regulatory powers in a single entity or person was not uncommon; as a sector starts to open up to new firms, however, this situation quickly becomes untenable (Guislain 1997, UNCTAD 1995).

According to Guislain (1997), the problem however lies in the reality of many developing and transition economies. In many countries it is difficult to achieve that independence in practice, at least in the short run.

The concept of regulatory bodies independent of the industry and the government is undoubtedly attractive, but independent, autonomous regulatory agencies with decision-making powers may not be suitable for all countries. If the political independence of the

BOX 5: Importance of independent regulation
(The case of Malaysia)

Malaysia's ambitious and wide-ranging privatization programme covering railways, the national airlines, telecommunications, electricity and water services attracted considerable domestic and foreign investment. This also allowed the Government to shift to the private sector the considerable cost of improving the country's infrastructure needed to sustain its high economic growth. However, questions have been raised relating to the role of the Government in promoting the healthy development of the privatized utilities. In May 1995, the Government—which retains a 70 per cent share in the privatized electricity utility Tenaga National—decided not to allow Tenaga to raise its prices, thereby contravening a 1993 agreement allowing the utility to adjust its charges according to movements in fuel prices and other costs. The decision was influenced by the Government's concern that higher electricity prices would add to the inflationary pressures in Malaysia's economy. On the other hand, Tenaga defended its proposed price increase on the grounds that an increase in revenues was needed for a multi-million dollar modernization scheme. Many investors now feel that the decision has set an unhealthy precedent for future government interference in the privatized industries. This case illustrates the importance of effective *independent* regulation (UNCTAD 1995).

regulatory organ cannot be ensured (e.g., as in countries with authoritarian governments), creating a new agency with decision-making powers may needlessly complicate the management of the sector by introducing an additional actor and yet another level of uncertainty. For instance, the United Kingdom model, and in particular the decision-making powers given to individual and independent regulators, should be seen in the proper context: the United Kingdom is a sophisticated industrial country with very strong, well-established legal practices and traditions. In this regard, Guislain recommends for some developing and transition economies with little or no regulatory track record the adoption of a light-handed system of regulation with limited discretionary powers and the contracting out of much of the regulatory control and verification work to reputable private auditors.

In particular, the idea of a small, central government team that contracts out important regulatory tasks to external auditors and institutions (i.e., "privatization of the privatization and regulation process") clearly is an interesting option and deserves some attention. Complex regulatory functions need to be performed professionally; where limited administrative capacity (as seen in the privatization of Sri Lanka's bus transport) is indeed a binding constraint, at least in the short and medium term, "privatization of regulatory tasks" should be considered. While creation of a separate group or agency with extensive powers and a clear mandate seems to be the best solution, at least for countries with extensive privatization programmes, this option will often be better suited to some other developing and transition economies' administrative capacity.

Conclusions and Recommendations

Natural monopoly sector privatization is a rapidly evolving field, and it would be premature to venture definitive conclusions as to the "best practice" privatization and regulation models for natural monopolies. Yet, the regulatory experiences in developing and transition economies to date suggest the following preliminary guidelines for natural monopoly regulation policy:

The bottom line is that regulation is a continuing process, whichever model is used. Harnessing competition for regulation should be the goal, but even the alternative measures of introducing competition (such as Demsetz-competition) require substantial supplementary regulation efforts of government. Embracing the competition principle as much as possible is important. Yet, liberalization requires re-regulation (i.e., reformulation of old rules and the creation of new ones). Again, market liberalization is not the same as "deregulation".

One should try to take full advantage of the unique opportunity that privatization offers the government to rethink and reform the sector. This implies that one needs to focus more on "reform" based on "real" competition than just the "private" or "public" ownership issue (Where privatization has involved competitive markets, the outcomes have been positive. As far as the public vs. private ownership debate is concerned, the superiority of neither ownership structure for natural monopolies has ever been proven empirically).

To this end, countries must find which segments of an industry have competitive characteristics and determine the most suitable ways of introducing more competition, while still maintaining appropriate oversight (e.g., for those sectors that exhibit natural monopoly characteristics (For example, Demsetz-competition in combination with yardstick competition in the water industry seems so far a feasible way of introducing competition, and vertical unbundling of electricity, hence competition in the market seems both feasible and efficient). This entails that governments *still* need to deal with the thorny problem of monopoly pricing.

The price-based (price cap) regulation model appears far superior to the cost-based (rate-of-return) regulation model, e.g., in terms of its incentive power. However, the *real* difference between them is not as big as it might seem. In practice, the difference becomes often diluted. The feasible choice for pricing regulation design lies rather on the continuum between New Zealand's model of extreme simplicity and Chile's model of sophisticated

specificity. Many intermediate solutions are possible between these two models, and the precise point on that continuum would then be a function of specific country and industry conditions.

Countries now also have to grapple more explicitly with distributional impacts, so as to increase the chance of success of competition reform. While it is possible, and perfectly legitimate, to argue that the losses made by some groups are outweighed by the overall gains (according to the so-called "compensation principle"), the distributional consequences of competitive restructuring processes (e.g., as a result of "economies of density") then need to be made explicit and at least discussed. Certain distributional inequities are better dealt with by means of subsidies from the government budget.

Not least in this regard, an understanding of the possible conflicts between allocative efficiency and other objectives (including distributional equity objective) is essential. Given the multiplicity and sometimes mutually incompatible nature of the objectives, particularly between static efficiency and dynamic efficiency, clear definition of objectives from the very outset is important. In case of eventual trade-off between static and dynamic efficiency (e.g., when determining the right price level), it is important to keep in mind that the ultimate objective of natural monopoly industries is sufficient and sustainable provision of their services. While reforms may be necessary to make services more efficient and economical (hence increasing static efficiency), the priority should still be dynamic efficiency.

In addition to introducing greater competition, it is also equally important that one gets the privatization process right. In many countries, privatization seems an unavoidable outcome of constraints, particularly financial ones. Once decided for privatization, proper sequencing of the privatization and its coordination with the regulatory reforms are important. The best procedure is that structural and regulatory reforms are implemented upfront and prior to privatization.

It is not easy to find a balance for each country and each sector between restrictive rules and adoption of a more flexible framework that allows for evolution of the rule but adds uncertainty. Generally speaking, detailed a priori regulation is better suited to relatively stable, technologically mature, and monopolistic sectors, such as water, than to sectors undergoing rapid technological evolution, such as telecommunications. However, in developing countries with weak administrative and judicial systems or poor track records concerning credibility, the use of detailed and relatively inflexible concession agreements with fairly precise upfront regulation may be preferable to more flexible rules subject to more discretion on the part of the regulator. This may be more likely to reassure investors than the creation of an autonomous regulatory agency with discretionary rulemaking powers.

Essentially, there is limited experience with regulation and privatization in developing countries, and we still have much to learn. The choice of regulatory approach is complex and there is no best case for all circumstances. Thus, the choice of particular regulatory framework (e.g., between multisectoral and single-sector agencies) to be adopted should be guided by its "good fit", particularly with the particular national context, and reflect the "reality" of developing and transition economies. In this regard, the option of "privatization of the regulatory task" certainly cannot be dismissed out of hand.

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