Exploiting New Market Opportunities in Telecommunications

Lessons for Developing Countries

Veronique Bishop
Ashoka Mody
Mark Schankerman

Cofinancing and Financial Advisory Services (Project Financing Group)
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Developing countries are in transition from telecommunications monopolies to multiple providers that compete with and complement each other. The transition stems from a huge suppressed demand for telecommunications, a dissatisfaction with traditional state-owned monopolies, and an unprecedented range of technological opportunities. The promise of a pluralistic market structure is great and may represent the only realistic hope of more than doubling telecommunications investments in the developing world to over $60 billion a year, conservatively estimated to meet unfulfilled and growing demands for conventional and new services.

However, for the promise of technological opportunities to be realized, interlocking measures will be needed to: (a) render incumbent providers more commercially oriented and subject to the same basic rules as other providers; (b) create a regulatory environment that provides incentives for efficient investment, protects consumers, and ensures fair competition; and (c) sensitively manage conflicting interests during the period of transition, especially in addressing the concerns of traditional telecommunications workers. Thus, the successful transition to a competitive structure follows not merely from technological developments that have reduced the economic benefits of large-sized operations but it follows also, and more importantly, from coordinated institutional reforms.

In most countries, telecommunications services have traditionally been delivered by a single, government-owned provider. Such state-owned monopolies have only rarely mobilized significant amounts of capital for the telecom network, and even in those instances have a poor record of responding to the evolving and varied needs of businesses and households. As a consequence of their past failures and abetted by technological change, monopolies are giving way to a heterogeneous structure where competition exists in numerous market segments. Countries undertaking reform show restructuring of the government-owned monopoly operator and regulatory reform occurring in tandem.

Promoting competition requires liberal market entry rules. In particular, to encourage entry by providers who may wish to supply only specific services, traditional cross-subsidization across services needs to be eliminated, which in turn may require sectoral unbundling. Such unbundling may occur through physical separation of assets and operations; often, however, an accounting separation, as between network and retail services, can go a long way in facilitating competition. The longer-term regulatory task is to implement pricing rules that protect customers and provide incentives to operators to reduce their costs. At the same time, a regulator in a pluralistic regime must establish rules and prices for the interconnection of the multiple networks—and this practice is still evolving.

Although the benefits of reform are often evident, the pace of change can be slowed by incumbent interests and experience shows that sectoral reform has to be led by forces outside the traditional sectoral establishment. For example, established interests often invoke, in a self-serving manner, the potential displacement of workers as a reason for holding back. In practice, this tactic has been undermined by a variety of measures that have successfully mitigated the potentially negative effects on workers.

This paper is about policy reform in a complex sector, where not only the physical network elements but also the institutional aspects are interdependent on each other. In dealing with these interlocking elements, our coverage is necessarily broad rather than deep. The aim is to provide an account of links between different aspects of the reform process, entailing a sacrifice in the extent to which specific issues can be probed.

This paper was prepared as part of the CFS Discussion Paper Series. The purpose of the Discussion Paper Series is to disseminate current practices and the lessons learned in privatization and private sector related activities. As a Department that covers all the World Bank’s borrowing countries, Cofinancing and Financial Advisory Services (CFS) endeavors to share with outside readers some of its cross-country experience in privatization. We are pleased to present this international review of telecommunications opportunities and hope it will contribute to the debate on the appropriate choice of instruments for privatization and public enterprise reform.

Ram Kumar Chopra
Director
Cofinancing and Financial Advisory Services
(CFS)

Nina Shapiro
Manager
Project Finance Group
(CFSPS)
EXPLOITING NEW MARKET OPPORTUNITIES IN TELECOMMUNICATIONS

LESSONS FOR DEVELOPING COUNTRIES

OVERVIEW

Stemming from a huge suppressed demand for telecommunications, a dissatisfaction with traditional state-owned monopolies, and unprecedented technological opportunities, an increasing number of developing countries are embarking upon a transition to a system of multiple telecommunications providers—competing with and complementing each other. The promise of a pluralistic market structure is great and may represent the only realistic hope of more than doubling telecommunications investments in the developing world to over $60 billion a year, conservatively required to meet existing, unfulfilled demands as well as the growing demand for conventional and new services. However, for the promise to be realized, measures will be needed to: (a) render incumbent providers more commercially oriented and subject to the same basic rules as other providers; (b) create a regulatory environment that provides incentives for efficient investment, protects consumers, and ensures fair competition; and (c) sensitively manage conflicting interests during the period of transition, dealing especially with the concerns of traditional telecommunications workers.

Thus, the successful transition to a competitive structure follows not merely from technological developments that have reduced the economic benefits of large sized operations but it follows also, and more importantly, from institutional innovation. The good news is that institutional change is possible—as this paper documents based on examples of successful reform in select countries. Though much of the experience to date comes from industrialized countries, several developing countries have undertaken varying degrees of sector reform, addressing their own special problems but also adapting lessons learned in advanced economies. Institutional innovations can spread across international borders with remarkable speed.

In most countries, telecommunications services have traditionally been delivered by a single, government-owned provider. Such state-owned monopolies have rarely mobilized significant amounts of capital for the telecommunications network, and even in those instances have a poor record of responding to the evolving and varied needs of businesses and households. Large waiting lists are evident, especially in low income countries. Moreover, a sizable latent demand lies concealed in most developing countries since prospective users do not register on waiting lists until there is a realistic chance of receiving a phone connection.

Countries undertaking reform show restructuring of the government-owned monopoly operator and regulatory reform occurring in tandem. Revitalizing the incumbent, typically the government-owned monopoly, is undertaken for social and commercial goals. Social objectives include the preservation of the government’s financial assets and protection of the interests of workers in such enterprises. However, to aid the process of sectoral reform, the incumbent operator’s incentives need to be reoriented towards commercial goals through corporatization, decentralization of activities into profit centers, and, finally, privatization.

Beyond restructuring lies competition. As a consequence of their past failures and abetted by technological change, monopolies are giving way to a heterogeneous structure where competition exists in numerous market segments (Figure 1). Today, competitive entry is possible in all segments of the sector. While competition is best established in domestic long-distance services, the cartel limiting competition in international services is being decisively broken, and the local loop providing the link from the ultimate user to the network—and the last bastion of monopoly—is also witnessing growing competition. Promoting such competition requires liberal market entry rules. In particular, to prevent cross-subsidization across services, and hence promote entry by new providers who may wish to supply only specific services, the sector needs to be unbundled. Such unbundling may occur by requiring physical separation of assets and operations; often, however, an accounting separation, as between network and retail services, can go a long way in facilitating competition.

The further task is to build new policy and regulatory structures to ensure fair competition. First, a number of transitional objectives must be achieved. Old rate structures that embed large cross-subsidies have to be phased out and replaced with new ones more conducive to competition. During the transition, the incumbent operator maintains a dominating position and thus can prevent fair competition; however, the incumbent is also saddled with service obligations that new entrants often do not have, requiring transitional compensation. The longer-term regulatory task is to implement pricing rules that protect customers and provide incentives to operators to reduce their
Figure 1 - Direction of Liberalization of the Telecommunications Sector

DIRECTION OF LIBERALIZATION OF THE TELECOMMUNICATIONS SECTOR

<table>
<thead>
<tr>
<th>Structure</th>
<th>Govt. Department</th>
<th>Govt. Owned Corporation</th>
<th>Liberalization Of Services</th>
<th>Private Monopoly</th>
<th>Competition</th>
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<tr>
<td>MOST COUNTRIES</td>
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<td>1996</td>
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INCREASING LIBERALIZATION

INEXPLOITING NEW MARKET OPPORTUNITIES IN TELECOMMUNICATIONS
costs. At the same time, a regulator in a pluralistic regime must establish rules and prices for the interconnection of the multiple networks—and this practice is still evolving.

Although the benefits of reform are often evident, the pace of change can be slowed by incumbent interests; hence, experience shows that sectoral reform has to be led by forces outside the traditional sectoral establishment. For example, established interests often invoke, in a self-serving manner, the potential displacement of workers as a reason for holding back. In practice, this tactic has been undermined by a variety of measures that have successfully mitigated the potentially negative effects on workers. No doubt, the diffusion of reform has been accelerated by user demand for technological advances. But it has taken the commitment of senior leadership to realign interests in favor of consumers and away from the old telecommunications establishment.

In what follows, we deal successively with the large gap between supply and demand, restructuring the incumbent to face the market test, the new opportunities for competition, creating a new regulatory regime, and the political economy of change.

THE SUPPLY-DEMAND GAP
The large unfulfilled demand for telecommunications in developing countries—seen in long waiting lists and poor service quality—impose a severe cost on the operations of firms and households. In addition to "plain old telephone service," applications tailored to customer needs are being pioneered in developed countries, but their relevance is as great for developing country enterprises, especially those with international transactions. Addressing this supply-demand gap will require substantial new investments, possibly of the order of $60 billion a year.

Evidence of Suppressed Demand
Figure 2 shows a familiar relationship: the availability of phones per capita increases with income per capita. More importantly, a comparison of the regression lines for 1981 and 1991 reveals that this gap in telephone use between the high-income and low-income countries has increased over the last decade. Such a gap could suggest that the telephone is a luxury indulged in by the rich—indeed, President Charles de Gaulle of France scorned it as a gadget—or that telecommunications are more productive in the more information-intensive, rich countries. We find persuasive evidence, however, that the gap arises in large part from severe underinvestment in telecommunications services in developing countries.

Today, no one can seriously assert that telecommunications is a luxury. For firms competing in international markets, the demand is particularly acute. Empirical studies have shown that both the quantity (lines per population) and the quality of telecommunications are extremely important for generating exports and for attracting foreign investment (see Boatman 1991, Mody and Yilmaz 1994, Wheeler and Mody 1992). In some respects, developing countries are even more dependent on telecommunications infrastructure than are developed countries. Exports of products that are characterized by rapidly-evolving demand (such as apparel) are particularly sensitive to the availability of a telecommunications network. In addition, the ex-
port of intermediate products (such as auto parts) requires close contact with customers who need to minimize their inventory levels. In the newly industrializing economies of East Asia, advanced applications of telecommunications for the movement of documents and goods are being developed to bolster their competitive advantage in traditional exports such as garments, footwear, auto parts, and electronics goods (Mody and Reinfeld 1994). This implies an accelerating increase in demand for telecommunications services.

Telecommunications investments in developing countries have shown high economic rates of return. For World Bank projects, they were estimated at 27 percent on average, which is substantially higher than the average on the Bank’s portfolio (World Bank 1991, p. 4). These estimates make conservative assessments of the consumer surplus from telecommunications investments and do not account for spillover benefits.

Failure to keep pace with growing demand has been especially evident in low-income developing countries, where suppressed demand is highest. According to ITU (1994), registered waiting lists for new telephone service represent 27 percent of the installed base in developing countries. The situation is most acute in Sub-Saharan Africa, where the average waiting list is 60 percent of the number of installed lines. In many cases, waiting times exceed ten years. In contrast, the upper half of middle-income countries have waiting lists of 19 percent (Figure 3).

**NEW LINES.** Pent-up demand in developing countries can be conservatively estimated at 45 million lines, the total of registered waiting lists (ITU 1994, p. A9). This is conservative in that: (a) not all countries report waiting lists, and (b) discouraged “waiters” are not reported. The existence of discouraged waiters is illustrated by the increase in waiting lists that typically occurs as more phones are provided and the prospect of receiving a phone improves (ITU 1994, p. 73). This phenomenon is strikingly illustrated in Figure 4a for India, where, even though at least one quarter of waiters have been served each year for the past decade, the waiting list has continued to grow. In Chile, the number of lines increased by more than the size of the waiting list between 1989 and 1990, yet the waiting list remained (Figure 4b). Similarly, according to one report, for every new telephone installed in China, two new applicants join the queue for telephones (Communications International, July 1994, p. 8).

**SERVICE QUALITY AND ENHANCED SERVICES.** Underinvestment and poor maintenance has also resulted in poor service quality. Fault rates of 20 per month for every 100 lines are not uncommon in developing countries, compared to fault rates of 2 per 100 telephones per month in developed countries. Low call-completion rates for domestic and international services increase costs for users and depress revenues for the provider. According to an estimate for Ghana in 1992, call completion rates were less than 50 percent; the average number of lines not working at any time was 20 percent and the average duration of faults was 30 days, though for rural connections repair times could be over a year (Anderson Management International 1993). In addition to the high demand for “plain old telephone service”, there is a growing demand for many specialized and “intelligent” services.1

**The Magnitude of Suppressed Demand**

The estimated $60 billion annual investment required to meet the demand for telecommunications services represents 1.36 percent of the annual GDP of these countries (Table 1). Clearly, this amount signifies a much larger commitment than most governments are willing to make. Those countries achieving the most rapid network growth, such as Korea in the mid-1980s, spent in peak years about 2 percent of GDP on telecommunications investment.

The International Telecommunication Union (ITU) has projected developing country investment in basic telecommunications networks at $32.1 billion per year (ITU 1994, p. A60). This estimate, however, is based on past supply trends, an inaccurate guide for the future, and ex-

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1 Many businesses urgently need packet-switching facilities, X.400 messaging services, electronic data interchange, and paging and mobile services. To overcome these shortages, dedicated bypass networks have been, or are being, created to enable companies with local and international needs to transfer data. In India, these include networks belonging to the Indian Railways, the Steel Authority, the State Bank, Reliance Corporation, and others. In Ghana, Barclays Bank has dedicated lines for its data transfer between branches.
As phone availability increases, so do waiting lists:

**Figure 4a - India:**
Wait Lists and Main Lines (in thousands)

<table>
<thead>
<tr>
<th>Year</th>
<th>Wait List</th>
<th>Main Lines</th>
</tr>
</thead>
<tbody>
<tr>
<td>82</td>
<td>1,000</td>
<td>7,000</td>
</tr>
<tr>
<td>83</td>
<td>2,000</td>
<td>6,000</td>
</tr>
<tr>
<td>84</td>
<td>3,000</td>
<td>5,000</td>
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<tr>
<td>85</td>
<td>4,000</td>
<td>4,000</td>
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<td>86</td>
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<td>87</td>
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<td>2,000</td>
</tr>
<tr>
<td>88</td>
<td>7,000</td>
<td>1,000</td>
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</tbody>
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**Figure 4b - Chile:**
Wait Lists and Main Lines (in thousands)

<table>
<thead>
<tr>
<th>Year</th>
<th>Wait List</th>
<th>Main Lines</th>
</tr>
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<tbody>
<tr>
<td>82</td>
<td>1,400</td>
<td>1,200</td>
</tr>
<tr>
<td>83</td>
<td>2,800</td>
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<tr>
<td>84</td>
<td>4,200</td>
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<td>87</td>
<td>8,400</td>
<td>800</td>
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<tr>
<td>88</td>
<td>9,800</td>
<td>400</td>
</tr>
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</table>

Although no accurate measures of investment requirements exist for quality improvements and enhanced services, it is estimated that high-income countries invested some $81 billion in these areas in 1992, or $200 per installed line. Given the lower sophistication of developing country networks, we could assume that their investments in quality improvements and enhanced services were only half the high-income country levels, or $100 per installed line, creating a further appetite for $17 billion per annum.

**The Transition from Old Ways to New**

Today, the challenge is to provide the large scale of required network investment without imposing a burden on government resources. At the same time, opportunities unfolded as domestic and international capital markets play a more important role in financing infrastructure. Joint ventures add another bank of opportunities, with leading international companies allowing transfer of expertise. For such capital and expertise to be efficiently deployed, services must be oriented towards the needs of consumers, with an emphasis on greater pluralism in the network.

Given the growth of needed investment in the sector over the past decade, state-monopoly telecommunications provision has diminished to make way for more open, competitive structures. As Figure 1 demonstrates, there is a marked trend towards liberalization: in a dozen countries, the sector has evolved from the government monopoly model prevalent in the 1970s to one in which a broadening array of services is being "unbundled" from the predominant operator. During the mid-1980s, many of these entities were reorganized so that telecommunications were separated from posts, operators were corporatized, and in

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2 ITU's calculations are based on the assumption that investment to the year 2000 will continue at the rate experienced in previous years (at a cost of $1500 per line). "Projection (is) based on average annual growth rate in main lines and population over last 8 years" (ITU, 1994, p. 3).

3 ITU estimates total investment in high-income countries at $99 billion in 1992, during which year 12.6 million new lines were installed. Using the ITU benchmark of $1500 per line, the new lines would have cost $17.4 billion per line. The balance, $82 billion, spread over 406 million installed lines, implies an average investment in quality and service enhancement of $200 per line.

4 A handful of government-owned monopolies have successfully enlarged the network. France transformed one of the smallest and most backward networks in Europe into one of the most modern in the world, trebling the number of main lines in a decade from 7 million in 1975 to 25 million in 1985 (Ergas, 1992, p. 2). Turkey's PTT similarly trebled its network, but in an even faster six years. And Korea's network has grown by 1 million lines per year since the early 1980s (Kim, Kim and Yoon, 1992).

Even state-owned monopolies that have mobilized funds for network investment have had a poor record of product innovation and introduction, due largely to their relative inflexibility. France Telecom's inability to successfully introduce new products (in contrast to its success in network development) has been attributed to rigid attitudes in the state sector such as a management bias towards high-technology solutions (Ergas, 1992). Similarly, Kim, Kim, and Yoon have concluded that Korea's state-owned public common carriers (PCCs) "lack sufficient incentives to innovate technologically and improve quality. The PCCs, limited by their monopolistic nature and a shortage of personnel and financial resources, could not effectively respond to the new opportunities" to provide specialized communication services (Kim, et al. 1992).
some cases, these government-owned corporations were privatized. Meanwhile, certain services were opened to competition, but generally only those outside of basic network services. This limited unbundling typically occurred in the following order: equipment, value-added services, data transmission, and cellular and private circuits. In the late 1980s and 1990s, competition was finally opened in network services as well—primarily domestic long-distance, but in a few instances local services as well.

**Enterprise Restructuring**

The restructuring of the incumbent operator is critical for both economic and political reasons. Increased autonomy—with incentives for commercial orientation—can greatly improve total performance. Typically, such autonomy is achieved through corporatization, but often the further step of privatization is needed to minimize governmental interference in operations. Privatization is—in practice—used to achieve goals beyond enterprise performance, including the development of capital markets. Successful privatization requires sensitivity to maintaining national ownership and continued adherence to social goals. Where constraints to privatization exist, contracting out—through build-operate-transfer (BOT) schemes and their variants—can draw new investment and improve efficiency.

An important premise of enterprise restructuring is that the regulatory functions must be separated from network operations from the start to create a level playing field for all operators. It is often argued that a regulatory framework must precede privatization, or even corporatization; however, in practice, the two tasks proceed side-by-side. (We deal with regulatory reform later in the paper.)

**Corporatization and Decentralization**

Corporatization is often a prelude to privatization. The major objective of corporatization is to convert the telecommunications department into an autonomous organization that is owned by the government, but runs on a commercial basis. By placing the telephone company at an arm's length from the government, corporatization permits telecommunications operators to respond directly to the market. Checks on the operator may be instituted at this stage through licensing conditions that stipulate the conditions of operation. The goal, often not realized, is that all requirements placed on the corporation by government be explicit, thus eliminating the need to respond ad hoc to government prerogatives.

Following corporatization, one strategy for improving efficiency is to decentralize operations. This practice allows greater responsiveness to customers and increases managerial accountability. Regionally based profit centers or separation into lines of business have been mechanisms for decentralization in New Zealand, Indonesia, and Mexico.

**New Zealand.** To create Telecommunications Corporation of New Zealand Ltd. (TCNZ), the government passed the State Owned Enterprise Act in December 1986, and the Telecommunications Act in July 1987. Under these laws, TCNZ became a corporation fully owned by the government. Following corporatization, TCNZ decentralized decision-making responsibility into subsidiaries so that managers closest to the customer would be accountable for their needs and for unit profitability. Four new Regional Operating Companies were created to provide local telephone service, and one subsidiary was created to provide domestic and international long distance service. There were also nine small, entrepreneurial “New Venture” companies, each focusing on a specialized market segment. New managers with commercial business experience were recruited and appointed to the boards of the newly created subsidiaries.

**Indonesia.** In 1991, the legal status of PT. TELKOM was changed from a government enterprise to a limited liability company. The new company’s shares are still held wholly by the Government, but this structure allows future transfer of shares, perhaps in tranches, to private entities. TELKOM is in the process of decentralizing its Organiza-

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<td><strong>Low</strong></td>
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<td>New Lines - ITU Estimate</td>
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<td>New Lines - to supply current well list by year 2000</td>
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<tr>
<td>Quality Improvements and enhanced services</td>
</tr>
<tr>
<td>TOTAL</td>
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<td>Percentage of GDP (%)</td>
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tion with the ultimate goal of creating several regional subsidiaries, plus a long-distance and a cellular operator under a holding company. The subsidiary companies will, in turn, form joint ventures with experienced telephone operators. Another company is likely to be established to manage the PALAPA satellite system.

The restructuring dovetails with the goals of investment mobilization and stimulation of competition. The new structure is likely to encourage competition in two respects. First, decentralization will create "benchmark competition" among the regional subsidiaries. The managers of each subsidiary will be responsible for the relative profitability of their subsidiaries. Second, a new wireless company will provide long-distance and local cellular service in competition with TELKOM.

MEXICO. In 1987, to prepare for privatization, Telmex's corporate structure was decentralized and separated from ministerial control. Functions were also restructured into geographic or service-related profit centers. Managers at the regional level could make decisions without relying on central approval and were more accountable for regional profitability. "This change accelerates decision-making, clarifies responsibility, helps to allocate capital, serving the needs of Telmex's different customer groups" (Casasus, 1994, p. 10).

Meanwhile, administrative control of Telmex was transferred from the Communications Ministry to the Finance Ministry, which was managing the privatization program. The Finance Ministry allowed greater autonomy in operations and Telmex gained more financially autonomy through the large price increases of 1988 and 1990. Telmex could then self-finance a larger proportion of its investment. Through innovative new securitization transactions, Telmex gained access to international capital markets and raised over $900m in three years.

Privatization of the Government-Monopoly Operator
The objectives of efficient operation can, in principle, be met through corporatization, and restructuring the organization into profit centers. But the further step of privatization has increasingly been taken. Transfer of ownership to the private sector is justified for a variety of reasons, including additional insulation of operations from political whims, greater efficiency of operations, and creation of a level playing field for other private operators.

The evidence is that post-privatization efficiency improvements benefit shareholders and labor; while consumers gain from rapid network expansion, but often pay higher prices for services that were heavily subsidized. A study of total welfare gains (sum of monetary gains to shareholders, employees, and consumers) found that the gains as a proportion of pre-privatization sales were 12 percent in the United Kingdom, they were much higher at 50 in Mexico and 155 percent in Chile (Galal, Jones, Tandon, and Vogelsang 1994).

To provide quick consumer access to new lines, privatizations are often accompanied by a requirement to undertake certain minimum investments. These so-called "roll-out" obligations are exemplified by the service conditions imposed on Telmex, the privatized Mexican telecommunications provider. Network development targets built into the concession required Telmex to achieve a line growth rate of at least 12 percent a year—twice the growth rate achieved during the late 1980s. In addition to line growth requirements, the concession also required improvements in service quality. Telmex more than met the targets. Similar roll-out conditions were used in Argentina and Venezuela where also the privatized utilities outperformed obligations. For example, privatized in December 1991, CANTV in Venezuela expanded its network by 50 percent in the following two years and virtually all targets for service improvements were met. Since the levels of service provision are now so low in developing countries and the incentives to expand so enormous, roll-out requirements may be unnecessary. Moreover, when roll-outs are used to secure the provision of services on uneconomic terms to particular areas or consumers, they can distort pricing.

Of interest, however, is the great sensitivity to political and social concerns in the privatizations witnessed thus far. The message clearly is that while efficiency gains are likely to be achieved through privatization, concerns regarding local ownership, redistribution of ownership and rents to employees and other socio-economic groups, and availability of service to weak consumers are of central interest to policymakers. Also, externalities—such as the development of capital markets—are a major objective in privatizing utilities. These lessons are illustrated by the privatization operations in Mexico and New Zealand.

TELMEX CAPITAL RESTRUCTURING FOR PRIVATIZATION.

The privatization process in Mexico was designed with several objectives in mind: (i) transfer part of the ownership to Telmex employees, (ii) attract equity interest from experienced foreign operators, but retain Mexican control of Telmex, and (iii) develop the ability to raise capital using new international financial instruments.

First, the government sold 4.4 percent of its A shares to the company's employees, of which 1.6 percent were sold to its managers (Dougan and Bruno 1991, p.6). These were paid for through an eight-year credit provided by the government's development bank, on favorable terms.

Second, a controlling block of shares was sold to a private Mexican-led consortium on December 20, 1990 for $1.76 billion. Foreign operating companies were allowed to participate as minority partners (in keeping with the for-
ereign investment law). The winning group included Grupo Carso, a diversified Mexican group in association with the minority investors Southwestern Bell and France Telecommunications. Though the group acquired a 20.5 percent ownership of Telmex, its voting rights were 51 percent.

Third, to further attract foreign capital but retain Mexican control, new shares with limited voting rights were issued in an international public stock offering to investors in the U.S., Europe, and Asia for $2.2 billion in May 1991. This was a landmark deal, representing the largest global stock offering by any Latin American company. It was also the first time a privatization was carried out through a public offering of shares in Latin America, and the first time that more than 85 percent of the shares being offered were placed outside the home country. Mexico’s government, now a minority Telmex holder, sold a 14 percent stake in the company. The offering placed the single largest injection of foreign money to date into Mexico’s government coffers (Dougan and Bruno 1991, p. 6).

Finally, in May 1992, the Mexican government sold an additional 4.7 percent of the company in an international and domestic offering, and now retains about a 4.8 percent holding. Overall, the government received some US$ 5 billion from the Telmex privatization (Casasus, 1994, p. 15; Tandon, 1992, Ch. 16, p.16).

The “Kiwi” Share in New Zealand. In privatizing TCNZ, the Government of New Zealand sought to limit foreign ownership to 49.9 percent, to ensure coverage of local service areas, and, through a “kiwi” share, to maintain leadership in policymaking.

In September 1990, the government took a dramatic step: 100 percent of TCNZ shares were sold through open bidding to a consortium led by two New Zealand managers (with 0.5 percent ownership) and owned by two American regional operating companies (Ameritech Corporation and Bell Atlantic). To ensure that the government’s objectives would be met, it attached several conditions to this sale. The agreement stipulated that the owners would: (1) sell back 10 percent of the stock to a New Zealand corporation, and (2) reduce ownership below 49.9 percent by spring 1994 through public subscription.

A special share—the “kiwi share”—issued to the Crown gave the finance minister specific rights to control overseas ownership and other key articles of incorporation. The articles require that half of the directors be New Zealand nationals. The government instituted service obligations in the “Telecommunications Pledge,” including continued free local residential calling, residential line rental price increases limited to the consumer price index, equal pricing for rural and urban customers, continued universal access, and the requirement to publish quality-of-service records (New Zealand Ministry of Commerce 1992).

Contracting Out: The Thai Example
Where political or other constraints to full privatization exist, yet another method for increasing network size and improving efficiency is contracting out, which brings in private initiative under the existing government operator’s umbrella. Such contracting out has been undertaken in Thailand to provide local telecommunications services (Augenblick, Stern, and Sullivan 1994, and Financial Times, April 6, 1994).

To help meet the growing demand for telecommunications services, the Telephone Organization of Thailand (TOT) has granted two Build-Transfer-and-Operate (BTO) concessions to private operators to provide three million new telephone lines by 1996 at an estimated cost of US$ 5 billion. The first concession, granted in 1991, provided for the installation of two million lines in the Bangkok area. The winner of the concession was a Thai-owned multinational (Charoen Pokphand group, an agro-industrial corporation), which subsequently formed TelecomAsia, in partnership with NYNEX, an American regional operator (which took a 15 percent equity position). NYNEX appoints the chief operating officer and other key executives.

Under the BTO scheme, TelecomAsia is installing the new lines, will transfer ownership to the Government, and then operate the system for 25 years under a revenue-sharing agreement. This agreement specifies that TelecomAsia will pass 16 percent of total service revenues to the Telephone Organization of Thailand (TOT). The system will consist of an overlay network that interconnects with both the 1.2 million-line TOT network and Communications Authority of Thailand’s international gateway. TOT has agreed not to compete with TelecomAsia before 1997.

A second BTO was awarded in 1992 to Thai Telephone and Telecommunication Co. (TT&T), an affiliate of the Loxley group with Japan’s Nippon Telegraph and Telephone holding a 20 percent interest, to install and operate one million new lines in the rural northern provinces or “up country,” centered on Chiang Mai. In the 25-year concession agreement, TT&T will take 56.9 percent of revenues collected; TOT will take the rest. The larger revenue-share for TOT, compared to the 16 percent for TelecomAsia, is justified on the grounds that provincial lines generate more revenue through long-distance calls.

The Thai BTO schemes prove the potential for attracting private financing to telecommunications projects, even for local networks. The projects have been financed with a combination of supplier credits, loans, and project cash generation. The two BTO companies have since raised funds through public offerings on the Thai capital market and form—along with other telecommunications listings—16 percent of the Stock Exchange of Thailand. Similar schemes are now being attempted in other developing countries, notably Indonesia.
BRINGING IN COMPETITION
Until only a decade ago, in most countries the telecommunications sector was dominated by a single organization that provided a variety of goods and services with very different economic characteristics. Scale economies (the advantages of large size) and scope economies (the savings realized from the joint production of services) justified the single provider. But economies of scale and scope have generally declined with technical progress of the last decade and, even where they exist, such economies may no longer justify government-mandated monopolies. There is compelling evidence that competition is possible for competitive possibilities in virtually all segments of telecommunications.

Do Natural Monopolies Exist?
When one provider can serve the market at a lower cost than two or more providers could, a natural monopoly is said to exist. Such cases occur when the costs of producing and delivering a service decline with increasing output (often referred to as economies of scale). It is also common for these providers to supply a number of services, only some of which benefit from economies of scale. A natural monopoly in one service, however, may allow the provider to gain an advantage in another service that could be competitively provided. This occurs when it is cheaper for a single provider to produce and deliver two or more services jointly than for separate entities to provide the services individually (economies of scope). The telecommunications sector was long considered to exhibit both scale and scope economies because of the “lumpiness” of the required investment and the adaptability of the physical infrastructure to multiple uses.

Evidence now shows declining economies of scale in the provision of telecommunications services. In switching or routing of calls, increased modularity means that being small has less disadvantage in cost. After being switched, calls are traditionally transmitted over underground copper cables, but wireless technologies reduce the minimum efficient size of investment for long-distance communications. Very small aperture terminals (VSAT), for example, are a low-cost, satellite-based alternative for long-distance communication. Radio-based, cellular technologies that provide service to a small customer base in a local area are available at increasingly competitive prices. Optical fibers do not conform to this trend—once laid in the ground their very large capacities render parallel investments wasteful. However, even with fiber optics, software make it possible for competitors to “share” the fiber in transparent and fair ways.

The evidence on economies of scope in the telecommunications sector is weak at best. Economists attempting to measure scope economies for the former Bell sytem in the United States came to very different conclusions on this question, although subsequent evidence has tended to favor the view that while scope economies do exist, they are relatively limited (see Evans and Heckman 1984, Charnes, Cooper, and Sueyoshi 1988, Banker, Chang, and Majumdar 1992). The physical evidence also undermines economies of scope. Common standards embodied, for example, in switching software (such as Open Network Architecture) seamlessly interconnect networks and services offered by numerous suppliers and permit the charges from these suppliers to be itemized on a single bill. Such software allows use of common facilities by multiple providers.

With economies of scale and scope declining, the question is: how much competition can the telecommunications sector sustain? Although telecommunications markets with numerous suppliers are still rare, competition among a few rival providers can lower costs and prices. The theory of contestable markets says that even where economies of scale and scope favor a single provider, potential rival suppliers that contest the market limit the risks of monopoly abuse. Thus, all new entrants should be allowed to provide services, letting the market decide how many providers can operate profitably. Potential competition is most effective where new entrants have limited sunk costs of market entry—that is, when entrants can recover their investments by selling assets if they decide to pull out of the business. By permitting easier redeployment of assets—through developments in switching, VSAT, cellular, and software systems—technological change is undermining monopoly provision of telecommunications services.

Ways to Unbundle
Competition is facilitated by unbundling the sector, either physically or in its accounting. Separation along business line allows prospective entrants to compete in those segments open to multiple providers. Moreover, unbundling allows for the market to test economies of scale and scope, rather than allowing regulators to predetermine which segments should remain bundled.

Vertical unbundling occurs when two activities—one of which is an input for the provision of the other—are institutionally separated. For example, since long-distance operators need local networks to reach their customers, the separation of local and long-distance services is vertical unbundling. Separation can also occur between provision of network services (an intermediate input) and retail services (a final output).

Horizontal unbundling separates activities by markets—either geographically or by service category. Telecommunications also lends itself to this form of unbundling. The operation of rapidly growing radio-based cellular services is typically separated from the provision of traditional tele-
phone services. In some cases, horizontal unbundling or
divestiture into a number of producers allows direct com-
petition; in other cases, as when divestiture leads to re-
gional monopolies, it allows for better performance com-
parisons and thus more efficient regulatory monitoring.

But the distinction between vertical and horizontal un-
bundling is not always sharp. Specialized providers sell
information services using communication links owned by
traditional network operators—thus vertical unbundling
between the provision of networks and the supply of in-
formation services is needed to allow fair competition between
horizontally separated service operators.

Constraints to unbundling are technical and economic.
Attempting to force activities that are closely interdepen-
dent into distinct boxes can impose high transaction costs
because coordination, once achieved smoothly within a
single firm, becomes more difficult and less effective when
handled between firms. And having separate, vertically
linked monopolies, each charging a markup over costs, may
result in higher charges than with a single, vertically in-
tegrated firm.

But even where the technology accommodates un-
bundling, the legacy of institutions often limits the possibili-
ties. In Hungary, a telecommunications law enacted in 1992
separated long-distance (including international) services and
local telephone services, which are under the jurisdic-
tion of municipal authorities (Bruce, Harrell, and Kovacs
1993). Under the law, private concessions for local ser-
ices were to be granted on a competitive basis. But prac-
tical problems intervened. As in other countries, local rates
are very low, attracting few investors to that part of the
network. And investors in the long-distance service faced
the prospect of bargaining with group after group of local
government officials on terms of interconnection to local
networks. A compromise awarded a single franchise for
long-distance services and 60 percent of the local network.
Competition for the rest of the local network was opened
to companies having demonstrable financial strength and
sound business plans.

Competition: Possibilities and Implications
A telecommunications market appropriately unbundled
opens up competition in virtually every segment. Com-
petition in any one segment lowers tariffs in that segment,
which changes the prospects for other segments. For ex-
ample, competition in domestic long-distance telephony
and international telephony has often substantially lowered
the traditionally large margins in these services so that they
can no longer subsidize local services. The consequent rise
in local rates, with developments in wireless technology
and the entry of cable network operators, is gradually, but
definitely, making local services amenable to competition.

Long-Distance Competition. Unbundling—either in-
duced by the market or mandated by the regulator—be-
gins with long-distance service because this segment has
high profit margins, which are typically used to subsidize
local services. The recent history of competition in tele-
communications begins with MCI’s challenge to the ven-
erable AT&T with the aid of microwave technology for
transmitting long-distance communications signals.

Long-distance services are also an important arena of
competition in developing countries. Two significant de-
velopments are occurring in China, which has recently li-
censed a second operator (Box 1), and in Mexico, where
competition for long-distance services will commence on
January 1, 1997 (Box 2).

Chile, also having begun with long-distance competi-
tion, has introduced full-fledged competition. In Chile,
two companies have dominated the market. Compania de
Telefonos de Chile (CTC) provides local telecommunications
service to over 90 percent of the population, and as
such is the main interface with the customer. Additionally,
CTC provides a limited amount of long-distance service,
operates cellular networks in the two major metropolises
(Santiago and Valparaiso) and offers a variety of other ser-
ices. Empresa Nacional de Telecommunications (Entel)
is the primary long-distance phone company in Chile,
though its share of the market has fallen to 70 percent as
new entrants have been allowed to provide long-distance
service in the past few years. A third company, Telex-Chile,
controls about 25 percent of the long-distance traffic
through its subsidiary Chilesat.

From this unbundled, yet monopolistic position, Chile
is moving to a multi-carrier, and potentially highly com-
petitive, structure. In mid-1994, new legislation permit-
ted CTC to extend and therefore compete in long-distance
services (through its subsidiary Chile-MUNDO), while al-
lowing Entel to provide local telephone connections. Other
existing and potential providers will have similar rights to
provide integrated services. For the Chilean customer, this
implies a choice of telephone companies, both on a call-
by-call basis by dialing an access code and through pre-
subscription to a specific company. Initially, primary com-
petition is likely to occur between CTC and Entel; how-
ever, Chilesat was successful in signing customers for inte-
grated service even in anticipation of the changed policy,
serving notice of significant competitive possibilities.

India is an exception. While maintaining a monopoly of long-
distance, Indian decision makers have chosen to divide the
country into 18 regions, in each of which a second operator will
eventually be allowed to compete with the incumbent. For such
competition to be realistic and meaningful, local rates would need
to be substantially revised upwards.
other major company likely to join the fray is Bell South, one of the major U.S. regional operating companies.6

Prospects for long-distance competition continue to improve with developments in satellite technology. Long-distance transmission of voice and data via satellite is used in Indonesia, but still principally under the umbrella of the government-owned provider—although, as in other countries, the use of satellite transmission for private, dedicated networks (using VSAT technology) is increasing. Recently, Malaysia announced the acquisition of a satellite explicitly in the context of entry by a second telecommunications company (Journal of Commerce, May 18, 1994). In the Philippines, Philippine Global Communications Inc. is expected to set up a domestic satellite network in the near future (Journal of Commerce, June 30, 1994).

**INTERNATIONAL COMMUNICATIONS.** The growing competition in international services does not stem, as yet, from any major technological breakthroughs and would not be worth remarking upon if it were not for the devastating impact international competition will have on the traditional rate structures. Until recently, international services were a carefully managed cartel of national telecommunications authorities. By restricting other channels of international communications flows, national authorities had devised a system of high international service rates, which they then shared (“settled”) according to arcane accounting rules. The huge profits from international services subsidized domestic, especially local, phone services.

The pressures on the cartel have been many. The settlement arrangements between national telecommunications authorities led to large anomalies in pricing. The anomalies are being exploited with the creative use of technology. For example, in the deregulated U.S. market, which offers among the lowest international rates, over a hundred “callback” bureaus have mushroomed. The overseas caller disconnects after the first ring. The intelligent switch in the bureau automatically calls back with a dial tone, permitting the user to place a call as if from the United States (Financial Times, August 15, 1994).

In addition, powerful pressures from firms operating in a global marketplace have forced most major telecommunications companies to form both formal and informal alliances, leading further to the crumbling of national barriers. With growing competition among the different alliances for the business of multinational companies, old rate structures are receiving further blows (Financial Times, June 16, 1994).

> **Box 1 - China Introduces Competition**

China has announced an historically unprecedented expansion of its network from about 30 million lines to 120 million lines by the year 2000. Investment by the monopoly operator, the Ministry of Posts and Telecommunications (MPT), is expected to be about $8 billion in 1994—aggregate telecommunications investment in China could rise to $15 billion a year if the ambitious targets are to be met.

To mobilize such large investments, the State Council has abolished MPT’s monopoly, licensing a new provider, China United Telecommunications (Unicom), to operate a nationwide network, including both long-distance and local connections. Unicom is a partnership of three Chinese ministries—railways, electric power, and electronics. The expectation is that the networks already operated by the railways and power ministries would form the nucleus of the new enterprise. The Ministry of Electronics brings its expertise in modern communications technologies to the venture.

Other steps towards opening the telecommunications market include: permission to the Ministry of Electronics in January 1994 to compete with MPT in data services; allowing the People’s Liberation Army to use its radio network for commercial ends; and the separation of regulatory and operation functions within MPT to ensure that the incumbent and dominant operator does not enjoy undue advantage over new entrants.

Though joint venture partnerships with foreign companies for the provision of services are currently not permitted, the indications are that such partnerships will soon be allowed. NYNEX, a regional operator in the United States, has established an advisory relationship with Unicom. Cable and Wireless of the United Kingdom, through its subsidiary Hong Kong Telecom, has been nominated a “preferred partner” by MPT. Expectations are that these partnerships will be formalized and used to construct and operate regional and functional networks, possibly on a “build-operate-and-transfer” (BOT) basis.


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6 Competition will be maintained through continued regulatory and judicial oversight. The Chilean Supreme Court confirmed a recent antitrust ruling requiring Telefonica Internacional (a subsidiary of Telefonica de Espana) to sell one or the other of its holdings in the two leading Chilean phone companies, CTC or Entel. Telefonica has since sold a 15 percent stake of the 20 percent it held in Entel, while maintaining its 44 percent interest in CTC. Also, in the transition to full competition, rates charged by the different companies, especially CTC, will be capped by the regulator.
further frayed the cartel. International services have traditionally been carried by publicly owned satellites, principally Intelsat.\(^7\) Availability of alternative transmission services, via satellite and undersea fiber optic cables, has facilitated bypassing the channels controlled by national authorities. Satellite-based services are growing at a rapid pace (O'Brien 1994). In addition to a number of regional initiatives in Europe and Asia, Panamsat, Intelsat's chief global competitor, launched the first of three satellites in July 1994. The three new satellites will give Panamsat between six and seven times its current capacity. Competition in satellite-services will be greatly reinforced if the exotic low-earth satellite ventures, such as Iridium, were to materialize.

Growing competition in international services has triggered new public policy concerns. For organizations like Intelsat and Inmarsat to perform effectively in the new competitive environment, they may need to be privatized (Wall Street Journal, July 29, 1994). More importantly, in place of maintaining a cartel for provision of international services, greater resources are being devoted—in service negotiations under the General Agreement on Tariffs and Trade—to seek enhanced access in foreign markets (Broadman and Balassa 1993).

**LOCAL COMPETITION.** The advent of radio-based cellular telephone networks has introduced a major competitive element, especially in developing countries. These networks have relatively low capital costs which make them readily contestable. Radio-based telephones compete with existing local networks, and in many countries with one another. By 1993, Sri Lanka had licensed three cellular operators (soon to be four), which has decreased its tariffs to among the lowest in the world—connection costs of $100 and operating costs of 16 cents a minute. This can be compared with the more typical costs charged by a monopoly provider in El Salvador—$1,000 and 35 cents a minute.

Cellular telephony, which uses radio waves for communications, is largely used for mobile communications, but it can also be used for "fixed" telephones. According to one commentator, the imminent development of fixed radio networks for local communications is a "revolution waiting to happen" (Adonis 1994). In the coming years, it is expected that the cost of fixed radio connections for the local loop will plummet, making them competitive with traditional, wireline networks. In the U.K., Ionica, an aspiring competitor to British Telecommunications and Mercury, plans to build local loops throughout the country using such radio technology (Financial Times, August 19, 1994). In Indonesia, Ratelindo, a joint venture between the state-owned operator and a private company, has been licensed to provide 280,000 fixed radio connections, principally in Jakarta.

Although radio-based mobile telephony already provides a measure of competition in local telephony, the traditional wire networks for providing the final connection to the customer continue to appear immune to significant competition. However, increased competition is evident even in this segment. Two types of competition to consider are benchmark competition and direct competition. In benchmark competition a country is split into regions, each of which has a monopoly local operator. For example, Argentina has two regional operators (Telecommunications Argentina in the north and Telefonica de Argentina in the south) and the US has seven (called the Regional Bell Operating Companies). This type of competition allows reg-

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\(^7\) Intelsat is mainly owned by government-owned monopoly telecommunications providers, though U.S. interests are represented by Comsat, a private company.

### Box 2 - Long-Distance Competition in Mexico

In Mexico, Telefonos de Mexico (Telmex) enjoys exclusive rights to provide long-distance communications until January 1, 1997 and local service through the year 2026. In anticipation of the opening of the long-distance market, the government is preparing to sell concessions to new operators. At the start, 60 of Mexico's most important cities will benefit from competitive provision of long-distance services, growing to over 200 cities by the year 2000.

Some prominent international operators, Bell Atlantic, Sprint, and MCI Communications, are said to be negotiating joint ventures with Mexican partners to bid for these concessions. Telmex, in the meantime, is gearing up provide interconnection to the new operators. While details of the interconnection pricing are not known, they are expected to reflect the costs of providing interconnection linkages and to follow "international norms" of transparency and non-discrimination between operators.

By licensing cellular operators in 1989, Mexico had already created the basis for competition. Cellular providers that are not subsidiaries of Telmex have formed an association, which has sought to establish precedents on interconnection standards and prices.

*Source: Reuters Newsfile, July 1, 1994.*
lators to check that one operator's prices are not signifi-
cantly out of line, without having to address the complex
issues surrounding interconnection and natural monopoly.
But since there is no competition within the local market,
benchmark competition does not create direct incentives
for businesses to cut costs and improve efficiency.

Direct competition is rapidly approaching. The Brit-
ish government decided to permit new entrants to the lo-
cal market in 1991, prompting cable TV operators and re-
gional electricity to plan expansion of network services,
but their existing infrastructure which already supplies
individual customers. Over 100 companies have been li-
censed to provide local services though British Telecom-
unications still dominates with a 90 percent market share.
In the United States, several states have passed legislation
to permit local competition (Baumol and Sidak 1994). As
noted, Chile also allows local competition, though CTC at
present controls over 90 percent of the local telephone lines.

**Competition: An Assessment**

Where economies of scale exist, it can be socially wasteful
for competing providers to lay duplicate networks—this is
the traditional argument in favor of restricting provision to
a single operator. However, even where a natural monopoly
exists, competition may be desirable since it increases incen-
tives for efficiency and consumer choice. The judg-
ment is increasingly being made that the benefits of com-
petition outweigh losses on account of natural monopoly
characteristics that persist in the telecommunications net-
work (see Cave 1991).

The contemporary experience with direct competition
is only a decade old, but both the early experiments with
competition and recent results validate its benefits. Data
for the United States during the early decades of this cen-
tury show that "competition stimulated growth, extended
service to unserved or underserved areas, and created pres-
sures which improved both the development and the ap-
lication of telephone technology" (Mueller 1991). Fol-
lowing the divestiture of AT&T in 1984, several new en-
trants invested in network capacity in the United States
(Crandall 1989, pp. 58-59). After the introduction of a
number of major deregulatory initiatives over the past two
decades, greater competition has led to lower prices or
better services for consumers—while efficiency gains, new
 technologies, and business practices led to sustained prof-
 itability (Winston 1993). Outside the United States, fall-
ing prices, better quality, and greater responsiveness to
customers appeared in Japan, New Zealand, and the United
Kingdom (Takano 1992, Oniki, Oum, and Stevenson 1990,
Williamson 1993, Bell and Cave 1991). In each of these
countries, however, gains from competition cannot be eas-
ily separated from efficiency improvements following the
privatization of the state-owned monopoly.

In the developing world, the experience of compe-
tition is still limited. Competition exists primarily in
 cellular telephony. There, the evidence from Sri Lanka
already cited is most striking. And not only are the ser-
vice costs low, but the cost of a cellular phone declined
from $2500 to $250 over the past year (due in part to a
decline in import duty). The number of subscribers is
reported to be growing at 8 to 10 percent a month
(Reuters, September 11, 1994).

**REGULATORY REFORM**

At the same time as enterprise restructuring takes place
and competition is introduced, three regulatory tasks are
typically undertaken to induce efficient investment, pro-
tect consumers, and maintain fair competition. Traditional
cross-subsidies are gradually eliminated through rate reba-
 ncing, to ensure that new entrants do not "cherry pick",
leaving the incumbent saddled with least profitable ser-
 vices; but the goal also is to raise local rates with a view to
promoting investment in that most underserved section of
the network. Consumer interests are protected through a
 regime that places a cap on price increases—such a regime
also induces the operator to improve operating efficiency.
Finally, the successful operation of an unbundled network
requires rules for fair pricing of interconnection between
 network segments. Ideally, rate rebalancing should be com-
pleted early; failure or inability to do so constrains, as we
will see, the effectiveness of other tasks.

**Rate Rebalancing**

The structure of telephone tariffs influences the segments
of the telecommunications market to which investors are
attracted. In the past, long-distance telephone calls were
priced high enough to allow monopoly suppliers of tele-
communications services to earn reasonable profits while
keeping down the price of access to the network and of
local calls. When telecommunications markets have been
opened up, new investment has typically flooded to long-
distance service—where tariffs are significantly above
 costs—rather than to network services where investment
needs are more urgent, but tariffs are below costs. In Ja-
pan, for example, several new investors entered the profit-
able long distance market, while none wanted to compete
with NTT's loss-making local service.

Alternative approaches exist to deal with the related
issues of rate rebalancing and fostering new entry. Rebal-
cancing can be achieved directly by raising local rates and
all countries seeking to introduce competition have to go
through this process. However, it may be unfeasible to
raise rates in one shot—though substantial increases have
been achieved over the short-run in Latin America. For
example, when Mexico's Telmex was awarded a six-year
monopoly under a concession agreement in 1990, rates for
local services were raised three or four times over original levels. In light of impending long-distance competition, Telmex further rebalanced rates during the period of the concession: long-distance rates have fallen while rates for local services have risen steadily.

In contrast, the Philippines chose to encourage new entry immediately, although the rate structures will change only gradually. New operators are prevented from serving only the lucrative international services market, and are further required to provide 300 of the less profitable local exchange lines for each connection they make to the international gateway.

Another transitional approach is to embed the cross-subsidy in the access price. For example, when a new entrant is providing the more lucrative long-distance service, the incumbent who has access to the final consumer can charge an access price that reflects some of the costs of maintaining the local network (see discussion below on access pricing). This does not solve the problem of encouraging new entry in the local network but does facilitate competition in long-distance services without putting the incumbent at a disadvantage on account of its local service obligations.

### Consumer Pricing Rules

Competition provides incentives for suppliers to charge the lowest profitable price. So if barriers to entry were eliminated, in theory, there would be no need to control prices. In reality, however, competition in the telecommunications sector is imperfect, so price regulation is generally required in some segments. As noted above, Chile has maintained a price-cap regime for the dominant providers despite substantially liberalizing entry.

Traditionally, utilities have operated under "rate-of-return" regulation—as was the case for the U.S. telephone company, AT&T, until 1989 (Braeutigam and Panzar 1993). Such regulation, also referred to as "embedded cost regulation" or "cost-plus" pricing, was used to cover operational costs and permit an agreed return on investment. The agreement sought to protect consumers from excessive prices while ensuring adequate investor returns. This regulatory device not only created no incentives to limit costs, it perversely encourages higher investments and cost inflation to increase total returns.

As such, a move has occurred to so-called "incentive regulations", which focus on fostering efficiency and technical progress in the network while at the same time providing high quality service to customers (Sappington in this volume). An important application of incentive regulation has been "price-cap" regulation, which sets the maximum allowable rate of price increase. The allowed rate of increase is the general rate of inflation in the economy, measured by the retail price index (RPI), minus an "X-factor", or the productivity offset. The X-factor is the difference between the rate of growth in total factor productivity (TFP) in the selected service or group of services and the aggregate economy. The purpose of the X-factor is to reflect the whole range of diverse factors that cause changes in the unit costs of service delivery, apart from the input prices—these include technological advances and shifts in demand that influence costs through economies of scale, scope, and density.8

First applied in the United Kingdom, the price cap system has been adopted around the world because of its expected benefits in encouraging efficiency improvements while allowing the operator to better predict its revenues. Empirical investigations of these benefits have been few because price caps are recent and adequate benchmarks for comparison are not available. One study based on interstate differences in regulatory regimes in the U.S. showed that the presence of a price-cap regime has a significant effect in lowering service prices (Mathios and Rogers 1989). Many states in the U.S. instituting price caps have also simultaneously required operators to increase deployment of digital infrastructure (Greenstein, McMaster, and Spiller 1994). However, as may be expected, price caps do not have any influence on price in a competitive situation, which prevails in cellular telephony (Shew 1994).

Improvisation has been an obligatory feature of price cap implementation, not only across countries to allow for varying conditions, but also within countries. Introduced in 1984 for governing prices charged by British Telecommunications in the U.K., the X-factor was set at 3 percent and applied to one basket of services comprising line rentals and tariffs for local and national calls (OFTEL 1992). The first review in 1989 raised the X-factor to 4.5 percent, followed by an interim review in 1991, which brought the highly profitable international services within the basket and raised the X-factor to 6.25 percent. Finally, in 1993, the X-factor was placed at 7.5 percent and should remain at that level till 1997. In parallel, a specific cap (or a subcap) was placed on line rentals (the X-factor was negative, implying that real prices increased). Also, private circuits, which had no price control because they were believed to be competitive were covered under a new basket in 1989 with an X-factor of zero.

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8 To prevent strategic behavior aimed at influencing the productivity offset, the value of the offset must be based on industry-wide indicators and not be tied to the operational and investment decisions of individual firms. Moreover, the productivity offset should be based on long run movements in (continued) productivity growth. Measurement of "best practice" productivity growth must be based on recent historical data, rather than forecasts (since, in competitive markets, price changes follow unit cost reduction rather than anticipating them and also because forecasting is impractical).
Telmex in Mexico became subject to price cap regulation in January 1992, a year after privatization. A single price cap is applied to the overall weighted average price of Telmex's services. The X-factor is zero, implying that prices on average can keep pace with inflation. The much lower X-factor than in the U.K. arises because the X-factor reflects not just productivity differentials, as it should in theory, but also seeks to compensate for historically low prices of certain services. As noted above, Telmex can decide how to rebalance its rates, keeping in mind that it will be subject to competition in long distance services in 1996.

In the U.S., the price cap plan for AT&T has three baskets—to discourage cross-subsidies between the baskets but permit flexibility within a basket. The average price of services in each basket has to be lowered by 3 percent. Over time, as particular services become more competitive, they are freed from regulation. For example, services have been steadily removed from basket three, which contains business services such as private line networks and data transmission.

No clear practice has emerged on pricing new and innovative services. Though it may generally be expected that such services are subject to competition, this is not always the case (e.g., call waiting and forwarding for residential customers remains largely under the domain of the dominant local provider). However, placing price caps on new services runs the risk of reducing incentives to innovate. Appropriate treatment of new services is related to the partitioning of services into baskets. One approach may be to cover all services—new and old—under one basket, as in Mexico. Provided average price commitments are met, application of the price cap to a single basket of services allows the alleged monopolist pricing flexibility across services. However, this raises the danger of inefficient cross-subsidies, leading to an argument for a larger number of baskets. Fewer baskets are preferred since they reduce the administrative burden of negotiating and monitoring a proliferating set of productivity offsets, as has happened in certain U.S. states (Schankerman 1994).

As with any regulatory regime, price capping is not perfect. The operator retains monopoly profits when cost reduction is greater than the expected productivity offset. There are also practical problems in implementation. Inevitably, renegotiations of the productivity offset occur, leading to reexamination of the fairness of rates and hence a reversion to the rate-of-return type calculations which the system sought to avoid. Thus, though the productivity offset legitimately needs to be updated to ensure that changes in productivity growth are reflected in the price cap, the offset should be left in place for several years—five to seven years—to maintain the incentive benefits of the price cap mechanism. Ultimately, the goal must be to phase out price regulation, as competition develops. For that, mandatory interconnection with non-discriminatory and fair pricing is needed.

**Interconnection Pricing**

Interconnection pricing is in its infancy, particularly in developing countries (Box 3). In practice, rough and ready norms for revenue-sharing between different components of the network are adopted. However, as the number of providers increases and as networks become more complex, the basis for interconnection pricing will be tied more to the costs of interconnection.

The lessons learned from interconnection regulation in developed countries are only just beginning to emerge. A primary social objective of the interconnection pricing regime is to facilitate efficient new entry. The incumbent operator has an incentive to limit competition by restricting physical interconnection and/or charging a price so high that new entrants cannot operate profitably merely by connecting a set of new customers to the existing network. Although lower interconnection costs make new entry profitable and induce greater competition, it is a mixed blessing. When interconnection costs are low, the new entrant has less incentive to build its own network—to lay its own cables, establish new wireless links, or install new switches—since it has cheap access to an existing network. This may be appropriate where the existing network is already well-developed since duplication is considered undesirable. In that case, new entry is primarily a means for fostering greater efficiency. Low interconnection prices in Japan, set at the level of highly subsidized local call rates, have resulted in only limited network expansion. Where networks are sparse, as in many developing countries, the objective of new entry is not only to create a more competitive environment but also to expand the basic network. Thus, an interconnection price should at least cover the incremental costs (fixed and traffic-sensitive costs).

A distinction is made between directly attributable costs (or the incremental costs of conveying a call) and the opportunity costs along the interconnection link (or the profits foregone from renting the interconnection link to a competitor). Directly attributable costs are not precisely measurable since the facilities are typically used in conjunction with other parts of the network when providing multiple services. Thus, cost allocations between services—an arbitrary exercise in practice—and conventions of more or less accuracy are used to overcome this problem.9

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9 The directly attributable costs of interconnection have two components: fixed and variable. Fixed costs are the costs of providing the physical access and refer to the hardware installed for creating access for other carriers as well as software (including the relevant databases on subscribers). Variable costs, or the costs of actually conveying the call, depend upon the volume of traffic.
The greater controversy lies in the appropriate definition and measurement of opportunity costs. There are two distinct problems here. The first is a transitional issue, related to the historical structure of tariffs. As discussed above, prices for services have been unbalanced, i.e., local services have typically been unprofitable, requiring recovery of costs from long-distance (and especially international) services. This legacy has a direct impact on interconnection charges. A new entrant has the greatest incentive to provide long-distance service where prices are above costs, where they can "skim the cream." If the incumbent charges only for the conveyance costs, then profits in the long-distance business will erode, while losses in local telephony remain. This requires that interconnection charges include some of the foregone profits in long-distance. In the United Kingdom, such charges are referred to as access deficit charges; similarly, in Australia, new entrants are required to contribute to a fund for providing universal services. The U.K. regulator, OFTEL, has often chosen, however, to discount or even waive these access deficit charges to stimulate new entry (Armstrong and Doyle 1994).

Opportunity costs remain even after rates are rebalanced to reflect their hidden cost and there no longer exist significant deficits in the provision of particular services. The efficient components pricing rule is an economically efficient way of pricing interconnection, under certain conditions. The rule specifies that the price of interconnection equal the opportunity cost to the provider on the particular route, where opportunity cost is measured as the revenue the provider would obtain from final consumers of telecommunications services minus any cost savings achieved if new entrant itself incurred some of the operational expenses in establishing that link.

This pricing scheme compensates the incumbent not only for direct costs incurred but also for profits lost when the entrant takes away the incumbent's customers. The rule also provides some competitive discipline, since only those competitors able to undertake operations at a lower cost than the incumbent will enter (Baumol and Sidak 1994). Moreover, if followed strictly, the rule is simple and the information required for implementation (the price charged by the incumbent and incremental costs along that route incurred by the entrant) relatively easy to acquire, and specific problems associated with determining and allocating costs to the incumbent are eliminated.

In practice, the rule has not been easy to implement. In New Zealand the rule has been challenged on the grounds that opportunity costs include monopoly profits of the incumbent provider, and is relevant only when competitive conditions prevail or when the final price charged to the consumer is regulated (Box 4). Application of the rule is further complicated by practical considerations. For example, customers gained by the new entrant are not necessarily customers lost by the incumbent. By identifying new customers and catering to their special requirements, the entrant can expand the size of the customer base, while enhancing the value of the incumbent's network. In such a case, the estimate of profits foregone by the incumbent needs to be scaled down to reflect the contribution made by the entrant in attracting new business.
Alternative approaches have been suggested to overcome the difficulties associated with a dominant operator. One is to mandate the break-up of the dominant operator. For New Zealand, Mueller (1993) has suggested that TCNZ be split into several companies. In this proposal, each company would have a regional base but would compete for all services with other companies. The limitations of such an approach are: i) the break-up will be arbitrary to a degree, ii) the cost efficiencies from the broader scope of activities enjoyed by large companies will be dissipated, and iii) no barriers exist to prevent the reemergence of one or more dominating operators.

A different approach to this problem with great relevance to a modern interconnection regime is emerging. In this model, no attempt is made to break-up the operator regionally or to isolate local and long-distance provision (as in the United States). Rather, separation occurs between network and retail services. In Rochester, N.Y., for example, the local phone company has voluntarily agreed to separate its business into one that provides the network infrastructure, which will be used by the new services company on the same terms as other entrants. The United Kingdom is moving in the same direction. OFTEL has proposed an accounting separation between the network and service operations of BT.

Ultimately, as with price capping, the expectation would be that mandatory interconnection with regulated prices would no longer be required. This would happen when, within narrowly specified geographic areas, alternative carriers are available to provide the interconnection to the customer, thus breaking the monopoly on interconnection services. Dispensation with interconnection regulation could occur even when there are only two providers of interconnection services (Schankerman 1994).

Making the Regulatory Transition

Empowering independent bodies with policymaking and regulatory capabilities, and ensuring their separation from the dominant operator, checks the power of the operator. Policymaking sets the broad agenda based on the needs of users, whereas regulation enforces the goals set by policymakers. Thus, the first task is to unbundle the various roles of the government. Box 5 describes, for Mexico and Malaysia, the range of actions required and process followed in this unbundling process.

The regulatory objective, in turn, can be undertaken in alternative ways. An independent regulator implements policies with respect to new entry, handles various aspects of pricing, acts as a source of information to both sides in the transaction, and arbitrates contracts and disputes between parties. However, in practice, regulatory provisions are also incorporated into the charters of operating companies and other company-specific contracts, laying out the

Box 4 - Legal Test of Efficient Components Pricing

In New Zealand, the “efficient components pricing rule” is under dispute. Telecommunications Corporation of New Zealand (TCNZ), the incumbent, has proposed this rule which requires the new entrant, Clear Telecommunications (Clear), to pay the direct incremental costs to TCNZ of providing the interconnection as well as the opportunity cost of that interconnection (which is the profits forgone by TCNZ when it allows Clear to use its communication lines). Applied to the local loop (the link from the customer to the nearest phone exchange), in effect this requires that Clear’s customers pay TCNZ the same line rental charge as do TCNZ’s own customers (TCNZ would also receive payment for incremental costs of linking to Clear’s network less costs saved due to Clear’s investments in the local loop).

Although considered a fair pricing rule by the High Court of New Zealand, it was found later by the Court of Appeal to violate section 36 of the Commerce Act since the price included monopoly profits. The Court of Appeal agreed with the principle that the incumbent should be compensated for lost profits, provided these were profits earned in a competitive set up and not in a monopoly situation. Alternatively, if the final price to the consumer were regulated at approximately the level prevailing in a competitive market, then it would once again be appropriate to charge for profits foregone.

The Privy Council determined that the judgment of the High Court had been appropriate. It reasoned that charging an interconnection price that included monopoly profits did not violate the Commerce Act since a “level playing field” existed and TCNZ effectively charged itself the same price for interconnection as it charged competitors. The matter of controlling monopoly profits was a separate one and needed to be addressed independently. In arriving at this judgment the Privy Council noted that it had not resolved the interconnection dispute but had only concluded that TCNZ’s position was consistent with the objectives of the Commerce Act.

Rights and responsibilities of operators. Examples of such provisions include the “kiwi share” in New Zealand or a similar “golden share” in Malaysia through which the government ensures social obligations of the dominant provider. Also, as in Mexico and Argentina, the roll-out obligations of the provider are embodied in the concession agreement between the provider and the government. Where limited regulatory capacity exists or relevant legislation limits the scope of action, such contracts take on additional importance.
Developing regulatory capacity requires an ongoing commitment to provide resources for regulatory skill development as well as ensuring the independence and authority of the regulator, as the Argentinean example shows. Charged with regulatory responsibilities in November 1990, the Comisión Nacional de Telecomunicaciones (CNT) in Argentina did little until the end of 1991 (Hill and Abdala 1993). CNT’s failure to formulate standards and processes for issuing licenses retarded the development of new telecommunications services. Meanwhile, a number of radio operators and telephone cooperatives, faced with a delay in receiving licenses and little or no policing of their operations, started operations without licenses. Consumers also suffered from CNT’s inability to effectively address service complaints. Efforts to reform CNT have, however, improved its performance. A team of outside consultants working with CNT from early 1992 to May 1993 made progress in developing strategies and procedures. CNT’s top staff, previously political appointees, have since October 1993 been chosen through a competitive selection process. The Philippines has also undertaken measures to make the regulatory process more autonomous and accountable. A draft bill in the lower house of Congress defines the role of the National Telecommunications Commission, increases the number of commissioners, assigns a fixed tenure, and increases access to operational funds.

Experience in industrial countries shows that as regulators become stronger, “regulating the regulators” may be desirable. In the United Kingdom, for example, the National Audit Office audits regulators under a larger mandate to determine “value for money” in public service, and the Monopolies and Mergers Commission hears appeals of decisions by sectoral regulators.

POLITICAL ECONOMY OF REFORM

As most policy reformers know, not all efficient solutions are adopted and achieving change depends upon dealing with relevant interest groups. The greatest threat is posed by those who merely derive rents from the existing shortages. Successful implementation of reform requires that non-productive parties—those who dispense phones in short supply—be phased out through creating a stronger consumer constituency. Then there are those whose skills could be rendered obsolete by the changes initiated—labor being the key group under this threat. Mechanisms for increased labor ownership are needed to ensure that all productive players share in the long-term gains, even though some may endure short-term losses. Little is known about the most vulnerable group who cannot adapt to the new conditions; however, the rapid telecommunications growth in the post-reform phase and training initiatives have diminished the size of this group.

Box 5 - Unbundling the Government’s Role in Mexico and Malaysia

Before reform, Mexico’s Ministry of Communications was responsible for policy-making, regulation, and some aspects of operation of telecommunications services. This permitted the Ministry to influence Telmex’s operating and financial decisions. When the Government privatized Telmex and introduced competition, the policy-making, regulatory, and operating functions needed to be separated.

The government’s efforts to streamline and reform the regulatory framework had three major thrusts. First, the regulator relinquished direct participation in the construction of networks and privatized telecommunications services so that it had previously been provided directly, such as the federal microwave network. Second, the rules under which Telmex operated were reformed. Price cap regulation and targets for network expansion and quality were applied, with a commitment to gradually opening up competition among all telecommunications services. Telmex was also granted a concession to operate a cellular communications network on a duopoly basis. Third, a new set of telecommunications regulations was passed to complement the General Communications Law. These laid out the limits of intervention by the government and the conditions for competition in the sector.

In Malaysia, the legal frameworks for the regulation and corporatization of telecommunications were established simultaneously through three legal acts. The 1985 amendment to the Telecommunications Act of 1950 reformulated the Telecommunications Department of Malaysia as the sole regulatory authority and defined its functions and powers within the sector. The Ministry of Energy, Posts, and Telecommunications retained the right to license operators. The 1985 amendment to the Pensions Act of 1980 made a special provision to preserve the retirement benefits of staff members. The Telecommunications Service (Successor Company) Act of 1985 transferred the telecommunications operating business and associated assets and liabilities from the former Telecommunications Department to a new operating company. In addition to these legal acts, the government used administrative means to enable the new operating company to function as a viable concern.

Source: Casasus 1994 (Mexico) and Daud bin Ishak 1989 (Malaysia).
Creating New Constituencies

It is to be expected that the threat of dismantling a large telecommunications monopoly will generate considerable resistance to change, often at the highest administrative levels. The loss of unofficial perquisites and diminished power can motivate considerable opposition. Usually there are few people outside of the government operator with adequate knowledge of the workings of the sector and thus the operator can use its knowledge and experience to advantage to raise issues and concerns designed to block or delay the reform momentum.

In those countries where reforms have been successful, telecommunications has been approached from the user perspective. This approach forces reform initiatives to shift out of the traditional telecommunications ministries or departments. Where major changes have been implemented, ministries representing user interests have been in the forefront of change. Finance ministries, for example, were prominent both in New Zealand and Mexico.

Australia created an independent regulatory body (Austel) and then wedged a "reformist bureaucracy" between Austel and the Government. Austel was an arm's length authority that created an appeal mechanism for mediation of conflicts between the government and market players. The reformist bureaucracy took a proactive approach by creating communications between various interested parties. Australia also developed two other interesting consensus-building mechanisms: (i) a parliamentary "Caucus committee" and subcommittees including those Members of Parliament who had worked in the sector, and (ii) a "ministerial advisory committee," acting as an extra-parliamentary mechanism to bring all interested groups—operators, potential operators, and labor—"inside the tent" to sound out ideas and generate consensus.

Users have also directly pressed for reform. The Australian Telephone User Group (ATUG) lobbied government continuously to erode the power of the telecommunications monopoly and to seek improved conditions for business. ATUG then took an active role in providing a user perspective during the reform implementation phase. In Argentina in 1987, 17 banks had joined together to push for new network facilities in Buenos Aires, preferably by a new operator (Cowhey 1993). Potential foreign investors and multinational development agencies have alerted the government to the international community's interest in becoming involved in improving India's telecommunications services.

Labor Acceptance of Reform

Organized labor can block reform or privatization of a state-owned telecommunications operator. Telecommunications workers everywhere fear that restructuring might mean layoffs or harsher working conditions. This concern is justified, especially since many monopoly operators are highly inefficient. Staff levels of 70 staff per 1000 lines are not uncommon in developing countries, compared with 5 or 6 staff per 1000 lines for efficient, developed country operators. For example, India's telecommunications operator employs nearly half a million workers (or about 56 staff per 1000 lines). The staffing ratio of Tanzania's state telecommunications operator is over 70 per 1000 lines, and the ratio has been increasing over the past several years. Obtaining labor buy-in for the reform process first requires involving labor representatives in the analysis of policy options (inviting labor "inside the tent") and preserving some of their major benefits (especially pensions). But reforms also provide an opportunity for radical rethinking of labor-management relationships, especially by giving labor a greater stake in the restructured operation (ownership stake or potential participation in increased profitability). To be effective, the more radical approach requires programs to increase the skills and flexibility of the workforce by offering: (i) training and re-training, so that the full range of workers keeps up with the demands of new technologies, (ii) job placement programs to allow flexible redeployment of staff, and (iii) incentives to increase skills using methods like "productivity clauses" that offer merit-based pay raises.

In many cases, labor has been persuaded to accept liberalization. In Mexico, a number of measures were taken to protect labor, and as a result, "the telephone workers' union (STRM) supported the idea [of privatization] almost unanimously" (Galal, Jones, Tandon, and Vogelsang, 1994). These protective measures were as follows:

- A government commitment not to reduce staffing, made clear from the start;
- Worker participation in the capital of Telmex where 4.4 percent of the company's shares were sold to the union;
- Renegotiation of union contracts, reducing the number of contracts from 56 to a single one to be negotiated once a year;
- Reducing the number of job categories from 500 to 41 by streamlining job titles to increase worker mobility from one function to another;
- Increased spending on worker retraining and skills development;
- "Productivity clauses" to reward workers for high performance.

LESSONS FOR DEVELOPING COUNTRIES

10 The World Bank, Staff Appraisal Report: The United Republic of Tanzania, Third Telecommunications Project; April 2, 1993, p. 16.
In the end, the total number of workers declined only marginally, and Telmex’s real labor productivity, after stagnating from 1981 to 1988, rose sharply from 1989 through 1991. This balance was reached by growing the network at least 12 percent per annum, introducing new labor-saving technology, retraining workers to operate the new equipment, and implementing a union agreement that permitted re-assignment of workers. Labor gained significantly from the privatization process as well. 

One study found that the aggregate welfare change as a result of the privatization was worth 50.7 percent of sales; of this, Telmex workers received 15.9 percent—just less than a third of the total gain through salary increases, profit sharing, and stock appreciation (Galal and others 1994, Figure 23-1, p. 528).

In Malaysia, one goal of the overall privatization process was to prune the civil service, and telecommunications workers saw this as a threat. But Telkom Malaysia was restructured without layoffs—99.9 percent of Telkom’s government employees accepted the package offered by the new corporation. The package was attractive because of Telkom’s commitment to “no retrenchment for five years” and to “terms no worse than pre-privatization” in terms of pay, benefits, and pensions. In fact, both skilled and unskilled workers are better paid in the privatized Telkom than they were prior to privatization.

In the United Kingdom, labor relations prior to privatization were difficult not only within British Telecommunications but all around the country. British Telecommunications has been reducing its labor force since 1981, when management unilaterally announced a plan to reduce the work force by 15,000 over a five-year period. Bargaining between the company and the unions continues to be hard, with at least one industrial action in 1987. Labor still gained marginally from the privatization (Galal and others, 1994, p. 528). Employees saw share bonuses and large wage increases in return for changes in working practices that allowed the company greater flexibility in labor allocation decisions.

LOOKING AHEAD

In the world of telecommunications it is easy to be captivated by the ingenuity of technical advances, of which there is an unending stream. Both the technology and economics point to increasingly competitive provision of telecommunications services, and there can be little doubt that the world is being relentlessly driven in that direction.

The stream of technical advances will be best exploited when regulatory restrictions on new entry and operations are minimized. In the past, governments have often thought it fit to prepare the ground by first restructuring and privatizing the existing operator before allowing competition. But especially where telephone penetration rates are low, the early appearance of new players, operating on level terms with the incumbent, can provide much needed phones, spur better performance from the incumbent, and reduce—though not eliminate—the burden of regulation.

The irony is that reform often proves most difficult just where phones are most scarce and where the creation of a new telecommunications regime might seem easiest because of the small installed base. The message of this survey is that change requires institutional savvy, which balances many conflicting goals and interests. Though certain practical measures to defuse these conflicts were described, a heavy burden is placed on policymakers and regulators who will continue to face ever-emerging challenges. This requires access to the best information, development of new skills, and, most importantly, the institutional flexibility to evolve with the new conditions.


The World Bank

Headquarters
1818 H Street, N.W.
Washington, D.C. 20433, U.S.A.
Telephone: (202) 477-1234
Fax: (202) 477-6391
Telex: MCI 64145 WORLD BANK
       MCI 248423 WORLD BANK
Cable Address: INTBAFRAD
               WASHINGTONDC

European Office
66, avenue d'Iena
75116 Paris, France
Telephone: (1) 40.69.30.00
Facsimile: (1) 40.69.30.66
Telex: 640651

Tokyo Office
Kokusai Building
1-1, Marunouchi 3-chome
Chiyoda-ku, Tokyo 100, Japan
Telephone: (3) 3214-5001
Facsimile: (3) 3214-5657
Telex: 26838