Telecommunications in Central America

Pedro Raventos

Development Discussion Paper No. 648
August 1998

© Copyright 1998 Pedro Raventos
and President and Fellows of Harvard College
Telecommunications in Central America

Pedro Raventos

Abstract

Important links run in both directions between telecommunications and economic development. This paper examines the telecommunications sector in Central America in the context of national and regional growth and sustainable development. Its analysis of the telecommunications sector in Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua shows that the sector developed substantially in the last several years even while under tight regulation or monopoly and that current telephone penetration is relatively high in relation to per capita income. Still, unmet demand for telephone service is substantial and geographic distribution of service is uneven. Moreover, revenues rely heavily on international calling, and Central America has the highest traffic imbalance in the world. This paper discusses prospects for expansion of the sector and revenues in each country under a variety of frameworks: continued monopolies; planned or ongoing privatization programs; new regulatory frameworks; and/or deregulation. Technology and regulation are moving the telecommunications sector in all countries toward competition, but the approach to reform varies in each country. These different approaches will transform regional cooperation, possibly making certain agreements more difficult but also increasing the potential benefit from regional regulation.

Pedro Raventos is a Professor at INCAE. This paper was written while he was a Visiting Scholar at Harvard University from February – August 1997 under the sponsorship of the David Rockefeller Center for Latin American Studies (DRCLAS), the Harvard Institute for International Development (HIID) and the Central America Project.
I. INTRODUCTION

Over the last few years, the telecommunications sector has shown enormous dynamism and is rapidly transforming the way in which we live and work. People can be reached almost anywhere through their cell phone, engineering firms in Boston can email plans to a construction site in Buenos Aires in minutes and receive almost immediate feedback, busy executives can cut their trips by using videoconferencing, the distribution and delivery network in many industries is being transformed beyond recognition, and many people can work at home, avoiding congested roads, communicating with the office through email. In dire contrast to this, half of the world’s people have never seen a phone. This threatens to accelerate the income gap between rich and poor nations as some have access to information and others do not.

Central America, as we shall see, is somewhere in between. Although, many rural areas still lack phone service altogether, and many other modern conveniences, urban areas are better provided for and business have access to some services, although they are mostly of poor quality and expensive.

The development of the region over the next few years will require substantial improvement in the communications infrastructure, in quantity, sophistication and diversity. The consolidation of democracy and the integration of these societies will require broad access to information by the population.

This essay attempts to characterize the present situation of the telecommunications sectors in Central America, and to appraise the way in which the individual countries are attempting to encourage its development, by allowing private investment and introducing competition, either selectively or in an integral fashion.

Reform of the telecommunications sectors in the Central American countries has followed three distinct approaches. El Salvador and Guatemala have elected a very liberal approach, while Honduras and Nicaragua seem to be choosing variations of the typical Latin American model of privatization, and Costa Rica appears to be following a very conservative approach involving very slow liberalization without privatization. In order to better appreciate the potential impact of these reforms and the tradeoffs being made in each case, we discuss some basic ideas about the working of network industries and some international evidence of the effects of different policies.

Section II discusses some of the links between communications and development, the way in which telecommunications sectors worldwide came to be organized as state or regulated private monopolies, and the way in which competition has been eroding this position. Section III attempts to describe the current state of the telecommunications sector in Central America, starting with the availability and price of different services, and then moving on to indicators of quality and an overview of the economic and financial situation of the current monopoly suppliers. Section IV discusses some of the basic choices involved in a restructuring and the implications they have for sector regulation. One of the most important decisions is whether to sacrifice the monopoly of the international gateway. Section V discusses the typical restructure/privatization model that has been applied in several Latin American countries and how it reaches a compromise between sector, macroeconomic and distribution objectives. We also consider some of the difficulties that have been encountered and variations which have been implemented to try to overcome those difficulties. Section VI discusses some recent trends in international telecommunications policy, in particular the FCC’s new positions on settlements, which are of fundamental importance in the design of domestic reforms. Section VII discusses the
attempt to apply this model to Nicaragua by the administration of Violeta Barrios, and the way in which protracted political negotiation of the targets made the simultaneous attainment of the various objectives increasingly difficult. It then considers some elements of the current capitalization strategy in Honduras, an interesting alternative to privatization, recently implemented in Bolivia. Section VIII discusses the basic elements and conceptual underpinnings of an innovative solution to sector restructuring/privatization being followed by El Salvador and Guatemala, based on a regulatory system sharing many elements with the US Telecommunications Act of 1996, and which attempt to leapfrog the bulk of Latin American countries, by avoiding the difficulties associated with a temporary private monopoly altogether. We first discuss the evolution of this view in El Salvador and some of its difficulties and then consider the way in which Guatemala has starting implementing this approach, including a review of one of the first multi-round, multi-property auctions conducted outside of the United States to award spectrum licenses. Section IX considers the special case of Costa Rica, where laws to corporatize the telecom firm and slowly liberalize the sector were stopped in Congress and substituted with more restrictive legislation which has also not progressed. Section X makes some closing comments about the ongoing reform of telecommunications in Central America, including some remarks about areas of regional collaboration as well as possible areas of regional tension.

II. TELECOMMUNICATIONS AND DEVELOPMENT

This section discusses the growing importance of telecommunications and the way in which this industry became organized either as a government monopoly or as a private monopoly regulated by the state.

The importance of telecommunications

Cronin (1993) found that US industries have on average doubled the intensity with which they utilize telecommunications services.\(^1\) Some of the most intensive users are finance, insurance, and trade. The fact that greatest proportional increases between 1965 and 1982 are found in industries showing the smallest levels in 1965 suggests that there is some degree of convergence in telecommunications intensity. Although a similar tendency surely exists in other countries, the coefficients may well vary.

More recently, increasing telecommunications intensity has been associated with a new fusion of information technology and telecommunications. Computer based network today support not only the introduction of intelligent products and services, but also the automation of clerical and factory work accomplished till the early 1980s by mainframe computers, and the leveraging of professionals in the last 15 years through the use of microcomputers.

This is changing the face of service and manufacturing industries. Computer aided design is allowing the separation of manufacturing and design functions, while the linking of retailers, and the full chain of suppliers, is revolutionizing the apparel business.\(^2\) Although, as part of this process, some industries have been spending over half their investments budgets on information technology, such efforts often not resulted in sustained competitive advantage but have been

---

\(^1\) Cronin measures telecommunications intensity as the relation between a telecommunications input and the sector’s gross value of production

\(^2\) Through quick response, Benetton has cut total channel time from 125 days to 30 days. See Bradley, Hausman & Nolan (1993).
necessary merely not to fall behind. Moreover, the effect of these investment in terms of higher productivity has been difficult to measure.

In a cross country framework, however, the results are more encouraging. Several studies have evaluated the link between telecommunications and development. World Bank (1994) found a statistical link between growth and several measures of infrastructure, including telecommunications. CEPAL (1992) found a two way relation: business telephone penetration increments growth, will growth stimulates demand and therefore residential phone penetration. Roller & Waverman (1994) using an endogenous growth framework and data for 35 countries between 1970 and 1990 concluded that there were causal links in both directions and that investments in telecommunications infrastructures led to spillovers and increases in growth.

These links are not surprising. Firms increasingly operate on a global scale as they seek to achieve economies of scale and presence in the most diverse markets, and require modern telecommunications to do so. Therefore, countries are in a better position to attract investment and exploit their natural and geographic advantages if they can offer such services, and this will allow them to grow faster.

Recent empirical analysis of the link between a country’s competitiveness and its ability to sustain high growth rates, has identified telecommunications input as important, though difficult to measure variables. The World Competitiveness Report has used both quantitative and qualitative variables to measure competitiveness with a preference for the former. Although a country’s level of telecommunications development has generally been a qualitative variable measured through interviews with leading business people, Glaeser (1997) finds that business people’s opinion on whether a country is on the cutting edge of technology can be predicted by an index of three rather simple variables: the number of phone lines, the number of fax machines and the total amount of computing power available. In so far as these opinions are accurate, research on the subject is considerably facilitated as this type of indicators, as we shall see, is much easier to obtain than information about business communications.

**Structure, Property and Government Policy**

These important linkages between telecommunications development and progress has led many scholars to analyze the kind of industry structures, ownership and government policies which might best encourage the development of this important sector. One approach is to study the way in which thinking about these topics has evolved with the industry itself.

Historically the communications sector has often operated under conditions of monopoly and has frequently been controlled by the government. In some cases this responded to the need to collect revenues, while in others it was supposed to encourage efficiency and broad availability. The European postal system is an example of the former. The monarch awarded concessions for its operation and carefully prevented competition and controlled rates in order to exploit the vast revenues that it could generate, specially at times of war Internationally, cooperative agreements were reached between the national monopolies, for the same purpose.

---

3 As one can see by examining the weights given to both sets of variables.

4 Information about public operators and about private regulated operators has generally been available in developed countries, but has become increasingly scarce as the industry becomes more diverse and deregulated and as privatization progresses. In developing countries there has rarely been adequate accountability by the state operators.

5 Excellent accounts of this are given in Noam (1992) and Viertor (1993).
In the early days of the telegraph in Britain, in contrast, there was competition between private providers. Although rates declined for some years, firms were eventually able to form a cartel and rates started increasing. Newspapers, the main buyers of telegraph services, protested and eventually were able to build a movement that led to nationalization, which led rates to drop dramatically. On the Continent, this service was offered by a state monopoly from the beginning.\(^6\)

The telephone in Europe had a similar evolution to that of the telegraph. In Britain, the Post and Telegraph Office could have operated telephony from its beginning, but quarrels over the patent delayed its introduction, so it opted instead to award non exclusive licenses to regional operators and develop the trunk system. Around the turn of the century, however, a decision was taken to nationalize telephony.\(^7\) In Latin America, in contrast, nationalization came much later, in the late 60s and early 70s.\(^8\)

In the United States, the phone system has always been private. After the invention of the phone in 1876, the Bell Company held an exclusive patent which it licensed in order to expand rapidly, and in 1885 started developing a long distance system through a wholly owned subsidiary, AT&T. When its main patents ran out in 1894, Bell encountered significant competition, which it tried to control by not selling equipment to its rivals, and by refusing to interconnect them to its long distance network a strategy which allowed it to buy out may rivals over time. As the firm became increasingly dominant it adopted a positive view on the regulation of the industry. By the 1930s it consolidate a near monopoly position and the Communications Act of 1934 established a system of federal regulation of the sector.

The early evolution of the phone industry, thus, lead to a monopoly form of organization.\(^9\) The elimination of competition, and its replaced by state operation or state regulation, was based on the observation that competition could be wasteful because it required duplication of facilities and the loss of economies of scale, and that competition had proved to be unfeasible given the network characteristic of the industry. Both arguments lead to the idea that this sector was a natural monopoly, and that the choice between state monopoly and private regulated monopoly was unavoidable. Interestingly, since then, competition, starting in the United States, has been eroding the monopoly position of the incumbent operator.

Technological progress and innovation have had a profound impact on the feasibility of competition in this industry, and the ability of the government to operate or regulate it. Telephone network have traditionally had a star topology, with lines running from homes and residences to the local switch and trunks connecting these to switches of a higher hierarchy. In the traditional phone network there was no important distinction between the technology of both links. Both access lines and trunks involved heavy investment in copper wire and the costs of these links were highly sensitive to distance. Thus, longer access lines would have to cost more than shorter ones, and the cost of calls outside the local area escalated with distance. In setting prices, the cost differences between loops were usually ironed out, though long distance prices reflected costs.

\(^6\) The monopoly included both post and telegraph, two of the three services of the PTT (post, telegraph and telephony).

\(^7\) In Germany the Post and Telegraphs took over telephony with the sole intention of using it in rural areas where skilled telegraph operators were hard to find.

\(^8\) Guatemala is an interesting example of very early nationalization of local service.

\(^9\) The difference between private regulated monopoly and state monopoly is explored analytically in section IV.
The introduction of microwave technology made long distance calling much cheaper and much less sensitive to distance. The reaction of both state firms and state regulators, was to pass on only part of this cost reduction and to utilize the rest to try to keep access to the network affordable and increase telephone penetration.

This obviously made long distance telephony highly lucrative and invited entry into this activity. Taking advantage of the FCC’s liberal view towards private networks, a radio repair man in Illinois founded MCI, to offer point to point communication for large firms which had heavy traffic between distant offices. Subsequently, the FCC inadvertently authorized it to start offering switched long distance service, when it obligated AT&T to offer its FX service to MCI. FX service allowed corporations to obtain a private line to the switch in another city from which it could make unlimited calling at local rates. MCI connected its users to its own switch and bundled it with the FX service of AT&T in effect creating switched long distance service in competition with AT&T.\(^\text{10}\)

Since this entry was stimulated by the cross subsidies that had resulted from the asymmetric technological advance, no conclusions could really be made on whether the industry was or was not a natural monopoly. In fact, most countries continued supporting a model based on a vertically integrated monopoly for many years, while the US long distance market had essentially been broken open.\(^\text{11}\)

The cross subsidies that had stimulated the entry of MCI however, were maintained, and when AT&T was broken up in 1984, the financial support that the long distance division provided for the local service division as an internal transfer had to be converted into an arms length payment between different companies. This gave birth to the access charges which are rates that the long distance companies paid to the local operators.\(^\text{12}\)

Long distance costs have been further reduced with the introduction of fiber optics and related equipment, the price of which has plummeted as a result of the increases in the amount of fiber deployed and with the advances in the complementary electronics.\(^\text{13}\) This has had an enormous impact on the cost of international long distance calls as undersea cable has been laid,\(^\text{14}\) opening a growing gap between price and cost and creating a clear incentive for entry into this service.

In the case of cross border traffic, however, such entry requires the approval of the foreign regulator, which in many cases is not forthcoming as it prefers to see its own operator continuing to exploit its monopoly position to either raise revenue for the government or subsidize other services.\(^\text{15}\) While the next section shows the importance of these foreign revenues for the Central American operators, section VI discusses the forces of change on the international front.

---

\(^\text{10}\) The entry of MCI could not have occurred without the FCC above 890 decision which authorized those frequencies for private networks, and AT&T’s development of the stored control switch.
\(^\text{12}\) In other countries such a payment is called an interconnection payment. Care must be taken in using the term access rate, as it sometimes refers to the rate paid by subscribers to be connected to the network.
\(^\text{13}\) Hausman (1994).
\(^\text{14}\) Actually, the cost of transatlantic cable had already dropped significantly while using coaxial cable.
\(^\text{15}\) This monopoly is based on control of the domestic network and the international gateway.
III. THE TELECOMMUNICATIONS SECTOR IN CENTRAL AMERICA

This section provides an overview of the telecommunications sectors of Central America. It first shows the supply of basic services and contrast it with estimates of demand and then considers their quality and price. The next two subsections consider the state of cellular, and cable networks and some indicators of the development of data services. The last subsection review some economic and financial indicators of the monopoly vertically integrated wireline operators.

(a) Balance of Supply and Demand for Basic Telephone Service

One of the most important indicators of telecommunications development is the number of lines per hundred inhabitants. Figure 1 shows how the Central American countries fair on this measure. Nicaragua, Guatemala and Honduras are at the lower end of the scale with a penetration somewhat higher than the average of the low income countries. Of these countries, Guatemala is furthest from being a low income country (with income per capita twice that of Nicaragua and Honduras). Costa Rica has a substantially higher penetration which is actually between that of Chile and Argentina in 1995. El Salvador is in-between. The average for the America’s is pulled up by a density of almost 60 in the United States and Canada.

Table 1 shows how this penetration evolved over time. Three things are evident. First, Costa Rica had already obtained its substantial advantage in 1980 after growing very rapidly during the latter half of the 1970s, and its advantage has actually been narrowing since then. Second, there was a slowdown in the 1980s associated in all countries with the curtailment of capital flows and in the case of Nicaragua and El Salvador to civil war. Third, there is a substantial recovery in the 1990s, specially in El Salvador, Honduras and Nicaragua. During 1990-95 telephony in Central America has been growing at 12.3% on average, which is almost twice the world average of 6.2%, or twice the growth rate of the 1980s (of 6.4%). Honduras and El Salvador’s very fast growth allowed them to duplicate phone density during this five year period. The two lagging countries in terms of growth are Panama, which fell behind Costa Rica during this period, and Guatemala which continued with the region’s poorest growth rate.

16 The demand estimates considered are based mainly on income. Clearly, though demand depend on price, the data available was insufficient to obtain reliable estimates of access demand.

17 This is about twice the penetration found in India an about 20% higher than in the Philippines.

18 The ITU shows a penetration of 16.4 in 1995, but comparison with figures of COMTELCA and ICE itself show that the ITU figure refers to installed lines and that there are actually 14.1 lines per 100 inhabitants.
On average, 70% of the lines in service are residential and 30% are business phones,\textsuperscript{19} though there are some important differences. In Guatemala, only 63% of users are residential, whereas in Nicaragua, this proportion is 81%.\textsuperscript{20}

### Table 1

<table>
<thead>
<tr>
<th>Lines per 100 inhabitants</th>
<th>Compound annual growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1975-80</td>
</tr>
<tr>
<td></td>
<td>6.9</td>
</tr>
<tr>
<td></td>
<td>6.0%</td>
</tr>
<tr>
<td>El Salvador</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>5.2%</td>
</tr>
<tr>
<td>Guatemala</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>8.6%</td>
</tr>
<tr>
<td>Honduras</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>17.1%</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>4.3%</td>
</tr>
</tbody>
</table>


Public phone density is also shown in Figure 1. In general the countries with the highest private phone density also show the highest public phone density, but there are some disparities. Nicaragua’s deficiency is evident as it has less than one public phone for every ten thousand people, which compares unfavourably even to the average for low income countries. Guatemala, with more than twice the per capita income has less than one public phone for every two thousand people, which is half the average level for the low middle income countries. El Salvador, on the other hand, surpasses that average, and Costa Rica has a public phone for every five hundred

---

\textsuperscript{19} This is almost exactly the same as in the US.

\textsuperscript{20} In section VIII we will show how GUATEL introduced a four part tariff menu to discriminate between different subgroups of business users and between these and residential users. For the use of tariff menus to obtain an adequate tradeoff between efficiency and universal service objectives see Raventos (1997) Chapter 3.
people, a density which surpasses that found in Argentina and Chile, but is less than the levels of six in the United States or seven in Italy.

Figure 2 shows the range between the density encountered in the main city and the density in the rest of the country.

![Figure 2](image.png)

Even advanced countries have regional differences in density, but they tend to be small. The United States, for instance, has a density of 65 in the main city and 55 in the rest, only 20% higher. In comparison, in Panama and Costa Rica the density in the largest city is 3.5 to 4 times larger than in the rest of the country. In the other countries the distribution gets worse, with this ratio taking a value of 4.6 in Nicaragua, 6.4 in Honduras, 6.9 in El Salvador and 16.5 in Guatemala. Expansion during 1993-95 has contributed to reducing the gap in El Salvador, but has worsened the gap in Nicaragua and Guatemala.

Another way of appreciating the adequacy of the wireline phone network is to consider whether there is unsatisfied demand for phones. In the analysis above it was clear that Guatemala had a very low penetration in relation to its income per capita. Such a measurement can be made slightly more formal by fitting a line between phone density and income per capita, as shown in Figure 3.

---

21 The average for the Americas is 2.6 excluding Paraguay and 3.1 including 10.6 for Paraguay.
22 In the next subsection we will consider quality issues.
The density in Guatemala is much lower than its income would suggest, whereas in Costa Rica and Nicaragua it is much higher. El Salvador is almost on the line and Honduras slightly above.

A second approach is to approximating excess demand is to consider the waiting lists kept by the phone operator, as shown in Table 2. This approach is rather unsatisfactory because not everybody who wants a phone joins the waiting list, specially if the estimated waiting time is already very long.

Table 2
Indicators of Unsatisfied Demand

<table>
<thead>
<tr>
<th></th>
<th>Costa Rica</th>
<th>El Salvador</th>
<th>Guatemala</th>
<th>Panama</th>
<th>Honduras</th>
<th>Nicaragua</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waiting list</td>
<td>61</td>
<td>200</td>
<td>100</td>
<td>28.8</td>
<td>229.4</td>
<td></td>
</tr>
<tr>
<td>Main telephone lines</td>
<td>479.8</td>
<td>284.8</td>
<td>289.5</td>
<td>304</td>
<td>160.8</td>
<td>96.6</td>
</tr>
<tr>
<td>Waiting list / Lines</td>
<td>12.7%</td>
<td>70.2%</td>
<td>34.5%</td>
<td>9.5%</td>
<td>142.7%</td>
<td></td>
</tr>
<tr>
<td>Waiting Time</td>
<td>0.8</td>
<td>5</td>
<td>4</td>
<td>1.4</td>
<td>&gt;10</td>
<td></td>
</tr>
</tbody>
</table>

Source: ITU (1996-97)

The above analysis would suggest relatively low level of excess demand in Costa Rica and Panama, as indeed occurs with a waiting list of around 10-13% of existing lines and a waiting period of between 10 and 17 months. El Salvador and Honduras show high excess demand and waiting periods, which is somewhat surprising, specially for Honduras which already has fairly high penetration for its level of income, but which makes sense once one considers the
extraordinarily low tariffs existing in Honduras at the time.23 The estimate for Guatemala is completely inconsistent with the previous evidence.24

The third way of calculating excess demand is to estimate residential and business demand directly based on a number of variables including income, price, network characteristics and sector characteristics. This can either be done econometrically or assuming some simple access demand function. While econometric exercises are rare,25 consultants routinely construct estimates of residential demand by calculating an average local phone bill, and contrasting it with household income distribution figures to find the number of households for which the constructed phone bill would represent less than 6 or 8% of income. Such calculations for Costa Rica in 1995 by Gallegos (1996) yielded excess residential demand of over 70% at the tariffs existing at the time, and even at rebalanced tariffs find an excess demand of 30%. This illustrates the well known fact that estimates of excess demand obtained in this fashion are always higher than those suggested by waiting lists.

(b) Network characteristics

In this subsection we review some of the few indicators available of the Central American network. It is not unusual for publicly owned telecom operators to measure very few quality indicators26 Table 3 shows some indicators.

A common characteristic of phone systems in developing countries is that severe congestion arises when capacity used or exchange fill reaches 90%, even though in theory fill could reach 100% based on an assumed traffic per subscriber.27 In Central America, the more developed systems of Costa Rica and Panama have fills of 86 and 87.8, close to the average for middle income countries, while Honduras and Guatemala have levels as low as 65.8 and 53.9, close to the average for low income countries.

23 We will see below that estimating excess demand correctly is extremely important for the capitalization of HONDUTEL.
24 The waiting list in Guatemala actually declined between 1990 and 1995.
25 This is surprising considering the fact that the required data could be assembled for some of the phone companies, and the importance that demand estimates play in setting the expansion targets that are included in many concession contracts at the time of privatization.
26 Call completion for instance, is rarely available at the local level. At the international level it is available only for Honduras (47.3%) and for Costa Rica (72.6%) according to accounts of the operators themselves.
27 Usually 0.1 erlang for urban areas. World Bank (1995).
Table 3

LOCAL NETWORK CHARACTERISTICS

<table>
<thead>
<tr>
<th>Country</th>
<th>Capacity used</th>
<th>Automatic %</th>
<th>Digital %</th>
<th>Residential</th>
<th>Faults per 100 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Rica</td>
<td>86.0</td>
<td>99.0</td>
<td>56.0</td>
<td>76.0</td>
<td>3.0</td>
</tr>
<tr>
<td>El Salvador</td>
<td>71.2</td>
<td>100.0</td>
<td>79.0</td>
<td>72.0</td>
<td>29.1</td>
</tr>
<tr>
<td>Guatemala</td>
<td>53.9</td>
<td>100.0</td>
<td>75.0</td>
<td>63.0</td>
<td>45.2</td>
</tr>
<tr>
<td>Panama</td>
<td>87.8</td>
<td>100.0</td>
<td>65.1</td>
<td>76.5</td>
<td>97.0</td>
</tr>
<tr>
<td>Honduras</td>
<td>65.8</td>
<td>99.8</td>
<td>80.2</td>
<td>70.0</td>
<td>45.3</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>79.4</td>
<td>98.6</td>
<td>77.1</td>
<td>92.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Low income</td>
<td>63.1</td>
<td>98.8</td>
<td>89.9</td>
<td>70.8</td>
<td>166.5</td>
</tr>
<tr>
<td>Low M Inc</td>
<td>87.3</td>
<td>99.2</td>
<td>43.0</td>
<td>74.5</td>
<td>60.3</td>
</tr>
<tr>
<td>Americas</td>
<td>93.4</td>
<td>100.0</td>
<td>73.7</td>
<td>68.9</td>
<td>39.7</td>
</tr>
</tbody>
</table>


The Central American network are almost completely automatic. The level of digitalization varies substantially and is actually lower for Costa Rica and Panama. Nicaragua and El Salvador have invested strongly in the digitalization of their networks over the last years, which should allow them obtain lower operating costs and enhance their revenue by introducing services such as call identification and call waiting.

According to the figures, most of which have not been audited by any regulatory authority, fault incidence in lowest in Costa Rica and Nicaragua and highest for Panama. The fault rate for a well designed and maintained network is 20, which is slightly less than the rate attained in El Salvador.

(c) The price of basic telephone service (BTS)

Table 4 provides data on the pricing of POTS in each country in 1995 and an average of prices charged in a benchmark of 13 countries. The benchmark can serve two purposes. On the one hand it may give an idea of cost if one can assume that prices in those countries are on average aligned with costs and that costs are similar in different countries. On the other hand it shows the cost of using phone services in other countries and therefore provides an indication of whether pricing in the domestic telecommunications sector contributes to international competitiveness.

---

28 The Autoridad Reguladora de los Servicios Publicos is beginning to monitor quality in Costa Rica, a process not without difficulties.
29 The equally important fault clearance rate was not available for any of the countries.
30 The countries in the benchmark are Argentina, Australia, Bolivia, Canada, Chile, Mexico, New Zealand, Singapore, South Africa, Spain, United Kingdom, United States and Venezuela. Benchmarking was used by Bolivia to set initial phone prices after capitalization, and is used routinely in Canada to regulate pharmaceutical prices.
Table 4

Prices for basic telephone service (1995)

<table>
<thead>
<tr>
<th></th>
<th>International Average</th>
<th>Costa Rica</th>
<th>El Salvador</th>
<th>Guatemala</th>
<th>Honduras</th>
<th>Nicaragua</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>242.7</td>
<td>191</td>
<td>343</td>
<td>258</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>Basic monthly</td>
<td>9.2</td>
<td>4.8</td>
<td>3.4</td>
<td>0.7</td>
<td>2.1</td>
<td>6.6</td>
</tr>
<tr>
<td>Local call (cents/miute)</td>
<td>2.70</td>
<td>2.33</td>
<td>0.67</td>
<td>1.00</td>
<td>2.00</td>
<td>1.33</td>
</tr>
<tr>
<td>Business</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>289.2</td>
<td>287</td>
<td>343</td>
<td>258</td>
<td>61</td>
<td>33</td>
</tr>
<tr>
<td>Basic monthly</td>
<td>16.2</td>
<td>8</td>
<td>5.7</td>
<td>2.1</td>
<td>4.1</td>
<td>6.6</td>
</tr>
<tr>
<td>Local call (cents/miute)</td>
<td>3.70</td>
<td>2.33</td>
<td>0.67</td>
<td>1.00</td>
<td>2.00</td>
<td>1.33</td>
</tr>
</tbody>
</table>

Source: ITU (1996-97) & Lynx Technologies

Although in theory installation should only recover the actual costs of installation and not part of the capital costs of the subscriber loop, in practice installation often includes such charges. Except for Honduras and Nicaragua, the other countries, are in the same order of magnitude as the international benchmark.

Theoretically, the basic monthly charge should recuperate all costs directly related to the subscriber’s access to the network. Examining Table 4 one can appreciate that all countries are way under the international benchmark. Nicaragua, which raised its rates in 1994, is closest to the benchmark, while Costa Rica is at around half the level, for both residential and non-residential subscribers. Honduras and El Salvador show even lower rates, while Guatemala has completely unreal rates. There is an important difference though between these countries. While Honduras showed a deterioration in the real value of rates in the years up to 1995, El Salvador showed a substantial increase.

In so far as local calling charges are below costs, the firm will either have to recover this deficit from another service or loose money. Most of this cross subsidy has traditionally come from the international service. While the peak rate for international calls to the United States averaged $1.38 in 1995 for the benchmark countries, the Central American countries had somewhat higher rates ranging between $1.xx for xx and $1.yy for yy. Though this represents some disadvantage for firms installed in Central America, the most important issue, which we will turn to below, is the way in which these international rates will evolve over time.

(d) The cellular and cable networks

In each of the Central American countries, the cellular network was developed by local investors in association with Millicom, except for Nicaragua, where the foreign partner was Motorola.

---

31 Clearly if the installation charge recovers more than the installation cost, part of these capital costs will no longer have to be recovered from the basic monthly charge.
32 Interestingly this is the same thing that occurs in the energy sector.
33 As we shall see below, the licensing process was generally an unfortunate experience and a warning of the deficiencies of the existing laws and regulations.
In Costa Rica, where service was introduced early, spectrum allocation and interconnection to the wireline network were handled very poorly. In Guatemala service began in 1990 with clearer rules, including a monopoly period of five years. In El Salvador service started in 1992 with exclusivity for xx years. Overall, Millicom’s strategy has been to obtain monopoly concessions and to cream-skim the market, until a competitor appears.

Cable service has been available since the early to mid 1980s and in some countries has reached rather important levels of development. Guatemala, in particular, has the highest level of cable penetration, judged by any of the indicators shown in Table 6. This has been encouraged by a fairly high TV penetration, but cable penetration is high even compared to TV penetration. The country’s main operator is Telerid, which was designed to provide cable, data and eventually phone services, and is ideally positioned to exploit the current opening of the telecommunications market.

Table 6
Table 6
Cable penetration in Central America 1995

<table>
<thead>
<tr>
<th></th>
<th>Costa Rica</th>
<th>El Salvador</th>
<th>Guatemala</th>
<th>Panama</th>
<th>Honduras</th>
<th>Nicaragua</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable suscribers (000)</td>
<td>55</td>
<td>25</td>
<td>180</td>
<td>30</td>
<td>45</td>
<td>20</td>
</tr>
<tr>
<td>Cable/phone suscribers</td>
<td>0.10</td>
<td>0.09</td>
<td>0.62</td>
<td>0.10</td>
<td>0.28</td>
<td>0.21</td>
</tr>
<tr>
<td>Cable/TV</td>
<td>7.3%</td>
<td>1.9%</td>
<td>13.8%</td>
<td>4.9%</td>
<td>10.0%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Cable per 100 h</td>
<td>6.9</td>
<td>1.9</td>
<td>8.2</td>
<td>4.4</td>
<td>4.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Cable per 1000 pop</td>
<td>16.1</td>
<td>4.6</td>
<td>16.9</td>
<td>11.3</td>
<td>8.0</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Source: ITU (1996-97)

(e) Data services

The discussion of Section II made it clear that reliable and inexpensive data communications are crucial for a country’s competitiveness. Because of the diversity of services and suppliers, however, it is particularly difficult to construct performance indicators and benchmarks in this area. One way of approaching this difficulty is utilize the indirect approach of Glaeser (1997) who found that business leader’s opinion on whether their country was in the cutting edge of technology could be predicted rather well by a simple index of three variables: the number of phone lines, the number of fax machines and the total amount of computing power available.

---

34 In 199x the Millicom operation was closed down and taken over the ICE the state owned telecom.

35 Experience with Millicom is covered in Section IX.
Table 7 shows some of these indicators for Central America. Internet users was taken as a proxy for the stock of computers which was unavailable. It can be seen that these variables correlate rather well with telephone density, although the difference between Costa Rica and the rest seems to widen. The density of computers in Costa Rica The Costa Rican lead in terms of Internet users can be explained by an early start.

Table 7

<table>
<thead>
<tr>
<th></th>
<th>Costa Rica</th>
<th>El Salvador</th>
<th>Guatemala</th>
<th>Panama</th>
<th>Honduras</th>
<th>Nicaragua</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet users per 1m pop</td>
<td>4.258</td>
<td>0</td>
<td>28</td>
<td>564</td>
<td>0</td>
<td>340</td>
</tr>
<tr>
<td>Fax machines per 1000 pop</td>
<td>0.65</td>
<td>0.94</td>
<td>0.23</td>
<td>0.11</td>
<td>0.11</td>
<td>0.02</td>
</tr>
<tr>
<td>Packet per 1000 pop</td>
<td>0.23</td>
<td>0.11</td>
<td>0.08</td>
<td>0.11</td>
<td>0.11</td>
<td>0.02</td>
</tr>
<tr>
<td>Phones per 100 pop</td>
<td>16.36</td>
<td>5.28</td>
<td>2.72</td>
<td>11.42</td>
<td>2.87</td>
<td>2.34</td>
</tr>
</tbody>
</table>

Source: ITU (1996-97)

A second approach is to directly consider the availability, and when possible, the price of data services. Table 8 shows the availability of services in each of the Central American countries. X.25 packet switched data is offered by all the public wireline operators in Central America. In Costa Rica, RACSA, a subsidiary of the wireline operator ICE, offers X.25, frame relay and private circuits, while in the rest of Central America data is offered by private firms, often sharing a fibre optic network with the cable company. Private virtual circuits over frame relay are offered by GBM in all of the Central American countries at prices competitive with the telecom operators leased circuits, as well as interconnectivity to IBM's global network.

Table 8

Data Services Offered in Central America

<table>
<thead>
<tr>
<th></th>
<th>Costa Rica</th>
<th>El Salvador</th>
<th>Guatemala</th>
<th>Panama</th>
<th>Honduras</th>
<th>Nicaragua</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic VSAT</td>
<td>ATT+RACSA</td>
<td>ATT</td>
<td>ATT</td>
<td>ATT</td>
<td>ATT</td>
<td>ATT</td>
</tr>
<tr>
<td>International VSAT</td>
<td>limited</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISDN (1)</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Domestic X.25</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>International X.25</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic frame relay</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International frame relay</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Mobile data</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

It is even harder to judge the cost of using these service as user tariffs are often fairly complicated, and typical consumption patterns are not available. The situation for 64 Kbs private circuits to the United States is less complicated, and Figure 4 represents cost calculations based on FCC data.\(^{36}\)

---

\(^{36}\) A private circuit to the US is made up of two half circuits. The price of the US half circuit was taken to be equal to the average revenue obtained by US operators per equivalent 64 k circuit as calculated from FCC data. The price of the Central American half circuit was constructed by reversing the international transport calculations for the TCP measurements in the FCC benchmark study. FCC (1997).
These figures are based on FCC data and may well underestimate the real price of these circuits as they appear to be very low compared to other countries. If that were the case, it would mean that the FCC international cost benchmarks constructed for Central America are biased downwards, an issue of considerable importance for the negotiation of international settlement rates to which we return in section VI.\textsuperscript{37}

In so far as they are correct, however, one finds that in Guatemala, Honduras and Costa Rica the state operator is cheaper than GBM.\textsuperscript{38} For most business, however, reliability and effective speed are much more important than price. Bank executives in Costa Rica have mentioned excessive down times, and the fact that 64 k circuits often function at only 19.2k.

\textbf{(f) The Revenue of the main operators}

The state owned monopolies obtain their income from basic telephony, long distance service, data service, international service and through the interconnection or direct operation of cellular phones. An analysis of revenue complements the tariff benchmarking.

In this subsection we will concentrate on the breakdown of the firms’ revenue per line into international and domestic components.\textsuperscript{39} Table 9 shows the position of each country for 1995.\textsuperscript{40}

\textsuperscript{37} According to Oscar Rodriguez, Operations Manager of ICE, the cost of the Costa Rican half circuit is over $3,000.
\textsuperscript{38} Since RACSA monopolizes the satellite uplinks in Costa Rica, it can clearly make it more expensive for GBM to operate.
\textsuperscript{39} Although it is also clearly interesting to break down domestic revenues by type, reliable and comparable data is hard to come by.
\textsuperscript{40} The ITU estimated number of lines for Costa Rica and Honduras were revised utilizing data from COMTELCA. For Costa Rica 478.8 were utilized instead of 557.2, while in Honduras 194.0 instead of 163.0.
Table 9

<table>
<thead>
<tr>
<th></th>
<th>Guatemala</th>
<th>El Salvador</th>
<th>Honduras</th>
<th>Nicaragua</th>
<th>Costa Rica</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>224</td>
<td>170</td>
<td>276</td>
<td>352</td>
<td>207</td>
</tr>
<tr>
<td>International</td>
<td>456</td>
<td>368</td>
<td>426</td>
<td>298</td>
<td>263</td>
</tr>
<tr>
<td>Total</td>
<td>680</td>
<td>538</td>
<td>702</td>
<td>651</td>
<td>470</td>
</tr>
</tbody>
</table>


There are several ways of looking at this. Firstly, one could simply compare the total revenue per line with that of integrated operators in other countries. Honduras and Nicaragua both have revenue in line with countries that have recently been privatized. For the same year, Mexico had revenue per line of $580 while Argentina (South) had $860 and Peru $950. As in the those countries, revenue depends importantly on international calls and one of the objectives of the privatization is to encourage the operator to reduce international rates and increment local ones gradually over time. This first comparison has obvious difficulties. Monopoly operators in other countries are capturing significant rents, especially on international calls, so having the same level of revenue per line gives little evidence of the alignment of tariffs to costs. Secondly, countries have different patterns of calling, in the same way as they have different trading patterns: smaller ones probably depend more on international traffic.

A second way approach is to compare the domestic component of these revenues with those in countries where there is separation between domestic and long distance service. Two such countries are Chile and the United States. In Chile, CTC in 1995 had a revenue per line of $371, while SBC in the US had revenue per line of $532. Since the Central American domestic revenues per line include domestic long distance, the revenue per line should actually be higher than in the Chilean case. However, only Nicaragua comes close to this level of revenue, with El Salvador and Costa Rica a far way off. If CTC or SBC are close to cost, then clearly, the domestic revenue should increase.

Clearly international revenue is very important for the Central American operators and a more detailed analysis of it is merited. Figure 5 shows the extent to which each country depends on international revenue. El Salvador and Guatemala, both draw about two thirds of their income from international, while Honduras draws 60%, Costa Rica 56% and Nicaragua 46%.

Except for Costa Rica, all other countries draw at least $350 dollars per line from international service. Of this, between $230 and $320 correspond to income that the operator receives from US phone companies, either for termination of international calls originated in US

---

41 In section VII we will discuss the standard Latin American privatization package, and the way in which a price cap mechanism is supposed to encourage tariff rebalancing.
42 Clearly the correct comparison is with cost, but for cost I only have information for Guatemala and Costa Rica and it is difficult to compare internationally as it depends on depreciation practices.
43 These revenue did not include long distance or international but did include interconnection revenues from companies that interconnected with them to offer these services.
44 These figures were constructed from ITU (1996-97), the financial statements of the telecom firms (except for El Salvador which was unavailable), and FCC (1995).
45 International revenues result from billing customers for outgoing international calls and from the settlement revenues which foreign operators pay to terminate calls domestically. These revenues are taken gross of settlements paid by the domestic operator abroad to have its international traffic terminated.
or in compensation for collect or USA direct calls originating in Central America. This adds up to $59 million dollars for Honduras, $68 million for Guatemala and $83 million for El Salvador.

Figure 5

![International Revenue per line](image)

The settlement revenue is large not only in absolute terms but also in comparison with revenue from calls billed in Central America. This can be explained by three factors. First, traffic per line (sum of incoming and outgoing) between Central America and the United States is much higher than in other regions. In South America the average level is of 133 minutes per line per year, while in Guatemala it reaches 450 minutes and in El Salvador and Honduras over 500 minutes. This is probably related to the large number of Central Americans which migrated to the United States during the 1980s. An estimate of their number is given in Table 10.

Table 10

<table>
<thead>
<tr>
<th>Central Americans living in the US</th>
<th>Legal</th>
<th>Legal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Rica</td>
<td>na</td>
<td>25,985</td>
<td>25,985</td>
</tr>
<tr>
<td>El Salvador</td>
<td>335,000</td>
<td>368,326</td>
<td>703,326</td>
</tr>
<tr>
<td>Guatemala</td>
<td>165,000</td>
<td>161,703</td>
<td>326,703</td>
</tr>
<tr>
<td>Honduras</td>
<td>90,000</td>
<td>93,988</td>
<td>183,988</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>70,000</td>
<td>96,919</td>
<td>166,919</td>
</tr>
<tr>
<td>Total</td>
<td>660,000</td>
<td>720,936</td>
<td>1,380,936</td>
</tr>
</tbody>
</table>

Second, traffic between the United States and Central America is the most unbalanced anywhere. Figure shows the relation between traffic billed in the United State and traffic billed abroad for the Central American countries and the averages for other regions of the world.

---

46 Immigration and Naturalization Service.
Although the average for Central America is over 6, this includes the figure for Costa Rica, 2.7, which is below the Asian average and the figure for Panama, 3.9, which is close to the average for South America. The ratio for El Salvador is 15.8, for Honduras 11.7 and for Guatemala 8.1. This imbalance is probably caused by a combination of factors: higher calling rates in El Salvador than in the United States, the fact that the Salvadorean resident in the US is richer and calls more often than his relatives in the motherland, and the fact that many residents in El Salvador do not have a phone and therefore have to use a calling card.\(^{47}\)

The third reason for this is the high level of the accounting rate. This rate, which is negotiated bilaterally between international operators, is the basis for remunerating corresponding carriers for terminating calls. The actual rate for terminating international traffic is called the settlement rate and is usually one half the accounting rate. We return to this in section VI.

(g) Productivity

One of the main productivity indicators is the number of lines per employee.\(^{48}\)

Costa Rica has the best performance, and in this case leading Panama by over 25%. Of the remaining countries, Guatemala had the highest productivity till 1990, but showed no improvement to 1995. El Salvador showed very rapid increase in productivity as result of a reduction in the labour force of almost 20% and a very rapid growth in the number of lines. Nicaragua and Honduras has shown important increases in productivity.

\(^{47}\) The lack of phones would make it attractive for Salvadorean residents to place collect calls to the US signaling to their relatives that they should call back at another person’s home or a public phone. This led ANTEL to charge for uncompleted collect calls, and further stimulated the use of USA direct calling cards.

\(^{48}\) Since labour costs vary it is not necessarily a good indicator of unit labour costs.
Although the productivity is improving, it is still very far away from the levels attained in recently privatized firms of around 180 lines per employee or well over 200 lines per employee in Chile and the United States.

IV. Industry Restructuring: Objectives and Guiding Principles

Section II explained how the telecommunications industry in most countries came to be organized as a state monopoly or a private regulated monopoly. Over the last years, however, there has been growing dissatisfaction with state ownership, and monopoly positions are starting to get eroded, under the pressure of technological change, and more recently, by pro-competitive regulation.

As the Central American countries are adopting rather different paths of reform, it is important to discuss, in a very general fashion, the way in which policy and thinking about ownership, regulation and competition has evolved, and the role each plays in attaining the objectives of efficiency and universal service. We begin with a discussion of these objectives.

Efficiency has two dimensions: operating efficiency and allocative efficiency. There is operating efficiency if firms produce at minimum possible cost, and allocative efficiency exists if firms set a price for their services which reflect the effect that the service has on its costs.

The traditional interpretation of universal service to make a phone available to every household is dated for several reasons. First, it may not be a feasible to put a phone in every household in poor countries which currently have a density of one to two percent. Instead, the objective may be to guarantee availability of public means of communications in all parts of the country. Second, in the age of INTERNET the service to be provided may be more than just a

---

49 We will consider the fiscal objective in section VII.
phone. In so far as the coverage target exceeds that which can be obtained on the basis of normal commercial planing, it becomes important to decide how to fund it. Although the modern tendency is to seek funding from the general budget, or through a sector tax, less efficient solutions are still prevalent in most countries: cross subsidies, implemented inside a vertically integrated firms or, where competition is present, through interconnection charges.

Ownership and industry structure have important effects on efficiency. Private property is often believed to lead to better administrative decisions, less corruption and better investment choices. Analytically, this is rooted in a supposition that the agency problems between the owners of a private firms and its managers are less severe than those between the government and public managers, as a result of clear focus on profits as opposed to the multiplicity of objectives typical of public firms.\(^50\)

Competition promotes efficiency as it prevents managers from raising prices too far above costs. The competitors can either be rivals in the market or, when barriers to entry and exit are not important, potential entrants. In the latter case, the incumbent firm can capture economies of scale or scope, but is still not allowed to exploit market power. Competition also improves operational efficiency by improving the control of private owners over their managers, and by limiting the ability of politicians to pursue non profit objectives.

The ideal form of organization for most industries is therefore private ownership combined with a competitive structure. Three characteristics of the telecommunications industry, however, have in the past prevented competition from functioning in the usual way, and have prompted government to regulate the industry or at least parts of it. First, the industry is subject to economies of scale and scope -expanding output or the range of services produced reduces unit costs- which means that to achieve minimum cost one might have to concentrate production in a single firm.\(^51\) Second, the telecommunications industry is a network industry subject to several externalities, like the fact that an additional subscriber increases the value of the service to all existing users.\(^52\) This is an externality which justifies some expansion of coverage beyond the market level on efficiency grounds alone. Third, the network characteristic of the industry also means that competition will only be feasible if interconnection is imposed by regulation, as often, operators will have an incentive not to interconnect smaller networks.

Section II discussed the two solutions which historically have been given to this problem. The most common has been public operation by a single firm which is given a monopoly. The United States, has opted instead for a private monopoly subject to regulation. In each case, economies of scale and scope could be captured, and some level of cross subsidies could be sustained. It is analytically difficult to rank these alternative forms of organization as the regulated private monopoly may or may not be more efficient than a public monopoly.\(^53\)

\(^50\) Although multiplicity of objectives is often blamed for the problem, a more fruitful way of thinking of this situation is one of multiplicity of principals, which gain predominance in an unstable fashion. See Raventos (1997) Chapter 1.
\(^51\) When this occurs one has a situation of natural monopoly.
\(^52\) The other externality is of a macro kind and represents the effect mentioned in section II through which a higher level of penetration leads to higher income.
\(^53\) The theoretical literature is split on this. Under the framework of Laffont & Tirole (1993), the state monopoly can turn out to be more efficient as it is subject to only one agency relation, as compared to the two agency relations which the private manager has (with the owner and with the regulator). Willig, on the other hand, created a model in which the private regulated firm may well be more efficient. The argument emphasizes the fact that the regulator, in the same way as the public firm principal, have objectives different to profit. The advantage of private operation turns out to be the weaker control that the regulator has on the private firm, due to a greater informational disadvantage.
In the United States, the regulatory bargain was to allow a monopoly in exchange for subjecting prices to control. Most typically rate or return regulation was implemented which allowed prices provided that the revenues resulting with these prices were no higher than the cost of production including a normal return to capital. It is well known that rate of return regulation does not provide adequate incentives for the firm to produce efficiently, as cost reductions will translate into reductions in allowed revenues. Furthermore, since total revenues are restricted, the relative price structure is often established utilizing flawed cost distribution methodologies.

The emergence of competition in parts of the industry (in the United States) forced on the regulator the need to make two decisions: (a) whether to allow the firms offering the monopoly service to participate in the competitive sector, (b) how to prevent the firm from subsidizing the competitive activity with the profits obtained in the monopoly activity. The FCC has at times allowed the incumbent monopoly to participate in the competitive activity, as with data communications, provided it did so through a separate subsidiary. In other cases, as with the manufacturing of equipment, separation has been imposed.

Where the competitive activity has required as an input the monopoly activity, interconnection has been mandated, and some form of interconnection pricing has been necessary. After the break up of AT&T in the US, as we saw in section II, a decision was taken to set access prices that would temporarily maintain the cross subsidy which had developed between long distance and local service. In so far as the rates of local service could be raised, the price of interconnection could be reduced towards its cost.

The problems with traditional forms of regulation has led to innovation. When British Telecommunications was privatized and a separate regulator, OFTEL, was created, Stephen Littlechild recommend against using rate of return regulation. Instead he favoured a mechanism in which the average price increase be capped by the inflation rate minus an x factor, meaning that prices on average would fall in real terms over time.

There are two particularly attractive characteristics of price caps which have been them very popular. First, they encourages the operator to lower costs because the prices it is allowed to charge are independent of its costs, and therefore any economy generated shows on the bottom line. Second, the average consumer must benefit as prices fall by a factor x in real terms, which is the part of the firm’s cost reduction that is transferred to consumer.

Price caps have been used in almost every privatization since British Telecommunications because they have a number of advantages which we will briefly review. First, they limit the discretion of the regulator, which is important for an investor that is committing a vast amount of capital over a long period of time. Once the cap has been set, the operator can be confident that it will be allowed to adjust its prices upwards in inflationary conditions, and will also be allowed to change the structure of prices: reducing one price allows the operator some leeway to raise others. This process of moving prices to their appropriate level is called rebalancing.

Countries with state monopolies rarely had independent regulatory bodies, as the Post-Telegraph-Telephone system basically regulated itself, and as such were much less ready to

---

54 This evidently depends on regulatory lag. Rate of return regulation also distorts the choice of inputs in favor of capital.
55 Clearly, there is a danger that the firm will comply with the cap by lowering price over time, but let the quality of service deteriorate at the same time. For this reason, price cap arrangements are always accompanied by service quality monitoring.
accept competition. However, although competition was slow to come it eventually found its way to the outskirts of the industry, through data services, or cellular phones, and the issues of interconnection, which we discuss in the next section, had to be confronted.

**Interconnection**

Alternative solutions to interconnection problem have also been devised. As we saw above, the FCC insisted on keeping the local carriers from participating in long distance market, as it was felt that these carriers could manipulate their costs and leverage their power in the local market into the long distance market. Other regulators, namely the OFTEL in Britain after privatization, have not kept the monopoly providers from participating in the competitive conditions, but have insisted instead in separate accounting procedures and careful regulation of interconnection.

Even if the interconnection cost is known an issue still arises regarding the price of interconnection, and whether to include in this price the cost of carrying and terminating the call, which is separate from the interconnection cost as such. The interconnection price in the US includes, as we noted above, both sets of costs and also contribution towards the costs of the access provider.

There are basically three ways of setting interconnection prices.\(^{56}\) The first is the incremental cost. This recovers the change in the levels of all costs resulting from the interconnecting activity. The second, favored in New Zealand and formerly in Britain, are variations of the efficient components price rule ECPR of Baumol.\(^ {57}\) ECPR price interconnection at the cost of interconnection plus the contribution margin that the supplier of the monopoly input would obtain by carrying the competitive service itself.\(^ {58}\) This contribution margin may represent profits for the firm, or may help fund a deficit in the local service. Third, some intermediate rule favored by the European Commission, is to utilize fully distributed costs,\(^ {59}\) an approach which could also help recover universal service support, though the Commission prefers to include only common costs, and to obtain universal service through flat sector taxes.

These different approaches sometimes correspond to optimal interconnection prices. When there is market power in the competitive service, however, the interconnection price should also compensate for this market power, leading in many cases, to lower interconnection prices. When entry into an activity is considered difficult, due to the dominance of the incumbent, the regulator often has decided to shade interconnection prices down. This was the case in Britain OFTEL initially set favorable conditions for Mercury in order to establish competition.\(^ {60}\)

The technical issue surrounding interconnection are just as complicated, and even more important than the pricing issues. Both in the US and in Britain it was necessary to carefully monitor that the incumbent would comply with its agreements, and when interconnection offered to rivals put them at a disadvantage set lower prices. This was the case with MCI and Sprint which for several years paid lower interconnection prices.

\(^{56}\) We assume that interconnection price will carry both the physical interconnection and the carrying cost.

\(^{57}\) Baumol & Sidak (1995).

\(^{58}\) The British system actually called for pricing access at its marginal cost plus a contribution to the access deficit. The rule reduced to the efficient component pricing rule when the contribution obtained from the competitive activities was exactly equal to the access deficit.

\(^{59}\) See Mitchell et al (1994)

\(^{60}\) This corresponded to the so called duopoly period in Britain.
Once the local network is opened up to competition interconnection issues become even more complicated, and a new set of issues become important. In the countries that have advanced on this issue the tendency is to let the parties themselves negotiate interconnection conditions, but having some form of arbitration or conciliation by the regulator in case that no agreement is reached. In the US, the regulator is instructed to set the price on the basis of long run incremental cost, while in El Salvador and Guatemala, as we shall see in Section VII, they are set to the offer of the parties that more closely matches a determination made by an outside expert. When the interconnection framework is perfected, final prices can in principle be deregulated which is exactly what is being proposed in Guatemala.

V. FISCAL CONSIDERATIONS AND TRADITIONAL PRIVATIZATION

Although the objectives of coverage has been dominant for most state telecommunications firms and has led to low access and local rates and therefore to low rates of return on assets, telecommunications operators have the potential of being very profitable, if domestic rates are moved closer to cost, international rates remain at least for some time well above costs, and operating costs themselves are reduced through more effective management.

If this is done, the government, as owner of the firm, can capture part of the increased income stream through taxation and transfer or dividend payments. Alternatively it can sell the firm, and receive a lump sum instead of the transfer and dividend payments, while continuing to receive tax payments over time. If the discount rate that the buyer applies to the cash flows from operating the firm is the same as the government’s there is really no long term fiscal advantage from privatizing the firm, over reformed public operation. In so far as the rebalancing of rates and increased operational efficiency cannot be achieved under public management, however, there may be a fiscal advantage to privatization, independent of any difference in discount rates. Though there is no guarantee that it will be achieved with privatization, a number of countries have put into place a legal framework and a regulatory system which has delivered many of these advantages under privatization.

The great challenges in a privatization is to get the investor to sink hundreds of millions of dollars into network development and growth, when there is a risk that the government may in effect expropriate this investment by reneging on tariff adjustment promises or by allowing entry. Spiller & Guash (1994) have argued this can be accomplished by designing a legal and regulatory framework that fits a country’s institutional endowment, which in turn depends on whether the party division of the legislature tends to assure that once laws are approved they are difficult to change, and on whether the judicial system is fair and contracts can be enforced, and even on custom.

Though this framework is highly suggestive, recent privatization in telecommunications have been fairly similar, and can best be viewed as variations on a theme, which we call the traditional privatization. In this model, the regulatory framework is usually specified in the telecommunications law, and the concessions for most fixed services are awarded through a contract. In some cases, the sector legislation is very specific, while in others this is left to the secondary legislation, or included only in the concession contract. Venezuela, Peru and Bolivia

---

61 Under such conditions foregoing future cash flows in exchange for a lump sum receipt is akin to borrowing.
have all used contracts, though these have been tied to the basic sector legislation much better in Peru and Bolivia than in Venezuela.\textsuperscript{62}

Prices are most often controlled through price caps, which typically have much less flexibility than in Britain, where changes can be referred to the Monopolies and Mergers Commission. There are interesting contrasts in the way that initial prices are fixed, in the grouping of services in baskets and the price cap formulas themselves. While Venezuela applied caps to three separate baskets, Peru capped individual service prices specifying from the outset the exact path which the price would follow, sacrificing flexibility but possibly enhancing credibility.\textsuperscript{63} In Table 11 one can appreciate how the basic monthly rate increases considerably, while the international rate falls more moderately.\textsuperscript{64}

When baskets are used, sometimes installation and the fixed monthly rate are assigned to a separate basket from usage, as in Venezuela while in others, like Mexico, the separation was by type of subscriber. These differences, end up having an important effect on the ability of the firm to rebalance. If efficiency is the main objective there is a very strong case for putting all services \textit{including interconnection} into a single basket as this allows the firm maximum flexibility to correct relative price distortions.

Table 11

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic monthly rate</td>
<td>3.69</td>
<td>5.06</td>
<td>6.48</td>
<td>8.59</td>
<td>11.65</td>
<td>14.71</td>
</tr>
<tr>
<td>Local calls</td>
<td>0.023</td>
<td>0.022</td>
<td>0.022</td>
<td>0.021</td>
<td>0.020</td>
<td>0.018</td>
</tr>
<tr>
<td>International long distance</td>
<td>1.79</td>
<td>1.61</td>
<td>1.46</td>
<td>1.29</td>
<td>1.09</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Evidently the restrictions on price behavior are complemented by minimum quality standards, in order to prevent the operator from raising price by letting the service deteriorate. The concession contract typically specified targets for indicators like call completion, fault rate, repair rate and so on.

In the traditional telecom privatization, the operator is offered a monopoly over facilities and most final services, a very restrictive regime, but often more liberal than the situation that existed before privatization. The cellular B band is usually included in the concession but sometimes has to be paid for separately (matching the A Band). The operator is obligated to interconnect other networks, although the conditions are often left vague. Despite statements about \textit{interconnection at cost}, there are usually qualifying statements which allow for return to capital and \textit{contribution towards the basic network}. The law often specified that in conditions where more than one party wants to operate a certain band of spectrum it must be opened to bidding.

The operator typically enters into the quantitative obligations to expand the network, and to invest sufficiently in network modernization to achieve the quality standards specified in the contract. This is most often expressed as a minimum installation of lines per year and targets for

\textsuperscript{62} In some countries the basic legislation is not very specific at all, leaving the details for the secondary legislation, which is often a presidential decree.

\textsuperscript{63} Prices could deviate from the path by a set margin.

\textsuperscript{64} The possibility of maintaining those international prices depends on the intensity of competition through call back and refiling.
network digitalization. Targets for public and rural telephony are also established. Table 12 gives some examples. The expansion target often represent a substantial increase over the recent history of expansion under state operation.\(^{65}\) The rural telephony target in Peru was handled in a peculiar way. The operator chose to cover about half the rural towns, while the rest would be handled through a universal service fund, where auctions would be held to identify the firm that would install the required service for the minimum subsidy.\(^{66}\)

Table 12

Universal Service Obligations\(^{67}\)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>México</td>
<td></td>
</tr>
<tr>
<td>Public phones: density of 5/1000 1998 All towns with over 500 inhab in 1994</td>
<td>Internal</td>
</tr>
<tr>
<td>Venezuela</td>
<td></td>
</tr>
<tr>
<td>Public phones: 10.5% growth per annum</td>
<td>Internal</td>
</tr>
<tr>
<td>Public phones in 20 town with fewer than 5000 inhabitants every year</td>
<td>Internal Ministry of Communications</td>
</tr>
<tr>
<td>Perú</td>
<td></td>
</tr>
<tr>
<td>Public phone targets in the TDP contract</td>
<td>Internal</td>
</tr>
<tr>
<td>Public phones target not in the TDP contract</td>
<td>Universal service fund</td>
</tr>
</tbody>
</table>

Fiscal considerations for privatization in Central America

The extent to which fiscal objectives are a factor in the privatization decision is not easy to establish. On the one hand, the public justification for selling the telecom firm, will often be to obtain efficiency and allow country to keep up technologically, even though there is a fiscal objective as well. On the other hand, different parties in the government may see the situation differently. As we discuss below, Costa Rica is the only case in Central America where the telecom privatization was suggested primarily to help alleviate the public debt problem.

To better appreciate the possible fiscal role of the telecom sale we proceed to examine the general situation of the state owned enterprises (SOEs) and some public finance indicators. Table 13 shows some SOE indicators for Central America and for the average of less developed countries for two periods: 1978-85 and 1986-91. The importance of SOE to the economy in the Central American countries is much smaller than the average in both periods, although the GDP share is quite high for Costa Rica and Panama and the investment share for Honduras in the first period. Costa Rica and Panama show SOE running surpluses in the second period while the other countries are closer to having no effect on the public finances.

\(^{65}\) A greater rate of expansion of the network is another difference between private and public operation which may make the former more valuable.

\(^{66}\) Such auctions have been successfully carried out in Chile. See Wellenius (1995).

Table 13

<table>
<thead>
<tr>
<th>State Owned Enterprises</th>
<th>Share in GDP</th>
<th>Share in Investment</th>
<th>Investment / GDP</th>
<th>Balance / GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Rica 1978-85</td>
<td>6.7%</td>
<td>15.8%</td>
<td>4.0%</td>
<td>-2.4%</td>
</tr>
<tr>
<td>1986-91</td>
<td>8.2%</td>
<td>8.4%</td>
<td>2.2%</td>
<td>2.2%</td>
</tr>
<tr>
<td>El Salvador 1978-85</td>
<td>2.4%</td>
<td>16.7%</td>
<td>2.5%</td>
<td>-1.2%</td>
</tr>
<tr>
<td>1986-91</td>
<td>1.6%</td>
<td>7.7%</td>
<td>1.0%</td>
<td>-0.5%</td>
</tr>
<tr>
<td>Guatemala 1978-85</td>
<td>2.0%</td>
<td>15.1%</td>
<td>2.3%</td>
<td>-1.7%</td>
</tr>
<tr>
<td>1986-91</td>
<td>1.5%</td>
<td>7.8%</td>
<td>1.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Honduras 1978-85</td>
<td>4.6%</td>
<td>27.2%</td>
<td>4.8%</td>
<td>-3.9%</td>
</tr>
<tr>
<td>1986-91</td>
<td>5.5%</td>
<td>12.6%</td>
<td>2.2%</td>
<td>-0.6%</td>
</tr>
<tr>
<td>Panama 1978-85</td>
<td>7.3%</td>
<td>17.1%</td>
<td>3.9%</td>
<td>-2.6%</td>
</tr>
<tr>
<td>1986-91</td>
<td>8.4%</td>
<td>8.9%</td>
<td>1.2%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Average 1978-85</td>
<td>12.6%</td>
<td>26.9%</td>
<td>6.1%</td>
<td>-2.1%</td>
</tr>
<tr>
<td>1986-91</td>
<td>13.1%</td>
<td>20.5%</td>
<td>4.5%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>


Table 14 shows some public finance indicators for 1995. The government deficits are highest in Costa Rica and Honduras, which also have very high levels of public debt. El Salvador and Nicaragua show a rather moderate deficits. Guatemala is striking in that it runs a deficit despite a very low level of government spending and investment.

Table 14

<table>
<thead>
<tr>
<th>Public Finance Indicators for 1995</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Rica</td>
<td></td>
</tr>
<tr>
<td>El Salvador</td>
<td></td>
</tr>
<tr>
<td>Guatemala</td>
<td></td>
</tr>
<tr>
<td>Honduras</td>
<td></td>
</tr>
<tr>
<td>Nicaragua</td>
<td></td>
</tr>
<tr>
<td>Internal Public Debt (1)</td>
<td>33.4%</td>
</tr>
<tr>
<td>External Debt</td>
<td>33.0%</td>
</tr>
<tr>
<td>Government Deficit (2)</td>
<td>2.0%</td>
</tr>
<tr>
<td>Total government spending (3)</td>
<td>30.1%</td>
</tr>
<tr>
<td>Public investment</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

(1) Excludes banking system
(2) For CR, ES, H (NPPS). For G, N (CG)
(3) For 1995, interest represents 5.5% of GDP in CR, 1.3% ES, 1% G, 3.9% N.
(4) For 1992, education represents 4.8% in CR, 1.4% ES (J5)
(5) For 1992, health represents 8.2% in CR, 0.8% in ES (J3)
Source: Consejo Monetario Centroamericano

We proceed to sum up some preliminary conclusions about the possible macro role of the telecom privatizations in Central America. Section 2 suggested that Costa Rica has rather favorable sector indicators, so the discussion about privatization has been based on macroeconomic considerations and in particular linked with the reduction of the internal debt. However, unless one can argue that efficiency, investment or the tariff path is different under

---

68 Although the internal debt for 1995 was about the same as the external debt it represented a much higher burden on the budget as a result of higher interest rates. Presently, the government is issuing foreign bonds in order to convert internal debt into external debt.
private operation, it would be just as effective for the government to take the flow of income from a reformed ICE over time. Honduras has a similar fiscal situation, and the fact that the sector performance has been poor means that privatization may lead to a great improvement. In Nicaragua, as we shall see in Section VII, a somewhat different fiscal motive can be advanced through privatization. In Guatemala, the privatization of GUATEL is not so much a fiscal consideration as a precondition set by the private sector to discuss tax reform, which is needed to reduce the fiscal vulnerability of the country.

We turn now to an examination of some traditional privatization in order to show the potential fiscal gain. Once the regulatory and legal framework has been established, firms are prequalified, so that the final process of awarding the concession can be based on price alone, typically through a first bid closed auction.

Table 15 shows that typically less than 50% of the company is privatized, which is puzzling as a partial sale would tend to reduce the incentive of the buyer to improve efficiency. This has limited the capital commitment of the strategic investor and has actually served as a signal that the government will not try to expropriate the investor through regulatory intervention, complementary to the contractual obligations.

<table>
<thead>
<tr>
<th>Transaction Date</th>
<th>Price Paid Millions $</th>
<th>Percent Acquired</th>
<th>Equity Value Millions $</th>
<th>Net Debt Millions $</th>
<th>Total Value Millions $</th>
<th>Lines in Service Thousand</th>
<th>Price per Line $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico Dec 90</td>
<td>1,758</td>
<td>20%</td>
<td>8,790</td>
<td>1944</td>
<td>10,734</td>
<td>6,754</td>
<td>1,589</td>
</tr>
<tr>
<td>Venezuela Dec 91</td>
<td>1,885</td>
<td>40%</td>
<td>4,713</td>
<td>0</td>
<td>4,712</td>
<td>1,804</td>
<td>2,612</td>
</tr>
<tr>
<td>Hungary Dec 93</td>
<td>878</td>
<td>30%</td>
<td>2,898</td>
<td>419</td>
<td>3,317</td>
<td>1,291</td>
<td>2,569</td>
</tr>
<tr>
<td>Peru CPT Mar 94</td>
<td>2,002</td>
<td>35%</td>
<td>5,720</td>
<td>-655</td>
<td>5,065</td>
<td>600</td>
<td>8,442</td>
</tr>
<tr>
<td>Bolivia Sep 95</td>
<td>610</td>
<td>50%</td>
<td>1,220</td>
<td>-590</td>
<td>630</td>
<td>243</td>
<td>2,596</td>
</tr>
</tbody>
</table>

There has been a rise in the valuations from the early sales. While Argentina, Chile and Mexico, achieved prices per line of less than $1,600, more recent ones, with the exception of Peru, have stabilized at about $2,500 per line. Peru was a special case which resulted from (a) an extremely underdeveloped network and huge excess demand meaning that the company could grow extremely rapidly; (b) Telefonica International Holding, and its local partners, obtained a fee for transfer of technology equal to 1% of sales and a management fee equal to 9% of

---

69 In section IX we return to whether such a supposition can in effect be made.
70 Evidently a generous management contract would tend to compensate that, and can also be used to redistribute the gains from the privatization as explained below.
71 Perotti (1995). It would not be attractive for a populist government to signal in this way as the pre-confiscation loss of profits due to reduced incentives does not compensate what it gains in credibility.
operating income before depreciation, while owning only 35% of the stock;72 (c) TISA was expecting to increase operating margins by firing workers and reducing other expenses. 73

In many cases, the deal with workers severely limits the amount of downsizing that can occur, even when workers can also expect to experience important capital gains in the transaction. In Bolivia, workers on average had a capital gain of $15,000, while in Venezuela the gain was $12,500 right after the privatization.74 These gains for workers are important in two ways: they moderate the opposition of workers to the privatization process (or even convert them in open supporters) and they have a demonstration effect in other industries. In Bolivia, the early privatization of ENTEL, was fundamental in obtaining the support of the workers in the Oil and Gas industry.75

Evolution of the Traditional Privatization

Although the consistency of expansion targets, quality standards and price caps is usually studied carefully before the transaction, unforeseen events have made some of the conditions of the concession contract difficult to satisfy. This has led to several variations on the model which we proceed to examine.

First, since expansion targets are based on forecasts of unsatisfied demand and of the growth in the economy which are very difficult to make accurately, some countries like Bolivia, have replaced the expansion targets with limits on the maximum waiting period for a phone.76

Second, though rural and public telephony targets are often financially viable only because surpluses remain in other activities, this tends to reduce the magnitude of the initial adjustment in prices, slowing the convergence of prices to costs. This can be alleviated by financing some or all the rural obligations through a Universal Service Fund.77 The allocation of these fund can handled either by the calculation of investment requirements utilizing cost models calibrated to the precise conditions of the area under consideration, or by auction.

Third, it is possible to utilize market mechanisms for the allocation of licenses (and spectrum) for activities not included in the concession. Both Venezuela and Panama, held auctions for the cellular A band before privatization while the B Band was included in the wireline operator’s contract. Nothing prevents licenses for PCS or other services to be auctioned, introducing some level of competition, provided reasonable conditions of interconnection can be guaranteed.

72 See case Telefonica del Peru in Raventos (1997). With the use of a valuation model one can find that this management fee was worth about $1 per share sold or about $2,000 per line. Even after one adjusts for this, the valuation of TDP is high compared to the other transactions.
73 In the first year, 1994, TISA fired 2700 workers and in 1995 another 500, paying about one year’s salary per fired worker as compensation. After that its productivity was still only 130 lines per employee.
74 Evidently this was a paper gain, and much of it was lost after the stock price took a beating. See Raventos (1997, 1997b)
75 This would suggest that a broad program of privatization and state reform can gain substantially through an early telecom privatization. Starting with areas were the losers are more evident, like pensions, can abort progress in other areas, as happened in Uruguay.
76 The adoption of maximum waiting time targets in Bolivia probably responded to the added difficulty of calculating expansion targets for 19 cooperatives and the added risk of error of not having averaging over regions. The waiting lists on the other hand are proving to be extremely difficult to manage for the newly created Superintendencia.
77 Peru, actually applied a combination of these procedures.
Fourth, it is not necessary to maintain vertically integration. Instead, separation can be sustained and transitory cross subsidies can be maintained through access payments. In Bolivia the state owned long distance company was capitalized and the regulator established interconnection payments that this company would have to pay to the local networks to originate and terminate phone calls.\footnote{Interconnection payments were set at levels that would maintain the situation existing before the capitalization. The rates exceeded standard calculations of incremental cost, but were low in comparison with other countries.}

Fifth, it is possible to include in the concession contract clauses that allow the regulator to allow entry under certain circumstances. Thus, in Bolivia, the Superintendencia can allow a second local carrier to offer service when the cooperative holding the license for that region has not attained a significant portion of the targets, and in particular, the expansion targets.

Sixth, when privatization has been fallen into disrepute, as it has in many countries, there are alternatives. The administration of President Sanchez de Lozada in Bolivia \textit{capitalized} the main public firms instead of selling them. This was done by inviting bids from operators to subscribe a 100\% increase in their capital and by transferring the existing government shares to a special pension fund to benefit the elderly. The scheme was very attractive politically because the firm was not sold, but instead \textit{it was made bigger} dispelling the fear that the funds could disappear. Since the transfer of the government shares to the pension fund may actually deteriorate the long term fiscal position of the state, an alternative is for the government to keep its shares.

Although these innovations help complete the package and make it more sustainable, there are clearly situations were the contractual conditions are explicitly or implicitly renegotiated. In Venezuela, the tariff rebalancing within the cap broke down, and the firm has been authorized to offer a tariff menu. Also, although the expansion targets were initially met, despite the strong downturn of the economy, they have recently been renegotiated in preparation for the sale of the second tranch of shares.

An important component of the traditional privatization is the ability of the buyer to capture rents from international service during a transition towards competition. The length of this transition, however, depends to a large extent on international policy. We turn to this in the next section.

\textbf{VI. INTERNATIONAL POLICY}

There is clear recognition internationally that the settlement rates are substantially above the cost of terminating phone calls, and that, with unbalanced traffic, this situation benefits the countries that are net recipients of traffic. One of the countries that has felt most affected by this system is the United States, having paid \$5.4 billion in settlements in 1996, up from \$2.8 b in 1990.\footnote{FCC 96-484}

In order to appreciate the sustainability of this situation it is useful to consider the origin and evolution of international policy. Accounting rates were created to compensate telegraph carriers in foreign countries for terminating domestic traffic. The division of the accounting rate was...
usually, although not always, equal. This policy was extended for telephone carriers at a time when most of them were national monopolies.

When set in the cooperative spirit of the International Telecommunications Union, ITU, these accounting rates allowed domestic monopoly operators to extract maximum profits from their international traffic. For many countries these profits allowed them to set the price of other services in a more conservative fashion.

As international telecommunications became liberalized in the US after 1985, a measure applauded by many who had been subjected to high rates, the FCC maintained its international settlements policy, ISP, the principles of which were alleged to date back to early decisions on MacKay telegraph seeking to terminate traffic in Norway.

The idea of the ISP was to protect US consumers of international service from the high prices which would result from foreign monopolies setting strongly inflated settlement rates. The ISP is based on three important rules: US operators cannot charge different settlement rates to a given foreign operator nor can they pay the foreign operator different settlement rates, settlement rate in both directions should by symmetric (there is a 50-50 split in the accounting rate), and the foreign operator must return traffic to US operators in the proportions in which it was received.

Prohibiting asymmetric settlement rates and the proportional distribution of return traffic were supposed to prevent the foreign monopoly from trying to obtain higher settlement rates (if it was a net recipient of traffic from the US), by playing one US operator against another in a negotiation in which it could threaten to disconnect those that did not agree with its conditions.

This policy has a long history, and it seems to protect US consumers from higher termination rates, and therefore higher collection rates. A simple analysis of the interaction between a foreign monopoly and competitive US operators, would suggest that the foreign monopoly ends up holding all the power in the absence of regulation. The settlement rate for calls into the US would be driven to marginal cost through the competition of the US operators, while the settlement for calls abroad would be set by the foreign monopolist at a level which would allow it to capture all the rents available in that market.

This logic has recently been questioned analytically. Daniel O’Brien, in his doctoral dissertation at Northwestern, used a game theoretic construct to show that both the non discrimination clause and the 50-50 split, instead of protecting US operators from whipsawing, actually puts them in the hands of the foreign monopoly. The reason for this is that although the ability to disconnect the operators give it a strong negotiating position, it does not give it complete control. Moreover, the foreign monopoly’s position deteriorates over time as there are fewer operators to play against each other, a condition which is known by them and strengthens their position. By prohibiting discrimination, this second stage is aborted and the monopoly is left in a much stronger position.

---

80 This is a well known result in the theory of vertical relations. If a firm sells an input to perfectly competitive firms downstream, it price this input in such a way that the product is sold to consumers at the monopoly price and all rents are captured by the input supplier through the inflated input price.

81 O’Brien (1989) suitably compares this situation to that of a monopoly selling a durable product, in which the natural pricing behavior for the monopoly is to **skim the cream**. However, the buyers’ rational expectation of a lower price over time actually lower their demand, and **reduces** the ability of the firm to discriminate and its profit. It becomes attractive for the monopoly to find a way of credibly committing not to reduce the price, which in practice has been attempted through leasing (eg. Xerox) or through a most favoured customer clause (eg. Chrysler).
There is substantial evidence that ISP has not always had its intended result. In fact, a very interesting case with telegraphs involved the Central American carriers, grouped under COMTELCA. These carriers received more traffic from the United States than they sent, and threatened to disconnect the American correspondents unless they raised the settlement rate. The American carriers, starting with Western Union International and followed by FTC Communications applied for FCC waivers in order to accept the higher settlement rates. Western Union International applied for a waiver to increase the charge, and was followed by Western Union Telegraph Co and FTC Communications. Thereafter, they sent a joint telex to COMTELCA accepting a raise in the settlement rate from $0.1773 per word to $0.2365 per word. Some interesting regional initiatives of a less confrontational nature such as the Central American microwave and fiber interconnection have followed.

The FCC has sought to undermine the settlements imbalance by encouraging competition through call back and especially resale. A call back customer calls a computer in the US, which identifies the calling number without answering and immediately returns a call which offers dial tone in the foreign country. This puts pressure on the foreign collection rate. There are essentially two types of resale: Pure resale which is the sale of another carriers circuits which has contracted termination in exchange for settlements. Facilities resale or simple resale uses leased circuits to provide service for which an arrangement is made with the foreign carrier for termination, which is normally not bound by existing accounting rate agreements and for which the proportionate returns do not apply. The latter puts greater pressure on settlement rates, but is allowed in only a few countries.

During the early 1990s the FCC, engaged in a complementary multilateral strategy and was able to move the ITU to pronounce itself favourably on cost based settlements, through ITU-T’s 1992 Recommendation D. Although settlements fell more rapidly after 1992 they have not done so at the speed which the US would have liked to. Table 16 shows the drop in the US accounting rates with Central America and the average level of US accounting rates with all countries for the period 1985-96.

The average accounting rate fell 3.2% per annum between 1985 and 1992, but then accelerated to 5.3% per year for the following four years. The Central American countries where only about 16% above the world average in 1985, but are now over 50% above the world average. This makes the Central American situation particularly bothersome for the FCC: not only is the proportional imbalance the highest in the world, but the price of the imbalance is very high.

---

82 This is an unusual situation, as the US most often receives more messages than it sends. In phone service, in contrast, it usually sends more than it receives. Kwerel (1994) argues that whipsawing is actually easier in the case of record carriers: the firm offers to divert traffic in favor of the correspondents that lower their settlement rate, and if they actually lower it this is to the advantage of the foreign monopoly. In the case of telephone service the foreign monopoly, seeking to increase the settlement rate (as it is usually a net recipient of traffic) offers to increase the return traffic for those operators that will increase their settlement rate. However in order to deliver on this, the foreign monopoly ends up paying higher settlements.


84 To advance its views on the protection of intellectual property, the US developed a similar strategy, using both unilateral threats (the watch lists) and multilateral negotiation at GATT. A third pillar in the case of IP was its NAFTA strategy.
Table 16

<table>
<thead>
<tr>
<th></th>
<th>1985</th>
<th>1992</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Rica 4/</td>
<td>1.50</td>
<td>1.35</td>
<td>1.00</td>
</tr>
<tr>
<td>El Salvador</td>
<td>1.55</td>
<td>1.30</td>
<td>1.1</td>
</tr>
<tr>
<td>Guatemala</td>
<td>1.50</td>
<td>1.40</td>
<td>1</td>
</tr>
<tr>
<td>Honduras</td>
<td>1.50</td>
<td>1.50</td>
<td>1.3</td>
</tr>
<tr>
<td>Nicaragua 5/</td>
<td>1.50</td>
<td>1.50</td>
<td>1.3</td>
</tr>
<tr>
<td>Panama</td>
<td>1.50</td>
<td>1.50</td>
<td>1.3</td>
</tr>
<tr>
<td>World average</td>
<td>1.29</td>
<td>1.03</td>
<td>0.83</td>
</tr>
</tbody>
</table>


The FCC has recently started reformulating its strategy on settlements and accepting the idea of departures from the ISP. At the end of last year, the FCC started defining benchmarks which it would pressure US operators to move towards in their negotiations in the next five years. Although the reports seek to develop a measure close to the theoretically appealing long term incremental cost, the actual benchmarks are based on the costs actually observed in the market for three types of services: satellite links, gateways and international termination. The cost of these services is measured for each country on the basis of the price of equivalent commercial services offered, but the benchmarks are only defined by category of country.

Table 17

<table>
<thead>
<tr>
<th></th>
<th>Transmission</th>
<th>Gateway</th>
<th>Termination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Rica</td>
<td>3.3</td>
<td>4.8</td>
<td>2.2</td>
<td>10.3</td>
</tr>
<tr>
<td>El Salvador</td>
<td>5.9</td>
<td>4.8</td>
<td>1.1</td>
<td>11.8</td>
</tr>
<tr>
<td>Guatemala</td>
<td>3.1</td>
<td>4.8</td>
<td>2.4</td>
<td>10.3</td>
</tr>
<tr>
<td>Honduras</td>
<td>3.1</td>
<td>4.8</td>
<td>8.7</td>
<td>16.6</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>3.8</td>
<td>4.8</td>
<td>3.7</td>
<td>12.3</td>
</tr>
</tbody>
</table>

Source: FCC (1997)

Such calculations based on the price of lines actually contracted should be higher than the actual incremental cost, and therefore allow for a profit when the benchmark is followed. Furthermore, the benchmark for the lower middle income countries ($726-$2,895) of 19.1 cents is even higher, in some cases almost twice the cost calculated for the Central American country. For the lower income countries the benchmark is 23 cents.

It is important to note, however, that some of the country TCPs may be measured incorrectly. For Costa Rica, for instance, a private 64 Kbs half circuit to the United States costs $3,124 per month. Assuming, as the FCC does in its calculations, that ICE fits four voice channels per circuit and that each circuit carries 8,000 minutes per month, this would yield a transport cost of 9.8 US$ cents per minute compared to the 3.3 cents shown in Table 17.

---

85 This is close to the settlement rate between the UK and the US of 21 cents in 1995.
86 Conversation with Oscar Rodriguez, Operations Manager of ICE.
87 Evidently if the FCC figures are incorrect, our calculations of the price of private circuits in section II are much too low. In that section we noted, however, that for these circuits availability, effective speed and reliability are at least as important as price.
Last August, the FCC specified the exact timetable for achieving the benchmarks. For lower income countries, including Honduras and Nicaragua, the benchmarks must be attained within four years of January 1, 1998, whereas for the lower middle income countries, including El Salvador, Guatemala and Costa Rica, the deadline is three years starting on that same date. Clearly the movement to the benchmarks would be a larger change for Central America than for most other countries, and the impact on the finances of the operators, would be even larger, given the traffic imbalance. Interestingly, two of the Central American operators which depend most heavily on settlement revenue have passed legislation which opens their telecommunications sector and contemplates additional measures to make prices rapidly converge towards costs.\textsuperscript{88}

The other element of the FCC recent approach is the so called Flexibility Order, under which departures from the ISP -non discrimination and even settlements- are tolerated provided the country in question satisfies the effective competitive opportunities (ECO) test or even in some cases where this is not satisfied. In the former case it would be feasible to allow a single carrier to provide end to end service into the foreign market without paying an accounting rate. In the latter case, departures can be allowed that will promote market oriented pricing and competition, while precluding abuse of market power by the foreign correspondent.

The FCC allowed AT&T to negotiate asymmetric settlements with KDD, under which, in the second year, AT&T would pay KDD 0.19 SDR to terminate traffic, while KDD would pay AT&T only 0.10 SDR. This is associated with the introduction of resale in Japan by January 1998, which is currently prohibited. The FCC is willing to accept asymmetric rates in exchange for lower levels and for competition.\textsuperscript{89}

Mexico also appears to have an asymmetric settlement arrangement with the United States, although it is not clear whether this was negotiated as part of the flexibility order, or if it is based on the special relation the US has with Mexico. Utilizing the FCC data on settlements, it appears that calls billed in the US paid 56 US$ cents while calls billed in Mexico paid 30 US$ cents.

Chile which has one of the more deregulated telecommunications markets, has not negotiated any asymmetric settlement arrangement with the United States, and its accounting rate, at close to $1 is way above the average. Chile today, does not satisfy the ECO conditions because of its asymmetric domestic access charge: it discriminates between incoming and outgoing and between international and domestic long distance. International operators pay 32c per minute to terminate calls in Chile whereas operators pay only 2-3 c to originate calls in Chile.\textsuperscript{90} This termination rate captures for the Chilean access provider a part of the substantial remaining rents in the settlement rate.

The European Union is moving to replace settlement rates for intra-region calls for a system of call termination charges starting in January 1, 1998. Central America has traditionally functioned on a sender keeps all basis, but this may have to evolve to a system of access charges following the asymmetric restructuring these countries are following. Otherwise international

\begin{footnotesize}
\begin{itemize}
  \item \textsuperscript{88} The legislation calls for very light regulation and procedures to reduce the price of network components to incremental cost.
  \item \textsuperscript{89} Conversation with Ken Stanley at the FCC, August 5, 1997.
  \item \textsuperscript{90} Before the ECO rules were introduced, ENTEL Chile was allowed to purchase America Tel in Miami applying an ad hoc procedure. For the FCC to allow it to become a private line provider it now has to satisfy ECO. This is of direct interest to the area as America Tel recently purchased Telepuertos, a provider of international business services in several of the Central American countries.
\end{itemize}
\end{footnotesize}
traffic would tend to land in the most liberal country and be transported from there to the other countries.91

The next three sections consider some elements in the restructuring efforts under way in Central America. They are organized in three groups: (a) Nicaragua and Honduras have been trying to implement for some years a rather traditional model of privatization. (b) In contrast, El Salvador and especially Guatemala have introduced the most liberal telecommunications of Latin America. (c) Costa Rica has been trying to reorganize ICE and introduce competition very slowly.

VII. TRADITIONAL PRIVATIZATION IN CENTRAL AMERICA

This section considers the two countries - Nicaragua and Honduras - that are inclining themselves for a restructure cum privatization fitting the standard model described in section V.92

In each case we will start with the special country circumstances which make this model appropriate and some elements of the regulatory framework and possible concession contract and discuss the way in which they fit together.

(A) NICARAGUA

The privatization of the telecommunications sector in Nicaragua has been strongly related to early efforts of the Chamorro administration to solve the property problem inherited from over ten years of Sandinista rule. Of the confiscated properties, some could be given back to their rightful owners without too much trouble.93 The return of a second group of properties, expropriated at the end of the Sandinista period, and therefore known as la piñata, would have resulted in escalated confrontation with Sandinistas so the government decided instead to compensate the owners with government bonds.

The phone company, TELCOR, would be sold in order to create a fund that would guarantee these compensation bonds according to a system created in October of 1992. For this purpose, a privatization committee was created in early 1993, the regulatory functions of TELCOR were separated from its operational functions, and in early 1994 the productive assets were transferred to a new company called ENITEL and an initial set of buyers was prequalified. Shortly afterwards, however, legislation was approved by Congress which required a specific law for each privatization, and an additional law creating the agency that would regulate the industry. The ensuing negotiation to pass such laws for telecommunications retarded the whole process for almost two years and, as we shall see below, established a set of conditions and restrictions for the privatization which made a successful transaction difficult if not impossible.

91 There is an interesting contrast with a free trade area. In that case, since external tariffs are not equalized, intra-regional trade is only liberalized for goods produced in the region. In the case of telecommunications, it is not possible to distinguish the regional traffic from the extra-regional traffic, so the access charge (frontier barrier) would have to be applied to all traffic. As in trade, the barrier becomes more important the better the condition and the greater the capacity of the transport link (road in the case of trade and microwave or fiber optic in the case of telecommunications).

92 Nicaragua has actually been ready for privatization twice. Once in 1994, and a second time in 1996. In the second year, the initial date for the receipt of bids was June 6, but it was postponed three times: to July 27, October 3 and March 31, 1997. According to some opinions there were fewer takers over time.

93 Up to December 1992 the government had been able to return 161 firms (out of 351 identified) to their former owners.
It was not until December 1995 that these laws were finally approved. The regulatory framework classified telecommunications services into five different groups: (a) public interest services, including basic telephony, which required a concession and which had to be available under rates approved by TELCOR, (b) general interest services, like cellular service and data transmission, which required a license, and which had to be available at rates that could be regulated by TELCOR, (c) special interest services, like beepers and trunking, which were offered to limited number of clients and which required a license, (d) services of particular interest, which are built for own use and generally cannot be connected to the switched network and (e) deregulated services.\(^{94}\)

The privatization law established that ENITEL would have a four year exclusivity for all telephone services, and could exploit the cellular B license at the national level. The price of monopoly services would be regulated using caps. These services were grouped into five categories for the application of the price caps: residential use (national and international), residential access (installation and fixed monthly), non residential use, non residential access and telex. This grouping substantially limits rebalancing. It is similar to that utilized in Venezuela, in that access and use are kept separate, but differs in that rebalancing between user categories is prevented by putting them in separate baskets. Apart from an efficiency factor\(^ {x}\) which is taken to be 2\%, there was an allowance for exogenous cost factors,\(^ {95}\) and a maximum increment for any one service of 25\%.\(^ {96}\)

Interconnection conditions between networks were left to free negotiation between the interested parties, but TELCOR was directed to decide the terms of the interconnection using competitive rates, if no agreement was reached within 90 days.\(^ {97}\) Operators were also obligated to file all interconnection contracts with TELCOR.\(^ {98}\)

The law and concession contract also specified a number of very detailed obligations for ENITEL in terms of expansion, quality of service, and treatment of labour. Table 18 shows the expansion targets.\(^ {99}\)

Attaining the growth in density would have required installing over 140,000 lines in three years, a compound growth rate of about 23\%, which was optimistic, but achieving a density of 10 by 1999, only one year later, seemed unattainable. Furthermore, this target seemed unnecessary considering that maximum waiting periods were specified for both Managua and the rest of the country.\(^ {100}\) Interestingly, if the concession holder did not provide the required rural service within 2 years TELCOR could authorize other entities to provide this service.

\(^{94}\) TELCOR had an important degree of discretion in reclassifying services, unlike OFTEL, in Britain, that could do so only with the approval of the Monopolies and Mergers Commission.

\(^{95}\) It is not clear whether changes in settlements would be considered in the price cap.

\(^{96}\) Since there had been no tariff adjustments since 1994, four adjustments of 8\% were permitted during the first two years of the concession independent of the operation of the caps. The concession contract allowed for a revision of the caps after two years, and every three years after expiration of the exclusivity period.

\(^{97}\) This is a typical interconnection clause for a traditional privatization. In the case of Nicaragua, this obligation is part of the concession contract, where it takes a somewhat different interpretation: the interconnection charges can include, if TELCOR considers it fit, an appropriate contribution to the costs of offering and maintaining telephone services, in so far as these costs are not covered by user rate. Such clauses can also be found in Bolivia and Peru and give the regulator considerable discretion.

\(^{98}\) Additionally TELCOR had to see that there are no cross subsidies or abuses of market power by dominant firms.

\(^{99}\) The dates assume that the effective date is December 1995.

\(^{100}\) It is likely that the congressmen included the quantitative target fearing that TELCOR may have difficulty monitoring the limits on waiting period. However, it remains that a density of 10 in 1998 is excessive and may have responded to groups that were interested in preventing the privatization from occurring.
Curiously, almost all quality targets were established for the last year of the exclusivity period (1999): failure rate of less than 5%, repair within 48 hours of 90%, dial tone within 4 seconds of 95% and call completion of 60%. Apart from the failure rate target, the other quality targets were not very tough at all, which is curious considering that Nicaragua had already at time achieved a very high level of digitalization.

Regarding labour, ENITEL would not be allowed to fire workers or prevent their unionization. Workers would have to be guaranteed a job in their present or similar position and would be allowed to buy up to 10% of the shares of the company at the adjusted book value and to receive 1% of the shares for free. These rather strong labour concessions were possibly a result of the complete control of the union by the Sandinistas.

The buyer would bid for 40% of the shares, with 57% of voting power, and it would enter into a management agreement with the company. The government would initially retain 49% of the shares and could sell more shares, not exceeding another 10%, to give further support to the bonds.

If the company had been valued at $2,500 per line, the average for the privatizations discussed in section V, the value of the company would have been $270 m and the equity would have been worth $135 millions, 40% of this would have been worth $54 million, representing % of the face value of the piñata bonds outstanding.

Whether ENITEL was actually worth this amount can only be judged through a valuation of the company, which is beyond the scope of this paper. Amongst the favourable factors, were the early rebalancing of tariffs, the relatively low quality targets, and the management fee. The negative factors, include the labour problem, over optimistic expansion plans and considerable discretion on the part of the regulator, which could increase the risk perceived by the investor.

The labour problem had several dimensions. To begin with, Nicaragua had the lowest labour productivity in Central America, less than one sixth of the internationally acceptable level. Even if it possible were to achieve line growth of 23% per annum to 1998, this would only achieve one third of the international benchmark if no workers were fired. Furthermore, the inflexibility of the

---

101 See Table 4 in Section II. This was the result of a tariff rebalancing implemented in 1994 as preparation for the sale that was planned for that year, which reduced the connection rate, and more than tripled the monthly rate and increased the rate for local use by almost 50% to 1.5 US$ cents per minute.
work force, because of the Sandinista dominated union, meant that the company would probably have to hire workers to fill critical positions.

The possible lack of consistency of the Nicaraguan privatization package can easily be explained by almost two years of negotiation to approve the required laws. Clearly, during this period, there was a greater possibility for various stakeholders to introduce their modifications than in the average privatization. Illustrative of the type of bargaining that occurred of this was the fact that the final law specified that $2.5 million would be taken from the privatization proceeds for the pensions of telecom workers and $1.5 millions would be used to build a new building for congress. Of the remainder 80% would guarantee the principal of the piñata bonds, while the remaining 20% would go to a housing fund.

The team of President Aleman has shown some support for the privatization ENITEL, although there have been pre-election declarations indicating that the funds would no longer be utilized to guarantee the piñata bonds. Moreover, President Aleman has demanded that all, but the very small properties expropriated by the Sandinistas be returned. On the other hand present management of ENITEL has doubts about the consistency of the privatization objectives, and is presently revising the whole process.102

(b) Honduras

Honduras shares many of the characteristics which have made the traditional Latin American model of privatization attractive. It had very low penetration, fairly low tariffs and high inefficiency (low productivity and fill factors).

Although some studies to evaluate privatization strategy were done as early as 199, it proved impossible to pass legislation that would allow the sale of the company, partly due to strong union opposition. In November of 1995, however, a new telecommunications law was approved, which deregulated some activities and allowed for later privatization.

The telecommunications law distinguishes between facilities and most final services, which require concessions, and other services, which require licenses or registration. The former can be offered in conditions of temporary exclusivity, the language usually adopted in this type of law. The law is rather open, leaving many things to the secondary legislation and the concession contract.

The proposed secondary legislation, however, leaves many of these gaps unfilled. It distinguishes between facilities, basic services, complementary services (data) and value added services. Operation of facilities and basic services requires a concession, while complementary services require a permit and value added services only need to be registered. Concessions can in some cases be given under conditions of temporary exclusivity. These various authorizations are required before applying for any spectrum that the service may require. Spectrum is allocated according to a plan prepared by the Regulatory Commission and its auctioning (with predetermined use) is contemplated at least in the case of permits.

102 The company’s management has been preoccupied about not having an independent investment banker. So far Price Waterhouse, has handled the strategic, regulatory and investment banking functions, depriving the authorities of three separate independent positions and an understanding of the crucial tradeoffs on which to base their decisions.
Recently, a law was approved which authorized the government to capitalize the company, following a variation of the approach applied successfully in Bolivia, where the government would retain its share of the telecommunications firm, in order to protect the fiscal benefits of the transaction.

Evidently many details are only specified in the concession contract, which will only be available in a few months. However, the studies by the consortium of advisors (Rothschild, Squire & Demense and Peat Marwick) suggest the following elements. The strategic investors will be invited to bid for 47% of Honducom, a company which will receive the assets of Hondutel. This share will give the investor control of the board. The workers will be entitled to 2%, and the government’s 51% will, unlike Bolivia, stay in the hands of the government.

The operator will enjoy an eight year monopoly for several final services (local, domestic long distance and international long distance), and it would appear that further entry into cellular and eventually PCS will be up to CONATEL. All service providers have to obtain facilities from the monopoly operator provided that it is able to deliver these in appropriate conditions of quality and price. This conditional exclusivity on facilities seems particularly appropriate considering the poor quality of dedicated lines in the area.

It is not clear how tariffs will be regulated in the concession contract. However, the financial projections utilize the rates shown in Table 19.

### Table 19

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>2000</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installation</strong></td>
<td>36.3</td>
<td>36.3</td>
<td>36.3</td>
</tr>
<tr>
<td><strong>Fixed Monthly Fee</strong></td>
<td>2.2</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Local traffic (c/minute)</strong></td>
<td>2.58</td>
<td>2.91</td>
<td>3.55</td>
</tr>
<tr>
<td><strong>Free minutes</strong></td>
<td>300</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td><strong>Domestic LD (c/minute)</strong></td>
<td>14.5</td>
<td>11.4</td>
<td>6.1</td>
</tr>
<tr>
<td><strong>International Central America ($)</strong></td>
<td>0.65</td>
<td>0.43</td>
<td>0.29</td>
</tr>
<tr>
<td><strong>International US ($)</strong></td>
<td>1.4</td>
<td>0.59</td>
<td>0.5</td>
</tr>
</tbody>
</table>

The rate strategy is essentially to increase the local rate per minute from 2.58 to 3.55 US cents and to reduce the number of free minutes from 300 to 50. This allows the rate to the United States to fall from $1.4 to 60 cents by 2000 and to 50 cents by 2005. Depending on the evolution of competition the decline in the international rate may actually be much stronger.

103 In the case of Costa Rica, no such clause has been considered and in the various law projects that have been considered, ICE keeps the monopoly of facilities in an unconditional fashion.
104 This is a variation of the traditional privatization which reduces the risk that the incumbent monopoly will completely obstruct the development of competitive activities.
105 If the actual tariffs are supposed to follow the table, it would be equivalent to the system utilized effectively in the case of Peru.
106 The initial tariffs already include the adjustment of June 1997 which increased the rate for local use 35% and reduced the number of free minutes from 450 to 300.
107 Furthermore, in so far as the FCC is able to push US operators to negotiate settlement rates below the new benchmarks, settlement revenues may be under those calculated in the study. Recall, however, that Honduras, as a low income country has 4 years starting January 1, 1998 to achieve a target of 23.1 US cents.
The expansion targets were initially set at 12 phones per 100 population or 750,000 lines by 2,004. This translates into a compound annual growth rate of 16.5% over the next nine years, and would amount to eliminating the waiting list of 229,000 and then have a growth rate of 7.5%. Recently, the target was revised to 600,000 by year 2,004, which would amount to eliminating the waiting list and then growing at about 5%.

The targets do not appear to be excessive because the subscription rates are kept very low, and use high use rates instead. This has the effect of stimulating access demand, and may actually connect users with exceedingly low consumption. It may also impair efficiency by limiting consumption of high income users, which could be avoided by introducing a tariff menu like the one that has recently been implemented in Guatemala. The line expansion targets are distributed around the country and cannot be concentrated in Tegucigalpa and San Pedro Sula alone, in order to make sure that the temporary rents get partly invested in rural telephony.

It is not likely that capitalization will occur before the change of government and even then some further adjustment to the strategy is likely.

VIII. PRIVATIZATION AND DEREGULATION

This section considers the extremely liberal models of privatization and deregulation being implemented in El Salvador and Guatemala. We also discuss why the designers of these reforms consider that there really is no tradeoff between efficiency and coverage, and that the way to achieve both is precisely by making competition possible.

(a) El Salvador

The restructuring of the telecommunications sector in El Salvador is part of a broad program of economic modernization implemented by the administration of President Calderon Sol, which took its free market character and a great deal of impetus under the leadership of Alfredo Mena Lagos beginning in the second half of 1995.

The Modernization program proposed by Mena Lagos had four parts: (a) Decentralization, including the restructuring of 260 municipalities into 80 viable ones to be financed in part by a land tax; (b) Reduction of bureaucracy through the elimination of unnecessary ministries; (c) deregulation, in particular of electricity and telecommunications; (d) Privatization of several sector with the sole purpose of achieving efficiency, and the creation of a private pension system.

Unlike Nicaragua and Hondurs, the fiscal situation was rather favourable so the government could afford to concentrate on efficiency as opposed to raising income. Section III showed, however, that El Salvador was in an enviable position to raise funds through a privatization, considering that it had received net settlement from the US alone of over $75 million per year. The authorities, however, placed a strong priority on efficiency.

108 Part of this expansion will be taken care of by the remainder of the Siemens and AT&T expansion projects of 110,00 lines each which were contracted in 1994.
Following the advice of some prominent regulation economists, including Pablo Spiller and later Tom Hazlett, the government devised a restructure which would open the telecommunications sector to competition almost immediately, and deregulate all prices except the price of critical components. It was hoped that such a strategy would not only create incentives for cost reduction, but would also lead to impressive expansion of the sector.

The initial privatization initiative called for the separation of ANTEL, the wireline operator, into two separate vertically integrated companies, each of which could operate anywhere in the country. The assets of ANTEL would be split between the companies in such a way that adjacent central offices would belong to the two firms, forming a checker board pattern. Certain operating functions and billing would temporarily be performed by a third company.

The terms of interconnection between the two equal sized firms would be settled ex ante, possibly on the basis of average long run incremental cost, thus tackling the crucial weakness of competition in basic telecommunications networks, namely the refusal to grant interconnection voluntarily, and guaranteeing a minimum duopoly model of the industry. By internalizing the subscriber externality, and deregulating final prices, incentives for network expansion would be optimal.

According to the consultant, El Salvador could then leapfrog development in other countries by avoiding the private monopoly stage of the industry altogether, and its regulator could, in turn, cut out an entire phase from the usual program, as recently described by the Economist:

*The life of a regulator has three phases: first to be a lawyer, pushing for more competition and fighting constantly against the incumbent monopoly; second to be an accountant, monitoring that nobody cheats, once competitors have entered the market; third, to disappear once antitrust laws and the courts take over*” The Economist, March 23, 1996

In the case of a telecom privatization, however, the regulator’s life typically begins as a sector reformer trying to attract first class firms to the country to invest a great deal of money into largely sunk assets. In the case of a less developed country, as was argued in section V, this may be difficult. The privatization team is in close contact with the investment bankers who often have an influence on sector structure and rules and sometimes even report on how much certain clause of the law or the concession contract will cost the government.

It is not clear why and exactly when the two firm privatization strategy was dropped. By September, however, a brand new Telecommunications Law had been approved, perhaps the most liberal one in Latin America, borrowing extensively from the US Telecommunications Act of 1996.

---

109 According to Spiller the tendency of operators to integrate vertically shows that economies of scope are present, and suggests that competition between vertically integrated suppliers is the appropriate model.

110 Alternatively the terms of interconnection could be left to negotiation between the parties. However, the interconnection rate may well become an instrument for collusion. Rey, Laffont & Tirole (1997), who have criticized the head to head visions of network competition for lack of a conceptual framework, have found, predictably, that in a simple duopoly model prices increase with the reciprocal interconnection rate which therefore becomes an instrument for tacit collusion.

111 Such mistakes clearly have a cost for the bankers as they most often receive a substantial success fee.

112 According to the Commission on Modernization, only four firms showed showed interest in the transaction, so running two sales would leave them with too few bidders.
The remainder of this section explains some elements of this law, and some points that should be observed in its implementation. Overall, the telecommunications law seems extremely liberal, but one encounters a series of clauses which make it difficult to know for sure how it will be applied. This may be clarified by the secondary legislation which has yet to be approved by the President.

The pro-competitive themes in the law are very simple: the elimination of barriers to entry and the deregulation of all prices. To eliminate entry barriers, the system will guarantee that access to the spectrum and interconnection will be made available to entrants subject to the following conditions: (a) the regulator is obligated to award spectrum that is not contested and to auction off the contested parts, within tight time limits. From the time of application the process should last no more than 81 days (or 101 with extensions). To protect the income that can be obtained from the spectrum, and taking into consideration the limited experience of the regulator with spectrum auctions, concessions will last only 20 years. (b) Interconnection is obligatory, but its conditions will be left to negotiation between the interested parties. Only in case of disagreement, will an expert be called in to determine the forward looking long run incremental cost of an efficient firm. SIGET will price interconnection at the party’s final offer that comes closest to the expert’s opinion. (c) Critical resources, other than interconnection, and including signaling, billing information and number portability, also have to be offered, and subject to the same procedures. (d) The access provider is also obligated to provide network elements on an unbundled basis, including loops, gateways, switching at all levels, billing and registry, at prices reflecting incremental cost as above, and subject to the same negotiation conditions.

The access provider thus has two incentives to negotiate interconnection rapidly and in good faith. On the one hand, if one could identify the real incremental cost and one could assume that the outside expert was to reach that level, the access provider would want to make sure that he is not forced to interconnect at less than that cost. Second, the law contemplates that access prices will be deregulated only for carriers that have no pending interconnection cases.

The regulator’s life also appears to skip the accountant stage, as any calculations surrounding interconnection disputes would be made by outside experts. The regulator is only required to keep lists of specialized firms and offer a choice of three to the parties in dispute, each of which can delete one name. Though the regulator will not be the accountant, it will be picking the possible accountants, and it is not clear, whether that makes such a big difference in terms of discretion. In either case it would need to understand the concepts and measurement methodologies involved.

---

113 Traditionally the main impediment to competition is the incumbent’s control of access to the customer. The telecommunications law distinguishes between access providers, which control access to the customer, and all other operators, called intermediate providers.
114 SIGET decides how it wants to fragment the spectrum horizontal and vertically. There is a presumption that breaking it up increases its value.
115 Obligating the incumbent to unbundle network elements, facilitates entry, and allows for more efficient network investment decisions by entrants.
116 Recall that the rate is set at the final offer of the contesting operators that comes closest to the estimate of the outside expert.
117 In the United States, the incentive for access providers not to have pending interconnection cases under the 1996 Telecommunications Act is to be allowed to offer long distance service. In El Salvador, as we shall see below, the access price is capped in real terms for existing customers, even when no interconnection cases are pending.
The US experience gives an idea of some of the difficulties. Since the Telecommunications Act of 1996 directs the regulator to set the interconnection rate in case negotiations fail, the FCC has conducted a detailed study.\textsuperscript{118}

The cost models preferred by the FCC have been based on an efficient network for the topological conditions of a given area being analyzed.\textsuperscript{119} The cost concept utilized was \textit{forward looking economic costs}, which were defined as, the costs that would be incurred if a new element or service were provided, or that could be avoided if an existing element or service were not provided, assuming that all input choices of the firm can be freely varied.\textsuperscript{120} The models are typically built \textit{from the bottom up} in the sense that they consider all the investments that are required to offer the service in a certain area.\textsuperscript{121} To calculate operational cost they usually employ ratios of these costs to investment costs.

The costs so calculated need not equal the costs of any \textit{real network}, and in fact, may tend to underestimate them for three reasons: (a) they do not include imbedded costs; (b) they can omit or underestimate indirect investment costs; (c) the indirect operating costs may be underestimated by the ARMIS ratios.\textsuperscript{122,123} All three points are a disadvantage if the purpose of the exercise were, as in the traditional regulatory contract, to allow the firm to recover all \textit{costs prudently incurred}. For the purpose of efficiently directing investment in network development and, in particular, choosing between renting or making unbundled network elements, only the latter two points have any significance.

The FCC has shown a preference for indicators following the latter philosophy and will pick cost figures calculated on that basis.\textsuperscript{124} Though the law in El Salvador only directs the regulator to prepare the list of possible consultants, this choice can have rather dramatic implications. This can be illustrated by using the calculations of the incremental cost of loops in the United States. While the local carriers’ consultants, like Strategic Policy Research, find loop TELRICs of $24.56 per month using a \textit{top down} econometric analysis of real firms cost figures, the consultants for the long distance companies, like Hatfield, obtain a cost of $13.84 using a \textit{bottom up} approach like the one described above.\textsuperscript{125}

Calculation of incremental costs in El Salvador may avoid an important part of this discrepancy as embedded costs of the existing network are not really relevant for a privatization, but may find other important difficulties. To calculate annual investment costs starting from the

\textsuperscript{118} Atkinson, et al (1997). OFTEL in Britain has also taken an interest in carefully examining alternative methodologies, and according to the consultants of the RBOCs in the US, they have been more sensitive to \textit{real costs generated by real companies}.

\textsuperscript{119} The starting point for incremental cost measurement were computer models of the telephone network built in order to identify high cost serving areas and distribute universal service support more equitably between companies.

\textsuperscript{120} Atkinson, et al (1997), page 4. When quasi fixed costs are added to the element long run incremental costs ELRIC, one gets the well known total element long run incremental cost TELRIC.

\textsuperscript{121} Even the calculation of investment costs are very difficult as they depend on fill factors and percentages of sharing of structures. Atkinson (1997) pag 6.

\textsuperscript{122} ARMIS Automated Record Management Information Systems are statistics for the operators, which allow for the calculation of the ratio between different categories of operational cost and investment costs. Using them, the model builder can infer operating cost from the investment cost of constructing a \textit{green field project} for which operating costs are obviously not available.

\textsuperscript{123} It is also surprising that given the enormous progress in wireless and broadband access, the estimates are calculated for a traditional phone network.

\textsuperscript{124} The FCC Interconnection Order is currently stayed by the 8th District Court.

\textsuperscript{125} The FCC’s preferred figure is of $14.32 per month, for loops and a range of $0.002-$0.004 per minute for local switching.
figures for equipment and plant investments, a depreciation rate and a cost of capital are required. There is considerable room for argument on both: the depreciation rate could be increased arguing rapid technological obsolescence while a high cost of capital would follow from high country risk.\footnote{Different assessments about the life of the assets and therefore the depreciation rates, are entirely possible given the rapid technological progress in telecommunications and the introduction of new access modes like PCS.}

The above difficulties are related to the interpretation of the law, but not its spirit. We now turn to sections of the law which may make its practical implementation a lot less pro-competitive than one might think from the above discussion. First, although the careful regulation of interconnection and the unbundling of network elements should allow the deregulation of final prices, the law caps the real price of access for existing users in the first two years.\footnote{Some have expressed the opinion that the deregulation after year two is unconstitutional. We have no way of judging this.} Second, although the interconnection regime described above is extremely pro-competitive, Article 105 of the Law defines interconnection rates for the first two years which are way above the levels suggested by \textit{bottom up} models in the US (in parenthesis) US$ 1.1 cents for switches (versus 0.2-0.4 cents in the US), US$ 1.7 cents for tandem switches (versus 0.15 cents in the US) and US$ 20 cents for international switches. Third, it is specified that these interconnection rates \textit{do not include direct interconnection costs like “puertos y enlaces”}.\footnote{This, in fact, defines a more traditional access pricing regime like the one that existed in the United States before the Telecommunications Act of 1996, and which continues to exist today.} This phrase actually allows for charging even higher interconnection rates.\footnote{Such an interconnection rates including cross subsidies from other services would be called an \textit{access rate} in the US. There is clearly ample room for confusion with the Salvadoran \textit{access rate} which refers to the basic monthly fee a user pays to be connected to the network.}

This interconnection regime allows access providers to keep at least part of the income that currently flows to ANTEL from international settlements. Since the beneficiaries of US billed calls are rather widely distributed in the country, this could encourage network expansion in many areas, whether by ANTEL or by new entrants.\footnote{EMETEL, a newly formed telecommunications company, is planning to establish a network in the Northern part of the country, starting in Metapan, a town with a large line deficit, that sustains an important volume of calls with Boston, the main destination of that town’s emigrants.} Other regions would have to depend on universal service funds created by the government out of general tax revenue.

The deregulation of access rates should have the same effect: the law calls for immediate deregulation of access prices for new users and deregulation after two years for existing users. The idea of this appears to be to encourage expansion, by allowing the operator to charge new users rates which will cover incremental costs, while preventing rate shock for existing users.\footnote{Article 37 prevents the operator from disconnecting existing users for reasons other than non payment of service for two or more months.} However, since the operator is obligated to unbundle loops at incremental cost, the access price for new users is indirectly regulated, and the fear of having the access rate established below incremental cost, through an incorrect measurement following a dispute, may brake expansion.

Even the unbundling of existing loops, could be onerous for the operator. The initial residential access charge of $6 is surely under the incremental cost of some users, and probably under the average incremental cost.\footnote{Pablo Spiller, the government’s principal advisor in designing the regulatory framework, had suggested increasing the residential rate to $8, which may still be low compared to average incremental cost.} Under existing uniform pricing, the operator has little risk that another firm will request unbundling of its more expensive loops, since, under a properly
calibrated application of the cost model to the conditions of those loops, their incremental cost will be higher than the price charged by the access provider and reselling those loops will not be profitable. Under existing uniform pricing the operator is exposed to another operator unbundling its cheaper loops as here the rate of $6 may well be above incremental cost.\textsuperscript{133} There is therefore an incentive to rebalance the access charges for existing users within the cap.\textsuperscript{134}

**Implementation:**

In preparation for the introduction of the new law, ANTEL adjusted its tariffs substantially in August of 1996. The basic monthly fee was doubled to $6.02 for residential subscribers and to $12.05 for businesses. The local rate per minute was more than doubled to US$ 1.80 cents and the rate to the United States was reduced to $0.80.

The current strategy of the Salvadorean government is to sell the assets of ANTEL and include a PCS band.\textsuperscript{135} The strategic investor will bid to purchase 51\% of the company in the usual way,\textsuperscript{136} while workers can use their indemnizations to purchase up to 10\% at adjusted replacement value. All workers will be rehired, but with a contract for only one year.

According to the telecommunications law, the regulator, SIGET, had to attend spectrum applications and resolve interconnection disputes very rapidly, after an adjustment period of six months, which ran out last March. Regarding spectrum, SIGET got involved in a fight with the President surrounding the definition of official spectrum which ended with the dismissal of regulator Orlando de Sola. The resolution of other spectrum cases would appear to be very delayed.

ANTEL is currently trying to negotiate interconnection agreements with the various applicants. Although we have not documented the actions of SIGET on this regard, ANTEL officials have indicated that they hope to complete such agreements with most of the interested parties, specially long distance carriers.\textsuperscript{137} The incentives for these parties to enter negotiations are mixed. While they could try to obtain unbundled network access through the dispute provisions of the law at incremental cost by fighting ENTEL, they could also lose the opportunity of getting interconnection rates which are higher than incremental cost, but lower than the interconnection rates established in the law plus the cost of \textit{enlaces y puertos}, which may be set in the secondary legislation.

There are four other issues which have not defined and which may be handled in the secondary legislation. The first refers to the place of interconnection. Although the law calls for interconnection at all technically feasible points, this leaves the incumbent with few incentives to design its network in order to make interconnection technically feasible. Second, there is no way of proving whether interconnection is technically feasible; in the US the incumbent must prove the claim that interconnection is not technically feasible and permit external verification. The third, has to do with the quality of interconnection, which in practice is much more important than

\textsuperscript{133} Is must be indicated that in the US there has been extremely little unbundling of loops. SNET is provisiong loops for AT&T in Connecticut, and Ameritech in Illinois

\textsuperscript{134} This will depend on how the pricing cap is defined in the secondary legislation (\textit{reglamento}).

\textsuperscript{135} The cellular B band would be auctioned separately, and would be in a position, together with the A band to compete with ANTEL.

\textsuperscript{136} First price sealed bid auction.

\textsuperscript{137} The auction of the multicarrier codes was conducted on schedule and presumably all firms that hope to be offering long distance service have already requested interconnection.
the price. Fourth, quality of service is not regulated at all, because the designers of the law felt that if one network was not offering an appropriate quality another one would do so. This, of course, is not true, as the competing carrier, will most likely offer service by unbundling the network and cannot improve the quality of the existing network.

(b) Guatemala

As in El Salvador, the privatization of GUATEL is part of a broad program of modernization which includes the restructuring and privatization of sectors like electricity, railroads and social security.

Guatemala differs from El Salvador in many regards. It is much larger, with a much lower population density, lower penetration and greater concentration of service in the cities. More importantly, Guatemala has a structural fiscal problem in that revenue is insufficient to finance the normal spending and investment activities of the state. The inclusion of the GUATEL privatization as extraordinary income in the 1997 budget was supposed to signal to the private sector the determination of the administration to restructure the state to be able to initiate a broad discussion of fiscal issues, including measures to enhance revenues.

The restructuring of the Guatemalan telecommunications sector has been very similar to that in El Salvador, except that in Guatemala the separation of the telecommunications firm in a checker board pattern was apparently never considered. The telecommunications law was written by the same consultants as in El Salvador, although a careful reading reveals some interesting differences.

First, final rates are completely deregulated. Second, spectrum concessions are for only 15 years, allowing for more frequent reaction. Third, the regulator can stop receiving interconnection cases for 80 days if it is overburdened, avoiding a loss of continuity, and possible loss of credibility when such a situation arises. Fourth, though the resolution mechanism for interconnection disputes is similar to that in El Salvador, is it more favourable to the access carrier who chooses three experts from the list kept by the regulator, and the interconnecting carrier then selects the firm that will do the study. Fifth, the regulator will not interfere with public spectrum. Sixth, the unbundling obligation is for only three years, compared to four in El Salvador. Seven, no interconnection rates are fixed. Eight, there is no secondary legislation.

Implementation:

In preparation for privatization, and the implementation of this law, the regulator had to find a way of rebalancing rates rapidly, as international revenue represented 68% of the total, and local rates were the lowest in Central America.\(^\text{138}\) This was done in a rather innovative fashion, by introducing in February of this year a local rate of 3.2 US$ cents per minute with no free minutes and no basic monthly payment, while reducing the rate to the US from $1.54 per minute to $0.60 per minute. These tariffs were more recently replaced by a tariff menu for local use, seeking to maintain access demand by low valuation customers by continuing to offer the previous tariff, but offering higher valuation customers lower use rates in exchange for a higher fixed monthly fee.

\(^{138}\) The basic monthly rate of residential subscribers was only $0.70, and $2.1 for businesses.
The regulator has had trouble in keeping up with the spectrum allocation periods. On the first day alone it received 494 applications and it now has accumulated 8000 applications. It has only approved two of these: a satellite frequency for Iridium which was not contested and 20 properties which were awarded using a multi-round auction.

Before privatization, GUATEL is advancing a number of projects. First, it is developing wireless loops, investing about $75 million in the first phase alone. Second it is developing a fiber optic connection to Mexico and two fiber rings in Guatemala city. Third, it is receiving advice from Belcore on customer service, network intelligence, and the development of the above mentioned wireless loop and fiber projects.

Since a law specifically authorizing the privatization of GUATEL would have required 2/3 of the congressional votes, the sale will be done under the Law of Public Contracts. The international operator will buy between 51% and 95% of the shares depending on the bids, while 5% will be available to workers who will all be fired and receive redundancy payment.

Between June 2 and June 17, the Superintendencia de Telecomunicaciones, ST, conducted a multi-round, multi-property spectrum auction, one of the first auctions of this type outside the United States. The authorities believe that there is a perfect fit between the desire to enhance sector efficiency and allocating spectrum by auction. Furthermore since 20 properties were being sold, 8 of 1 MhzX2 and 12 of 200 KhzX2, it was felt that the FCC model of a simultaneous multi-round auction would best promote this objective.

---

139 As in El Salvador it had a grace period of 6 months for actions on spectrum.
140 In the United States the first three spectrum auctions raised over $7 billion, and at the same time replaced the system of lotteries.
141 In such a design the information revealing advantage of the multiple rounds presumably compensates the incentive for collusion.
Eleven bidders participated in the auction with a total initial eligibility ratio (points of eligibility over total number of points) of 3.63. Figure 8 shows the level of activity, measured in terms of the points represented in new bids, and the aggregate value of highest bids for each round of the auction. It can be seen that the maximum activity occurred during the first 10 rounds, and that after that round there are no more than two bids per round till round 25. Correspondingly the total value bid shows its maximum increase during these first ten rounds, and was caused mainly by the bids of GUATEL and Alitel.

In the closing offers one would expect equivalent properties to have the same price and that a bidder which won more than one property would obtain adjacent ones, in order to exploit technical advantages. This did not happen in Guatemala, as GUATEL obtained properties C, E and S, thus preventing other companies from efficient aggregation (for cellular for instance). The correlation between initial eligibility and the spectrum awarded, which was observed by Crampton for the United States, was also not present in Guatemala. GUATEL with relatively low eligibility obtained a substantial portion of spectrum. Finally, after round 74 there was very little bidding with the exception of GUATEL which was seeking to bid up the price.

Although the auction was generally regarded by the participants as fair, they objected to the strategic behavior of GUATEL, which they claimed, wasn’t even interested in offering trunking services, the main application for the bands being auctioned. In the last round of the auction they even colluded amongst each other, leaving GUATEL alone bidding up the price.

The auction raised almost $3 million for a little over 20 Mhz of spectrum. This amounts to about $0.01 per Mhz-pop. The US narrowband auctions generated $3.1 per Mhz-pop (national) and $3.46 per Mhz-pop (regional) and the broadband auction generated $0.52 per Mhz-pop.\(^{142}\)

\(^{142}\) Panama generated $80 million for its cellular license, which compared to 2.66 million people amounts to $29.7/pop. Assuming the cellular band was 25 Mhz, this would correspond to over $1.00 per Mhz-pop.
Hopefully, future auctions will collect much greater revenue as 70% of it goes towards financing universal service and the remaining 30% feeds a capital fund to finance the Superintendencia.

As in El Salvador, the deadlines for interconnection agreements have been passed, and it has been said that the managers of GUATEL prefer that the new owners negotiate the interconnection agreements. The Superintendencia will clearly have to take action on this, if the pro-competitive intent of the legislation is to become effective.

IX. GRADUAL LIBERALIZATION:

Section II showed that the telecommunications sector of Costa Rica is the most developed in Central America, although it has many difficulties, which can increasingly brake its growth.\textsuperscript{143} Section V, on the other hand, showed that the country has a very serious long term fiscal problem, a situation which often encourages privatization and, in particular, sale of the telecom. This section discusses some of the problems facing the telecommunications sector in Costa Rica, and the difficulties that have been encountered in restructuring it.

The expansion of the network and the introduction of new services in Costa Rica has suffered from restrictions on the contracting ability of ICE, which as a public firm, is monitored by the Contraloría. ICE executives have complained repeatedly that the system of public procurement is outdated and the award of contracts is subject to endless complaints and revisions. This has affected not only the purchase of switches and the award of line expansion programs but the investment in the modernization of network: the ATM backbone for transmission and ISDN service.

Since lines somehow get laid, however, and the general public does not miss the more sophisticated services, there is strong public opposition against privatizing ICE. People are also concerned about the transparency and fairness of any such process, a suspicion which probably owes a lot to the unfortunate experience the country had with the introduction of cellular telephony in the late 80s.\textsuperscript{144}

According to the Constitution, the state is responsible for telecommunications and others services, which can, however be delegated to the private sector by Congress. Starting in 1987, COMCEL, a firm in which Millicom Inc was a shareholder, tried to establish itself as a cellular operator, by obtaining a frequency band allocation from the Radio Control Office. Subsequently, in 1988, when ICE invited bidding for a strategic partner to develop this service, COMCEL was the uncontested winner. Soon after, the Attorney General, upon the request of a left wing congressman, stated that wireless communications could not be offered by private parties except through a concession granted by Congress. Since this determination was not binding on ICE due to a legal technicality, it proceeded to interconnect COMCEL with the wireline network. The Board of ICE, however, voided the strategic alliance, leaving COMCEL as a private operator with allocated frequency band, and interconnected to the public network but without the right to operate a telecommunications service.\textsuperscript{145}

\textsuperscript{143} Costa Rica has an unusual situation in that ICE handles both telecommunications and electricity in a monopoly fashion, and that the former sector subsidizes the latter.

\textsuperscript{144} This draws on the Millicom case in Raventós (1997).

\textsuperscript{145} Millicom lawyers have argued that COMCEL operated under the radio law. However, this law contemplates private radio service, not switched service.
The company, however was able to survive for several years. On the one hand, it had received funding from the World Bank’s IFC, and in the process, to obtain OPIC insurance, had requested a letter from the Director General of Industry at the Economy Ministry. This letter stated that there were no restrictions that would impede firms like Millicom from installing themselves and developing cellular telephony. On the other, it kept close contacts with two different governments by seeking legal council from politicians associated with both parties.

The ICE unions, which were opposed to any private participation or liberalization of the sector, as a matter of principle, made it their business to close Milicom, and eventually succeeded when the Supreme Court gave the firm a period to regularize its affairs and eventually closed it down. In the process it received much public support. The firm has since sued the government of Costa Rica and ICE for $400 million in the US, a case that is still pending.

This case showed the weakness of the regulatory structure for telecommunications in Costa Rica. The important economic issues, here, were evidently the allocation of spectrum and the conditions of interconnection between ICE and the cellular operator, and not the possibility of having a private operator as such.

At the end of 1995 the government initiated a dialogue about the future of ICE and the reform of the telecommunications and electricity sectors. Knowledgeable of the popular opposition to privatization, the government veered the debate towards the liberalization of the sector and away from privatization. 146

The end result of this dialogue were three laws sent to the Congress designed to liberate ICE from some of the restrictions that had made its management very difficult, and gradually opening the sector up to competition. ICE would be allowed administrative and financial independence, and its actions would be reviewed by the Contraloria a posteriori. Contracting for less than $2 million would not require bidding and it would be allowed to offer concessions to other operators. Furthermore, it would start paying taxes and could distribute up to 25% of its profit in dividends. These actions would allow ICE to move faster in expansion and modernization of the network, and to reduce the cost of doing so. ICE-Telecom, like most telecommunications operators has low levels of debt and interesting cash flow generation which would have made such development entirely feasible. 147

A second bill sought to open the sector gradually over time. A concession for a second cellular band would be awarded within 18 months of the laws approval, though all telecommunications facilities would continue to be offered as a state monopoly till year 2002, as would the offering of international long distance service. 148

Although this strategy seemed exceedingly conservative at the time, considering the high level of sector development, it would allow the company to rebalance rates slowly, or, if rates were to be rebalanced more rapidly, as suggested by a consultant in a 1996 report, it would allow

---

146 Interestingly, reform of the pension sector had created much discontent and probably played a role in increasing the opposition to privatization of the ICE, in the same way as happened in Uruguay some years before. In Bolivia, in contrast, relatively early privatization of the telecom allowed the government to proceed with more sensitive areas like the privatization of part of the petroleum sector, and the reform of pensions.

147 The restructure plan also intended to stop de subsidies from telecommunications to electricity.

148 Concessions for national service would be given within two years of the new law. The unconditional restriction on facilities is specially serious considering many business people’s complaints about the unreliable service offered by RACSA.
substantial transfers to be made to the government. The more flexible monitoring of management in a public firm was an innovation for Costa Rica, which had not been tested, but which seemed exceedingly unattractive to many people in the wake of losses in the state owned banking system of over $100m related to investments in Venezuelan sovereign bonds, in transactions which were either fraudulent or at least enormously misguided. Although the idea of ex post accountability according to well specified objectives seems to have worked in New Zealand, there were strong feelings in some sectors against giving this kind of freedom to ICE.

It was only at the end of 1996 that a new finance minister tried to confront the national debt issue and called for the sale of state assets.\textsuperscript{149} Although some were hoping that this would make the laws presented to congress look moderate, it had the opposite effect. Instead of allowing bipartisan agreement to proceed with privatization with some degree of liberalization, it united groups in both parties, which had always shown opposition to such measures.\textsuperscript{150} The opportunity for political entrepreneurship within the party, and outside by former left wing politicians and even by former president Carazo and his son in Congress, led the president to declare that he had no intention of selling ICE, thus closing the debate. In the end, however, even the transition laws were discarded as a bipartisan bill was presented to entrench the government monopoly.

It would appear that no progress will be made on this till after the Februrary 1998 elections, and even then it will be difficult. Both candidates have shown opposition to the privatization of ICE. It appears likely, that reform will have to occur as a result of two kinds of pressures. If ICE continues to have difficulties in modernizing its network this will eventually impinge on the country’s ability to attract the kind of industries that it would like. Second, if there is an acceleration in the liberalization of international telecommunications, like the FCC would like to see, the regulator will be forced to rebalance rates, and support may tend to emerge for competition and the incorporation of private capital into certain activities.\textsuperscript{151}

The fiscal problem, however, remains, and it is possible to argue that the long term fiscal position could improve with the privatization of ICE-Telecom. In section V we argued that this would only be true if the lump sum payment received for the firm plus any taxes received from the privatized company exceeded the present value of the cash flows that the government would receive from the state firm. There are three reasons why this could be true. First, though ICE is relatively efficient compared to the Central American countries, it is rather inefficient compared to the best firms in Latin America. Furthermore, it will most likely fall behind as ever more diverse services are required. Second, it is not clear that ICE will be able to rebalance local rates, before the international revenue has actually dropped, since it is likely that the regulator will continue practicing residual pricing.\textsuperscript{152} Such aggressive rebalancing could in principle be

\textsuperscript{149} ICE privatization may have had a not inconsequential effect on the public debt, and other than the public banks, there were not many other assets that could have been sold.

\textsuperscript{150} Since the Constitution prohibits private monopolies, it would have been impossible to proceed with a Latin American style privatization. However, an intermediate strategy may have been followed of regional concessions, which would not have been considered monopolistic due to simultaneous existence of carriers with licenses which permitted them from offering wireless service in that area.

\textsuperscript{151} It is important to remember that ICE depends much less on international revenue, and has a much more balanced traffic pattern than the other countries of Central America. ICE reacted fairly early to the pressure from call back my making it illegal and by introducing volume discounts for large users. ICE recently introduced a rate to the US of $1.00 per minute for clients with monthly bills between $1,000 and $2,000, and a rate of $0.65 per minute for clients with bills above $2,000.

\textsuperscript{152} Recently it has started formalizing the pricing of local service on a residual basis by trying to increase the interconnection payments that the long distance division of ICE pays the local division.
established through a contract with a private firm.\textsuperscript{153} Third, a private operator is likely to expand and modernize faster than ICE as it is not likely that ICE will obtain the flexibility it requires.

X. CONCLUSIONS

In all the Central American countries there appears to be an understanding that technology and regulation are moving the industry towards competition, but the response has been very different. While Honduras and Nicaragua are privatizing their wireline operator using a fairly standard approach designed to exploit remaining market power in international telephony to soften tariff rebalancing and stimulate network expansion, Guatemala is proactively seeking to stimulate that competition, by trying to guarantee interconnection at forward looking incremental costs, hoping that deregulation of final prices will stimulate network expansion and that the income from spectrum auctions will support investment in unprofitable but socially important areas. El Salvador started with a framework similar to the one in Guatemala, but appears to be protecting some of the rents of international service for the facilities providers, through its incompletely defined access rate regime. In Costa Rica, the reform of the sector has not progressed. ICE will respond to competition, as it has done in the past, and the regulator is unlikely to stimulate competition itself.\textsuperscript{154}

There are at least three explanations for the different approaches to sector reform. First, except to Costa Rica, the reforms respond to different macroeconomic conditions. Nicaragua and Honduras are undertaking traditional style privatizations to improve the long term fiscal position. El Salvador and Guatemala have less serious fiscal conditions. Second, the reforms respond to different sector conditions. The countries adopting very liberal frameworks have conditions favouring competition. Guatemala has a large fiber network, which was built to carry cable TV, and data, but which is also capable of carrying voice. El Salvador has a very high population density which makes both wireline and wireless connections cheaper and therefore facilitates competition. Third, the reforms respond to different ideologies. The authorities in both Guatemala and El Salvador have embraced competition as a way of reducing the role of the state.

Though privatization relieves the government from its role as operator, the success of all these reforms clearly depends on how well the newly created regulatory institutions function. Traditional privatization puts fairly limited pressure on the regulator for the first years allowing it to train personnel and tackle increasingly complicated interconnection problems over time. The disadvantage, of course, is that the incumbent can entrench its monopoly position. The more liberal privatization frameworks try to avoid this by encouraging competitive pressure through rapid interconnection procedures and spectrum allocation, but putting strong pressure on the regulator. The danger in that case is that the inability of the regulator to respond may lead it to loose credibility, and that spectrum revenue can be sacrificed.

The very different approaches to reform will clearly transform regional cooperation in telecommunications. In the past this collaboration has been in three areas: joint negotiation of settlement rates with the United States, the development of regional trunks, like the 140 Mbs microwave link, and sharing of international satellite circuits to countries with little traffic, like Switzerland, using such links. In the future there is unlikely to be a position on settlements

\textsuperscript{153} In the mid 1980s the government entered into export contracts which have held up despite heavy criticism.

\textsuperscript{154} It is clear not whether the new settlement targets will be implemented exactly as envisioned in the FCC guidelines, as they may be fought in the US courts and the WTO. However, it is clear that settlement rates will continue declining.
accepted by all countries. While Guatemala may want to accelerate the reduction in the settlement rate the position of El Salvador will depend on how it completes the definition of its access regime. The other three countries clearly remain interested in sustaining settlement rates as high as possible.

Improvements in the regional trunk connections are needed with some urgency, for both regional traffic and to connect the region to the Columbus II submarine cable running between Cancun and West Palm Beach. These investment, however, would put greater and more immediate pressure on international revenue in Costa Rica, Honduras and Nicaragua, specially if Guatemala and El Salvador negotiate lower settlement rates. Since regional traffic operates on a sender keeps all basis there would be a tendency for traffic to land in Guatemala or El Salvador paying a low settlement rate and to be sent to the other three countries paying to further settlement rate.¹⁵⁵

There is great potential for cooperation at the regulatory level.¹⁵⁶ First, the negotiation of access rates for regional traffic, is crucial to sustain investment in regional facilities in the face of different approaches to international settlements. Second, the newly created regulatory institutions can share expertise and information on areas like cost and demand measurement. A clear understanding of costing methodologies can guide regulators in interconnection proceedings or at least help them identify the more suitable consulting firms.

¹⁵⁵ Tension on these issues is evident in the current paralysis of the regional optic fiber project.
¹⁵⁶ This is already materializing as the meetings of COMTELCA have recently been attended by both the manager of the state telecom and the telecom regulator.
BIBLIOGRAPHY


