



# REGULATION AND COMPETITION IN MOBILE TELEPHONY IN LATIN AMERICA

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Carlos Lapuerta<sup>1</sup> Juan Benavides<sup>2</sup> Sonia Jorge<sup>3</sup>

<sup>&</sup>lt;sup>1</sup> The Brattle Group <sup>2</sup> IDB

<sup>&</sup>lt;sup>3</sup> Consultant

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Carlos Lapuerta, The Brattle Group (London, UK) Juan Benavides, IDB (Washington, D.C.) Sonia Jorge, Independent Consultant<sup>4</sup>

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<sup>&</sup>lt;sup>4</sup> The conclusions put forward in this report are those of the authors, and do not necessarily reflect the views of the IDB, the OECD, or Members of these organizations.

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# **Executive Summary**

The history of fixed-line telephony in Latin America is generally one of low penetration, long waiting lists for obtaining new lines, and poor service quality. Within this context mobile telephony has played an important role. Mobile telephony has expanded rapidly in several countries, partly because mobile networks allow customers to avoid the waiting lists associated with new fixed lines. Mobile phone companies often operate efficiently because they tap the management expertise of specialized foreign investors, and because they operate in a competitive environment. Successful mobile telephony can also prompt the introduction of fixed-wireless service, which offers to increase penetration rapidly. The introduction of mobile telephony has been extremely beneficial for several Latin American countries. We briefly describe this background in Chapter 1.

Adopting appropriate regulatory policies can significantly enhance the success of mobile telephony in Latin American countries. We address three important questions of regulatory policy: access regulation, the participation of fixed-line local service operators in mobile telephone markets, and entry. We analyze these questions in light of the experience of three countries that we have chosen as case studies: Colombia, Bolivia, and the Dominican Republic (Chapter 2).

Mobile telephone companies must sign interconnection agreements with fixed-line local service companies, so that mobile users can communicate with customers on fixed-line networks. Some countries allow companies to negotiate such agreements voluntarily, and at most an industry regulator or the competition authorities will intervene if voluntary negotiations break down. Other countries mandate specific terms of interconnection and specific prices, leaving little to voluntary negotiations among companies.

In Chapter 3 we discuss the appropriate level of government intervention in interconnection agreements. We recommend against relying on voluntary negotiations. Existing fixed-line local service companies have strong incentives to insist on unreasonable terms, or to delay reaching agreement as much as possible. Experience indicates that the intervention of courts or regulators in interconnection disputes is far less effective than proactive regulation that seeks to avoid such disputes. Even if voluntary negotiations succeed, both experience and economic theory indicate that telephone companies have inappropriate incentives to agree to excessive call termination rates. Problems can also be anticipated in the negotiation of roaming agreements among companies.

We recommendation proactive regulation of access. We recognize that limits on the independence, authority or resources of regulators can affect their ability to regulate access effectively. We therefore recommend strengthening regulators, and adopting rules that can minimize interconnection disputes and promote the efficient development of mobile telephony without tasking the regulator excessively.

We propose regulating the terms of interconnection by reference to a model interconnection contract that incumbents would be obligated to offer, but which

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companies could voluntarily amend if desired. Regulators should require the publication of amendments, to reduce the scope for discrimination. The regulator should adopt the model contract pursuant to an open consultation process that asks market participants for their views concerning a sample interconnection contract proposed for the market in question.

Regulators should anticipate the need to intervene in interconnection disputes, which can arise as parties disagree on the interpretation of the model contract, or as one party alleges a breach of the contract by another. Regulators should get involved, but do not have to employ panels of experts full time in anticipation of such disputes. We suggest that the model contract stipulate a dispute resolution mechanism based on the rules of international commercial arbitration, where the regulator would sit as the head of the tribunal.

We recommend a requirement for interconnection fees to be no greater than the underlying costs of providing access. We acknowledge that detailed computer models can sometimes help measure the cost of service for particular networks or geographic areas. However, we identify several conditions that regulators should satisfy before relying on such models: a) having sufficient resources to implement such models successfully, b) committing to analyze rigorously in a consultation process the key inputs to the capital costs in the model: the cost of capital and average depreciation lives, c) committing to disclosure of the inputs, methodology and results to ensure maximum transparency. If the commitments cannot be met, we recommend the use of international comparisons to derive interconnection fees, supplemented by analyses of distinctive factors within the regulator's country.

To help regulate call termination charges with minimal intervention, we propose two ideas. Call termination charges could be tied to either the call-origination charges that each network charges to its customers for calls that cross networks, or to the "implicit" call-termination charges that each network charges for a call that terminates in the same network. We define an implicit call-termination charge as the difference between the total cost of an internal network call and the call-origination charge that the network imposes on customers who call other networks.

In Chapter 4 we discuss the appropriate participation of incumbent fixed-line operators in mobile telephone markets. Incumbent participation raises issues of discrimination and predatory pricing. An incumbent who competes in the mobile telephone market will have incentives to provide inferior interconnection service to its mobile phone rivals. An incumbent can also have incentives to use its market power in local phone service to subsidize mobile telephony, driving rivals from the mobile market. Predatory pricing and service discrimination are of particular concern because regulatory monitoring, prevention and punishment of such behavior is quite difficult. Limiting incumbents to local service markets would avoid these problems, and would also facilitate access regulation. If in some markets it is politically impossible to prevent incumbent participation in mobile telephony, we recommend two alternatives. First, we recommend restricting incumbent participation in mobile phone markets to geographic areas where they do not dominate the provision of local fixed-line service. Incumbents

who face such limits should have the ability to sign agreements with other mobile companies to ensure national coverage and efficient infrastructure use. Second, incumbents should be required to engage in strict management, accounting, and legal separation of their mobile and fixed-line activities.

In Chapter 5 we analyze several different approaches to regulating entry in mobile telephony. One common approach involves an exclusive long-term license for one company to operate in a specific geographic area. Another common approach involves selling a particular number of licenses in an organized auction. We recommend a third policy: allowing unlimited entry in mobile phone markets. We discuss the typical arguments for either exclusive licenses or auctions.

People often believe that exclusivity will promote investment. However, exclusivity creates incentives for monopolistic behavior, which seeks to raise prices by limiting consumption. By limiting consumption, monopolists also limit investment. A more refined argument in favor of exclusivity involves a reduction in investment risk. A prospective investor may find it easy to finance a large capital investment if an exclusive license makes the profitability of the investment more certain. However, we see no evidence or theoretical reason to suspect that a policy of unlimited entry would deter appropriate investment by exposing investors to excessive risk. If the risks of competition make investment unattractive, then a policy of unlimited entry will naturally lead to only one entrant. We prefer to let investors decide how much risk of competition they are willing to bear.

We see only one theoretical economic argument for restricting entry: that unlimited entry may present a "first-mover" problem. No mobile phone company may wish to be the first to enter a particular market if entry imposes a significant risk of failure, while success only invites immediate entry that restricts profitability. However, we note that the assumptions behind this theory are not realistic, and that experience contradicts the predictions of the theory.

We also address and reject other common arguments for restricting entry: that the market can only bear a limited number of competitors, that spectrum is a scarce natural resource that the government should not give away for free, and that auction revenues can help finance universal service. Generally, we conclude that the market can decide on the optimal number of competitors better than the government, that errors on the side of excessive entry only help consumers, that spectrum in most Latin American countries is not close to becoming scarce, and that auctioning mobile spectrum is not an appropriate way to finance universal service.

We also discuss an interesting variant of the question regarding entry in mobile telephony: the freedom that mobile phone operators should have to deploy their spectrum. We conclude that regulatory policy should permit mobile phone operators maximum freedom in the deployment of spectrum, including the use of spectrum to provide fixed-wireless services.

# 1. Mobile Telephony in Latin America: Overview

The number of wireless communications subscribers in Latin America has expanded rapidly. In 1993 there were virtually no mobile phones in the Region. In the first five years of service provision, annual growth rates reached triple digits.<sup>5</sup> In 2001 subscribers were expected to grow by another 33% to reach 86 million. Considering the population of 530 million, subscriber penetration is roughly 16%, which already exceeds fixed-line penetration. Beyond 2002, firms like *Strategis* and *Strategy Analytics* forecast sustained double-digit growth in the mobile telephony segment. *Strategy Analytics* forecasts 150 million subscribers by 2005, while *Strategis* predicts 161.4 million.

Mobile telephony has brought particular benefits to low-income users. Operators have used prepaid subscriptions to serve low-income users without incurring credit risk. Pre-paid options tend to be more expensive, but they do not require credit checks, and they have relatively low monthly subscriber fees. Consumers prefer not to submit their credit history for inspection, and they enjoy taking control of their expenses. Pre-paid services have contributed to the exponential growth in mobile subscribers in many countries. In Mexico, Venezuela and Peru, the number of subscribers on pre-paid plans is much greater than the number of subscribers on contracts.

Mobile telephony has become a substitute for fixed-line telephony, which in Latin America has been dominated by inefficient monopoly operators who provide poor service<sup>6</sup> and lack either the financial or management resources to eliminate long waiting lists of prospective consumers<sup>7</sup>. Mobile telephony has also brought benefits to other telecommunications markets. Several companies have used mobile services to enter specific countries, establish a brand name, and later expand their service portfolios to include data services, internet access, long-distance and ultimately fixed-line or fixed-wireless services. Examples include the Dominican Republic, Mexico and Brazil. Some evidence also indicates that the success of mobile telephony may also have placed competitive pressure that has yielded improvements in fixed-line telephony.<sup>8</sup>

<sup>5</sup> The average subscriber growth rate across Latin American countries was 103% between 1993 and 1998 (International Telecommunication Union, *STAR Database*).

<sup>&</sup>lt;sup>6</sup> In 1999, there were an average of 59.9 faults per hundred fixed lines in Colombia, 48.0 in Ecuador, and 17.1 in Peru. In contrast, the ITU reports that there was an average of only 4.1 faults per hundred lines in the United Kingdom during 1999 (International Telecommunication Union, *STAR Database*).

<sup>&</sup>lt;sup>7</sup> In 1999, the waiting list for main lines was 1,155,000 in Colombia, 29,574 in Peru, 26,547 in Chile and 7,500 in Bolivia. In contrast, the ITU reports that in 1999, there was no waiting list for main lines in France, Germany, the United Kingdom or the United States. (International Telecommunication Union, *STAR Database*).

<sup>&</sup>lt;sup>8</sup> Gutierrez, L., and Berg, S., "Telecommunications Liberalization and Regulatory Governance: Lessons from Latin America", *Telecommunications Policy* No. 24 (2000) 865-884 (the authors find that higher numbers of cellular phones per capita are associated with higher fixed-line penetration, and state that the relationship may reflect a "competition effect" where "competitive entrants stimulate improved performance and additional investment by (public and private) wire firms" (at 879)).

The success of mobile telephony has been possible because of the liberalization of Latin American telecommunications markets during the nineties. Most Latin-American countries introduced competition in long-distance and mobile telephony. Countries frequently granted two or three long-term concessions to competing mobile phone companies. The resulting competition helped reduce prices.

The experiences of different countries show that entry regulation and access problems largely determine the strength of competition in telecommunications. Entry is frequently restricted, as in Mexico where ten geographic zones were introduced with a legal duopoly in each. Colombia adopted the same approach, as we describe in the case study. The OECD paper "Competition and Regulation Issues in Telecommunications" (DAFFE/COMP 2002-6) highlights the issue of access and identifies three categories of access-related problems: (i) whether a particular service must be offered to a rival; (iii) the timeliness and quality with which the service must be offered; and (iii) the price at which the service is offered. The experience of Mexico provides an example of a seemingly excessive fee for access by a mobile network, at 5.5 cents USD per minute "which contrasts with the tariffs subject to incremental costs, as in the United States, where Ameritech applies tariffs of 0.75 cents USD per minute". Price, timeliness and quality become particularly sensitive issues where the dominant operator offers the same service to itself or its affiliates, and therefore has incentives to distort competition in mobile telephony.

The price of call termination charges presents a particularly difficult access issue. Most Latin American countries have a policy where the "Calling Party Pays" (CPP). CPP has contributed to the expansion of the mobile market in Latin America. Telmex opposed CPP in Mexico, but the adoption of CPP increased the number of subscribers by 1.1 million in three months after its adoption in April 1999. Telmex had problems meeting the demand for increased traffic created by CPP. In Peru, the number of subscribers increased by 150% after CPP was adopted in May 1996.<sup>11</sup>

Despite its success in expanding mobile telephone service, CPP raises issues about the cost of call termination charges paid by fixed-line subscribers and by the customers of competing mobile networks. In the presence of CPP, competition between networks might not suffice to create competition for termination charges.

Below we present three case studies. Each case study provides background information on the mobile telephone market and other telecommunications markets in a particular country. Each study summarizes the country's regulatory policies and experience. We intend the studies to provide valuable context for understanding the

<sup>&</sup>lt;sup>9</sup> Gonzalez, A.E. et al., "Telecommunications in Mexico", *Telecommunications Policy* Vol. 22, No. 4/5 (May/June 1998) 341-357.

<sup>&</sup>lt;sup>10</sup> Landa, R.T. "Policy Reform in Networks Infrastructure: The Case of Mexico", *Telecommunications Policy*, Vol. 21, No. 8 (Oct. 1997), pp. 721-732 at 725.

<sup>&</sup>lt;sup>11</sup> Americas Telecommunications Indicators, ITU, 2002.

policy recommendations that we develop in subsequent chapters concerning access regulation, incumbent participation in mobile telephony, and regulating entry.

#### 2. Case studies

# Colombia<sup>12</sup>

#### **Industry Overview**

Colombia has 44 million people with an average Gross Domestic Product per person of \$US 1,911 in 2002. Most local service customers are concentrated in the four largest cities of the country: while these cities comprise 28% of Colombia's population, they have 59.2% of the operating lines. In 1998, 90.7% of the fixed lines used digital technology. However, fixed wireless service is still in its infancy.

The government owned the telecommunications sector in Colombia until the late eighties. The industry was technologically backward, characterized by low-quality service and reduced coverage. Teledensity was only 8% in 1990. Municipal governments owned the providers of telecommunications services in major and medium-sized cities. There was also a cluster of regional firms under the control of TELECOM (the national long distance monopoly). Most of the local and regional firms were subsidized by long distance profits—mostly made in international calls.

In 1993, Law 37 of 1993 encouraged private participation in the telecommunications industry<sup>13</sup>, through "public-private partnerships" to expand coverage and upgrade equipment. Tariff rebalancing helped remove the financial constraint that made local service unattractive to low-income customers. Law 37 and tariff balancing together contributed to a significant expansion in local service. New local operators, both private and public, installed 467,000 new lines between 1995 and 1999. Fixed local service grew by an average 10.4% per year during the nineties. Teledensity jumped from 8% in 1990 to 18.3% in 1999. The waiting time to install a new line moved from 80 days in 1996 to 46 in 1998. Additionally, service quality improved dramatically. The mean time to repair a fixed line fell from 13.9 days in 1996 to 2.8 in 1998. Four firms dominate local service: TELECOM and its regional and local subsidiaries: EPM, EMCALI and ETB.

The liberalization of long distance witnessed the entry of two new competitors in 1998: ETB, which is the largest local service provider, and Orbitel. <sup>14</sup> Competition in long distance has brought lower prices and higher traffic levels: the average domestic tariff fell from \$COL 264/minute in 1998 to \$COL 222/minute in 1999. Traffic increased from 4.313 million minutes to 5.268 million minutes over the same period. Competition and lower prices helped erode TELECOM profits in international long distance, which had

<sup>12</sup> See Benavides and Fainboim (2002) and Meneses (2000).

<sup>&</sup>lt;sup>13</sup> Law 72 (1989) had opened the way for entry by private parties. The 1991 constitutional reform allowed private participation in all economic sectors.

<sup>&</sup>lt;sup>14</sup> Orbitel is owned by two domestic economic consortia and by EPM, the second largest local service provider.

mostly been used to subsidize its local service subsidiaries. Use of the illegal "callback" system also eroded TELECOM profits.<sup>15</sup>

#### Mobile Telephony

In 1993 legal measures<sup>16</sup> assigned the Ministry of Telecommunications the responsibility of conducting auctions to foster entry.<sup>17</sup> Prices were left unregulated, but the concession contracts had coverage targets, including obligations to serve the poorest municipalities within the concession areas. Coverage plans had to be implemented within five years. The concession contracts could not be transferred totally or partially within three years of the subscription date. Additionally, shareholders could not sell or transfer their shares during this period. The concession term was set for ten years, with a possible extension for ten more years, although the contract did not specify the conditions for extension. Cellular firms had to contribute 5% of their gross revenues to fund universal service.<sup>18</sup> Colombia was divided into three regions, and two participants were allowed in each region. This system effectively created three regional duopolies instead of permitting unrestricted entry. Several cellular operators entered the market in 1994.<sup>19</sup> The tender yielded US\$ 1.2 billion in entry fees to the government (1.2% of 1994 GDP).

The combination of high up-front license payments and steep investment requirements forced operators to rely on \$US denominated debt. High financial leverage made operators vulnerable to demand fluctuations and currency devaluation. Both risks materialized as a consequence of a macroeconomic crisis in 1999-2000. Consolidation

<sup>15</sup> However, international long-distance tariffs remain relatively high. Rates to the US range from US\$0.50 to US\$1.41 per minute, depending on the time of day.

<sup>&</sup>lt;sup>16</sup> Law 37 and Decree 741.

<sup>&</sup>lt;sup>17</sup> The national territory was divided into three regions: eastern, western and the Caribbean coast. Service would be provided through two networks for each region (A and B). Private firms could compete to enter in networks A and B. Public firms and private/public partnerships were allowed to participate in the contest for network A. The entry scheme left open the possibility of establishing two national networks, each operating in the three regions.

<sup>&</sup>lt;sup>18</sup> These monies were initially transferred to TELECOM, and since 1998, to a trust (Fondo de Comunicaciones) in charge of managing the universal service and coverage process.

<sup>&</sup>lt;sup>19</sup> Eleven firms registered to submit bids (eight proposals for the private and three for the mixed network, respectively). Network B concessions were granted in January 1994, and network A concessions in February 1994. The winners of network B were Celumóvil (eastern region) Celumóvil del Caribe (Atlantic coast) and Cocelco (western region). Three of the most important economic groups in the country (Santodomingo, Ardila Lulle and Luis Carlos Sarmiento Angulo Organization) and their foreign partners (AT&T and Telefónica de España) make up these firms. The concessions for network A were awarded to Comcel (eastern region), Celcaribe (Atlantic coast) and Occel (western region). Comcel is made up of TELECOM, ETB and Bell Canada International. Celcaribe is made up of Millicom International and some other local telephone companies. Occel is made up of Cable and Wireless and EEPPMM.

resulted,<sup>20</sup> partly in response to financial problems and partly in anticipation of PCS entry. There are now three established firms with the following market shares: Comcel 61%, BellSouth 34% and Celcaribe 5%. The PCS auction was finally held at the beginning of 2003. Only one bidder showed up, submitting a US\$55 MM bid (close to the reservation value of the auction). The winner is a consortium composed of EPM and ETB. Cellular firms are now concerned about the possibility of discrimination in the provision of call termination service by the local service networks of the consortium.

There have been three major types of disputes between the state and the cellular firms in Colombia:

- On issues that the concession contracts left unclear. Ambiguities in the law and the lack of government experience in dealing with Build-Operate-Transfer (BOT) schemes permitted the issuance of concession contracts that did not adequately address asset ownership at contract expiration. The concessionaires argued that they should only return their spectrum to the government, and not equipment. In practice, they interpreted their concessions as Build-Operate-Own (BOO) contracts—which are more lucrative than BOT contracts. In January 1997, the Ministry of Telecommunications decided to move up the due date for license extension from ten to thirteen years. The Ministry accepted the concessionaires' arguments that uncertainties regarding contract extension made it difficult to obtain long-term credit. In 1995, the government eliminated the obligation to serve the poorest municipalities from the concession contracts. The firms contended that cellular technology was not suited to deliver that kind of service. Ambiguities in the contract facilitated this modification.
- On the regulation of entry. In 1996, government announced that PCS licenses would be granted sometime in 1997 or 1998. Cellular operators sought unsuccessfully to become PCS operators, but were able to postpone entry of this new mobile technology until 2003. The licensing of PCS raises an important dynamic question. If the government had permitted unlimited entry into PCS, the cellular firms might have claimed that it undermined the value of their concessions and constituted a form of expropriation or "deregulatory taking". Although restricting entry with auctions may maximize government income and keep existing companies happy, it may simultaneously keep prices high. High auction fees can slow the growth of mobile telephony<sup>21</sup> and later produce credit problems that prompt the renegotiation of concession terms and obligations.
- **On tax distortions**. Article 16 of the Colombian Tax Statute (Decree 624, 1989) exempted private/public partnerships from paying income taxes. In 1995, the

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<sup>&</sup>lt;sup>20</sup> Celumóvil absorbed Celumóvil del Caribe in October 1997 and BellSouth acquired Celumóvil in 2000. BellCanada, the largest shareholder of Comcel, bought 69% of Occel in March, 1998.

<sup>&</sup>lt;sup>21</sup> Overall, entry restrictions may have slowed the growth of mobile telephony. Colombia still has a very low mobile density, in comparison with countries like Brazil (18%) and Chile (33%).

Constitutional Court finally eliminated this exemption as a response to a suit claiming that Article 16 violated the right of equal treatment and freedom of enterprise. However, cellular companies currently pay a 20% VAT while fixed telephony is exempt from VAT.

#### **Bolivia**

#### **Industry Overview**

Bolivia's telecommunications sector was deregulated on November 27, 2001, upon the expiration of a six-year exclusivity period that had been granted by law<sup>22</sup> to Entel and the Local Service Cooperatives<sup>23</sup>. The regulator requires licenses or registration for practically all services, including unregulated services such as the Internet. Licenses do not restrict entry, but serve principally as a source of legal obligations that facilitate SITTEL's monitoring and oversight of the telecommunications sector. In addition, licenses require operators to pay the regulatory fee of about 1% of gross revenues, which covers SITTEL's operating costs. The policy of unlimited entry contrasts with the common policy of holding auctions designed to increase government revenues.

Despite market opening, the Bolivian market still retains its traditional industry structure, where monopoly providers control certain services. Entel has provided national and international long-distance services, as well as satellite, telex, telegraph and local services in areas with no telephone cooperative. Entel has been privatized recently, and benefits from foreign capital investment. Entel also maintains the most extensive national telecommunications network. Entel has an advantageous position relative to other companies because it can easily develop and expand its national long-distance network to provide the full array of local services. Entel's position raises concerns of potential monopolization.

The fourteen cooperatives providing local service have tried to improve and restructure their services and business strategies in preparation for full market opening. However, only the largest cooperatives have made serious strategic reforms.<sup>24</sup> Most of the small cooperatives, five of which serve less then 1,700 lines, will most likely face some difficult business decisions to survive in the open market.

<sup>&</sup>lt;sup>22</sup> The Telecommunications Law of 1995.

 $<sup>^{23}</sup>$  Each company had a monopoly for a specific geographic area, defined around one of the country's main cities and respective departments

<sup>&</sup>lt;sup>24</sup> Cotas and Comteco have gradually improved their coverage, modernized their networks, and increased and diversified their service offerings to compete in a new market structure. Cotas claimed that it had already gained 36% market share from Entel's long distance market in its service area ("Bolivia's Cotas-Teledata Offers Domestic and International Long Distance on ITXC.net," *World IT Report* (January 28, 2002)). Comteco is expanding its presence in mobile telephony through Nueva Tel, and exploring new opportunities in other service areas.

The recent market opening has already improved the choices available to customers in the largest urban areas. However, only 6.7% of Bolivians had access to fixed telephone lines in 2002.

Superintendencia de Telecomunicaciones (SITTEL) has regulated telecommunications in Bolivia since 1995<sup>25</sup>. One of SITTEL's key roles is regulating interconnection charges. The law allows operators to set interconnection charges pursuant to voluntary negotiations, but gives SITTEL ultimate authority over the issue. Interestingly, operators have foregone the option to negotiate interconnection charges among themselves. This experience provides useful context for our discussion concerning the relative merits of voluntary negotiations and regulated access. SITTEL sets charges based on international benchmarking and its own analysis of interconnection costs in Bolivia.

#### Mobile Telephony

TELECEL<sup>26</sup> introduced mobile telephony in 1991, and was later joined by Entel Móvil (1996) and by Nueva Tel in late 2000<sup>27</sup>. Despite having 55% of the market in early 2002, TELECEL faces strong competition from both Entel Móvil and Nueva Tel.<sup>28</sup> Nueva Tel's entry into the market prompted immediate price reductions and market growth. Through its Viva GSM offer, Nueva Tel reached over 40,000 subscribers in the first 6 months of operations and surpassed their first year goal of 100,000 subscribers. The company estimates that it will have about 200,000 subscribers by the end of 2002.<sup>29</sup> Total mobile phone teledensity was 10.40% in 2002, already surpassing that of fixed telephony. However, growth in mobile telephony is now slowing down. The majority of the population still cannot afford fixed or cellular telephone services.

The regulator has tried to promote universal service by issuing mobile telephony licenses that stipulated network expansion targets and required contributions to the national program for rural development (PRONTER). However, mobile service remains decidedly urban.<sup>30</sup> Mobile service has become the principal substitute for expensive and

<sup>27</sup> A joint venture between Comteco and Western Wireless, which started service at the end of 2000.

<sup>&</sup>lt;sup>25</sup> SITTEL was created by the 1995 Law on the Sectoral Regulatory System (Ley del Sistema de Regulación Sectorial - SIRESE). SITTEL reports to the General Superintendencia and also works closely with the Dirección General de Comunicaciones (of the Ministry of Economic Development) to develop and implement sector policies. Despite its governmental relationships, SITTEL enjoys financial and institutional autonomy to regulate the sector, and supports itself from operators' fees.

<sup>&</sup>lt;sup>26</sup> Telefónica Celular de Bolivia.

<sup>&</sup>lt;sup>28</sup> "Telecom Deregulation," *Bolivian Times* (March 21, 2002).

<sup>&</sup>lt;sup>29</sup> Ibid.

<sup>&</sup>lt;sup>30</sup> Operations focus on the three largest urban areas: La Paz, Santa Cruz and Cochabamba.

difficult-to-obtain fixed lines. A walk through the streets of La Paz shows that mobile phones are not limited to the urban elite. Poor street vendors also use mobile phones, both for their communications needs and as a source of business, using their handsets to resell mobile service as informal "phone shops".

Entel participates in mobile telephony through its subsidiary Entel Móvil. Given Entel's strong position in the market, participation in mobile telephony raises logical concerns over potential discrimination in the provision of access to Telecel and Nueva Tel

#### **Dominican Republic**

#### Industry structure

The liberalization process started in the Dominican Republic in the early 1990s, but has accelerated since the General Telecommunications Law of May 1998 established the current legal framework for competition in the industry. Market developments have since prompted rapid growth in basic services, mobile telephony, and value-added services.

The former monopoly operator is the Compañía Dominicana de Teléfonos (CODETEL)<sup>31</sup>, which is still the dominant provider of local, domestic and international distance, controlling about 80% of the total telecom market.

Since 1998 most telecommunications license holders are authorized to provide local, long-distance, cellular, internet and data transmission services. CODETEL's main competitor, Tricom, started offering long-distance services and soon after started offering cellular, beeper, internet and pre-paid card services. However, CODETEL delayed Tricom'ss plans to offer local service by resisting interconnection. CODETEL was finally ordered to provide interconnection after the new telecommunications law was passed in 1998.

Tricom innovated by introducing fixed wireless telephony in the Dominican Republic. Since then, two other service providers also entered the local service market – Centennial Dominicana and Turitel. Both Tricom and Tirutel invested in wireless local loop solutions to serve urban areas, and to extend services to rural and under-served areas. Their strategy exposed CODETEL's failure to provide services in those areas.

All service providers are required to have a license in the Dominican Republic. However, a license has become a simple formality to ensure that companies: a) register in the country, b) meet minimum requirements to be successful providers, and c) contribute

<sup>&</sup>lt;sup>31</sup> CODETEL has been in service since 1930, and is now owned by Verizon.

appropriately to the regulator's budget and to the development fund.<sup>32</sup> The policy of essentially unrestricted entry has helped promote the development of competition.

Other than the contribution to development, companies do not face any universal service obligation under their licenses. Service providers focus their service in the "corredor de la fortuna" which covers most major urban centers and business clients. Rural areas and certain urban areas continue to be neglected.

INDOTEL regulates the telecommunications industry in the Dominican Republic,<sup>33</sup> but cannot require companies to provide universal service. INDOTEL remains responsible for the advancement of universal service,<sup>34</sup> and administers the development fund to which companies contribute. INDOTEL is in the process of developing a biannual project plan that will seek to meet specific infrastructure goals through public bidding processes, such as providing at least one public phone for each of the poorest 1,500 localities that still do not have access.

According to the telecom law, all companies are required to provide interconnection to their networks. INDOTEL has been working on new Interconnection Rules, as the Institute would like to systematize the process and avoid anti-competitive conflict among service providers.

#### Mobile Telephony

Codetel introduced mobile telephony in the Dominican Republic. Three additional service providers have since entered the market: Tricom (1995), Centennial (1998) and France Telecom (2000). Table 1 shows that Codetel's dominance in local telephony has not produced similar market shares for mobile service. Other mobile service providers have acquired market share by lowering prices, and by marketing services aggressively. Both Centennial and France Telecom (through its Orange service) have lowered prices, and introduced cheaper pre-paid cellular plans. CODETEL and Tricom have since responded by offering cheaper international rates to their mobile subscribers than to their fixed-line subscribers. This incentive targets the approximately 1 million Dominicans with relatives living abroad. The efficiency of this pricing policy is questionable, and may raise concerns that Codetel is using its dominance in long-distance service to secure a competitive advantage in mobile service. We discuss concerns with such abuses in a

<sup>&</sup>lt;sup>32</sup> Companies are required to contribute 2% of revenues as a Contribution to the Development of Telecommunications ("Contribución al Desarrollo de las Telecommunicaciones" or (CDT). Chapter VI of the General Telecommunications Law authorizes INDOTEL to issue a regulation concerning the financing of the Telecommunications Development Fund (FDT).

<sup>&</sup>lt;sup>33</sup> Chapter XII of the General Telecommunications Law establishes INDOTEL as the telecommunications regulatory body of the Dominican Republic, with responsibilities covering all aspects of telecommunications regulation.

<sup>&</sup>lt;sup>34</sup> Chapter XII of the General Telcommunications Law establishes INDOTEL's primary objective as the promotion of telecommunications development in the Dominican Republic, particularly with regard to the advancement of universal service.

subsequent chapter concerning incumbent participation in mobile telephone markets. However, if France Telecom survives this competitive response, or other companies enter the market, then competition in the Dominican Republic will clearly have succeeded. Competition to date has certainly contributed to reasonable prices and the rapid growth in mobile phone users. The outlook for competition remains optimistic, given the interest of other companies in entering the market (*e.g.*, US-Sprint, Telmex of Mexico, Telefónica de España and Digi Cell from Ireland).

Table 1.

(distribution of local and cellular market shares)							
Company	Local Lines	Year entered the market	Cellular Lines	Year entered the market			
CODETEL	754,360	1930	468,664	1994 **			
Tricom	161,411	1998	302,613	1995			
Centennial	N/A		68,000	1998			
France Telecom			215,000	2000			
Turitel	768	1998					

Table 2. Telecommunications Indicators in the Dominican Republic

	1996	1997	1998	1999	2000	2001	2002 <sup>3</sup>
Total Fixed Lines							
Toptal Lines (Res.+Bus.+WLL+Pub.Tel.)	618,551	704,389	772,180	826,746	894,164	955,145	908,957
Residential Lines	420,753	487,272	539,352	561,388	592,285	615,769	602,245
Business Lines	191,275	208,617	222,146	230,514	239,804	257,604	246,783
Wireless Local Loop							
Total Lines	0	0	0	22,967	49,914	70,448	48,148
PublicTelephone Lines							
Total Lines	6,523	8,500	10,682	11,877	12,161	11,324	11,781
Teledensity (fixed lines)	8.2%	9.2%	9.9%	10.5%	11.2%	11.8%	11.0%
	1996	1997	1998	1999	2000	2001	2002 <sup>3</sup>
Wireless Lines	1996	1997	1998	1999	2000	2001	2002 <sup>3</sup>
Total Cellular Lines (Analog and Digital)	<b>1996</b> 82,547	<b>1997</b> 141,592	209,384	424,434	705,431	<b>2001</b> 1,270,082	
							1,700,609 33.9%
Total Cellular Lines (Analog and Digital) Annual Growth	82,547	141,592 71.5%	209,384 47.9%	424,434 102.7%	705,431 66.2%	1,270,082 80.0%	1,700,609 33.9%
Total Cellular Lines (Analog and Digital) Annual Growth	82,547	141,592 71.5%	209,384 47.9%	424,434 102.7%	705,431 66.2%	1,270,082 80.0%	1,700,609 33.9%
Total Cellular Lines (Analog and Digital) Annual Growth	82,547 1.1%	141,592 71.5% 1.8%	209,384 47.9% 2.7%	424,434 102.7% 5.4%	705,431 66.2% 8.8%	1,270,082 80.0% 15.7%	1,700,609 33.9% 20.7%
Total Cellular Lines (Analog and Digital) Annual Growth Cellular Teledensity	82,547 1.1%	141,592 71.5% 1.8%	209,384 47.9% 2.7%	424,434 102.7% 5.4%	705,431 66.2% 8.8%	1,270,082 80.0% 15.7%	1,700,609 33.9% 20.7% <b>2002</b> <sup>3</sup>
Total Cellular Lines (Analog and Digital) Annual Growth Cellular Teledensity  Fixed and Wireless Lines	82,547 1.1%	141,592 71.5% 1.8%	209,384 47.9% 2.7%	424,434 102.7% 5.4%	705,431 66.2% 8.8%	1,270,082 80.0% 15.7%	1,700,609 33.9% 20.7%

Source: INDOTEL Sector Statistics

Mobile teledensity provides an indicator of successful competition in the mobile telephone market. Mobile teledensity surpassed fixed lines in 2001, at 15.7% compared to 11.8% for fixed lines (see Table 2). Many now perceive the Dominican cellular market as developed: <sup>35</sup>

College professors insist they be turned off during class. Children carry them to baseball practice. The government has restricted their use among employees. Homes in remote villages have them hanging on the walls. Beepers and cellular phones are ubiquitous in the Dominican Republic [...]

Others see continued potential for expansion, particularly since fixed lines remain expensive and are difficult to obtain.

## 3. Access Policy

Mobile phone companies need access to existing telephone networks, so that mobile subscribers can call fixed-line customers. Mobile phone companies therefore seek interconnection agreements with incumbents. We analyze whether government policy should rely principally on voluntary negotiations or regulation to derive the terms of interconnection.

#### **Market Failure**

Governments should resort to regulation only if they have strong reason to believe that markets will not provide appropriate solutions. Markets are apt to fail in several

<sup>35</sup> "Cellular Obsession," Business Latin American, December 18, 2002.

respects concerning the provision of access to mobile phone companies. First, control over access to existing fixed-line networks gives the incumbents significant leverage in signing interconnection agreements. By refusing to sign an agreement, an incumbent can delay the entry of a mobile phone company to the market. In the absence of government control, incumbents have natural incentives to abuse their leverage. Abuse can encompass excessive interconnection fees, the use of such fees to subsidize incumbent participation in mobile markets, and discrimination in the provision of access services.

Economists and government authorities in several countries have recently become concerned with another access problem: phone companies have incentives to charge excessive interconnection fees for terminating calls. In most Latin-American countries, the initiator of the telephone call pays all charges (the "Calling Party Pays" or "CPP"). If a fixed-line customer calls a mobile customer, then the fixed-line customer will pay for two services: the service of originating the call, which is provided by the fixed-line network, and the mobile company's service of terminating the call. Competition among mobile phone companies might create pressure for low prices for some aspects of mobile service, but not for low termination fees. No mobile company would care to offer competitive call termination fees, since its customers would not end up paying the fees—only the originators of calls on other networks pay.<sup>36</sup>

In voluntary negotiations to derive an interconnection agreement between a fixed-line network and a mobile network, the fixed-line network might not object to the high calltermination fees proposed by the mobile network. If there is no significant competition

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<sup>&</sup>lt;sup>36</sup> Professor Mark Armstrong of Oxford University has produced recent research analyzing the problem of call-termination fees ("Call Termination on Mobile Networks" (11 April 2002)). Since each mobile customer only uses one network at a time, a mobile network has an effective monopoly over call termination services to its customers. This monopoly arises naturally, even if competition dominates the industry. We can imagine a mobile market with 100 different companies, each with a 1% market share, and each company would still have a monopoly over call-termination services to its customers. Each company would still have an incentive to set unreasonably high call-termination charges. Competition in our hypothetical 100-company market would ensure reasonable aggregate profit levels. Competition would push mobile phone companies toward compensating for high calltermination fees by reducing prices for other services. Prior to acquiring a customer, a mobile phone company would anticipate the possibility of high call-termination fees. Perhaps these fees in isolation could produce an average excess profit of \$50 per year per customer. Under competition, each mobile phone company would naturally be willing to pay the customer \$50 up front to join its network. Competitive mobile phone companies actually offer customers the equivalent of up-front payments to join their networks: the payments come in the form of subsidized handsets. Few customers actually pay the full cost of acquiring handsets. Professor Armstrong's theory therefore explains a common pricing pattern in mobile telephony: seemingly excessive call-termination fees accompanied by subsidized handsets. Excessive call-termination fees would prompt an inefficiently low level of calls to mobile customers. Subsidized handsets would produce an inefficiently high level of mobile customers in total. If government policy relies on voluntary negotiations to derive interconnection agreements, then these inefficiencies can be expected.

for the customers of the fixed-line network, then the fixed-line network can just pass on the high call-termination fees to customers. To the extent that competition emerges in fixed telephony, the incumbent might still prefer high call-termination fees. The incumbent might recognize that, as long as all competitors have to incur the same call-termination fees, small networks will suffer disproportionately. Small networks will naturally have a higher proportion of inter-network calls. High call-termination fees can therefore discourage companies from entering the telephone business, since the fees would place a disadvantage on the initially small size of entrants relative to established incumbents.

International experience shows that call-termination fees can be excessive. In the United Kingdom, it can cost approximately \$0.16 US per minute to terminate a call on a mobile network.<sup>37</sup> The same network, however, might charge only \$0.10 in total for one customer to make a call to another customer within the same network. The network has a natural incentive to keep the costs of within-network calls reasonable, since mobile phone customers care about the total price of calls that they originate. Excessive fees are limited solely to the price of calls that a mobile phone company's customers do not originate. The regulator of the telephone industry, Oftel, has investigated the matter and concluded that mobile phone call-termination fees are excessive.<sup>38</sup> The Competition Commission has followed with its own investigation, and reached the same conclusion.<sup>39</sup>

Another problem with access involves roaming agreements. Customers attach importance to the geographic coverage offered by mobile phone companies. If one mobile phone company offers national coverage, while another only offers coverage in one or two cities, then the company with national coverage will have a significant competitive advantage. Competition will motivate networks to expand coverage even to places where the expected utilization does not offset the associated costs. A mobile phone company may extend coverage to a relatively small city under the full knowledge that the revenues from customers located in the city will not offset the network expansion costs. The mobile phone company would be motivated primarily by the prospect of attracting additional customers in larger cities, who occasionally visit the smaller city and who attach significant value to the broad geographic coverage of their network. The mobile phone company might reasonably expand its coverage to the small city, even if the

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 $<sup>^{37}</sup>$  In 2002, Vodafone and  $O_2$ 's weighted average termination charge for calls originating on fixed lines was US\$0.16 (GB£0.102) per minute. *See* Competition Commission, "Vodafone,  $O_2$ , Orange and T-Mobile", (December 2002), p. 13.

<sup>&</sup>lt;sup>38</sup> Oftel, "Review of the charge control on calls to mobiles", (September 26, 2001).

<sup>&</sup>lt;sup>39</sup> Competition Commission, "Vodafone, O<sub>2</sub>, Orange and T-Mobile", (December 2002). Other countries have investigated call-termination fees and concluded that they were excessive. In Australia, the regulator has set maximum prices on call-termination fees. In Italy, the competition authorities ruled that two mobile phone companies unreasonably harmed the development of competition by negotiating an interconnection agreement with high call-termination fees. The authorities concluded that the high fees threatened a disproportionate impact on a new entrant to the market, whose smaller network would naturally witness a much higher percentage of calls terminating on other networks than the two established companies.

combined traffic of local residents and visitors from large cities did not fully recover the costs.<sup>40</sup>

Once a mobile phone company subsidizes network expansion to an area with a low population density, an interesting question arises concerning roaming agreements. A new rival mobile phone network might desire to offer an equally broad geographic coverage. However, it might be wasteful to build a second mobile network in the low-density area. The new mobile phone company might naturally prefer to sign a roaming agreement with the existing network. Since traffic in the area is not high enough to compensate for the network expansion costs, the existing network would naturally have excess capacity available. However, the existing network would have natural incentives to reject a roaming agreement, which would magnify the extent of competition for customers in the high-population-density area. It would not seem realistic to rely on voluntary negotiations in such cases.

In summary, we see three difficult interconnection issues where markets cannot be trusted to deliver optimal answers automatically. First is the potential abuse of mobile networks by fixed-line incumbents who seek high access fees, or who try to delay access, or provide discriminatory access service. Second is the natural tendency for voluntary negotiations to result in excessive call-termination fees. Third is the possibility that some mobile phone companies will resist signing roaming agreements that would enable competitors to expand their geographic coverage efficiently.

#### **The Case for Voluntary Negotiations**

Although we have identified several difficult interconnection issues related to mobile telephony, these issues do not clearly imply a need for regulation. Some people still see a strong case for relying principally on voluntary negotiations, as long as the government maintains a threat of intervention to stop abuses that may surface. In many countries, the competition authorities handle disputes over unreasonable fees or refusals to sign interconnection agreements with rivals. The relevant choice is not between regulation and complete tolerance of market failure. Rather, the relevant choice is between active regulation and a more passive role that allows the market to seek a solution first, but that threatens government intervention to resolve disputes. Disputes can be raised by the parties who negotiate interconnection agreements, or by consumers or other companies affected by such agreements. Below we outline the arguments in favor of such a policy. In the next section we explain the arguments against voluntary negotiations. We then finish this Chapter with conclusions and recommendations.

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<sup>&</sup>lt;sup>40</sup> A rather simplistic economic theory might suggest that the mobile phone company address this problem by charging higher rates for telephone calls in low-population density areas. However, complex charging systems have been known to generate uncertainty and skepticism among consumers. Some years ago AT&T's move to a uniform price per minute on all mobile services throughout the United States was hailed as a brilliant marketing strategy. It is therefore logical to expect that a mobile phone company would extend its geographic coverage broadly, and would simultaneously accept losses in low-density areas to preserve an appealing price structure.

We believe that the most compelling rationale for voluntary negotiations comes from the "Chicago School" of economic thought, which has played a major role in the development of competition policy worldwide. The economic theory of the "Chicago School predicts that incumbent telephone companies will have natural incentives to sign interconnection agreements that contain efficient prices. The Chicago School further predicts that incumbents under certain circumstances will have no incentive to delay signing interconnection agreements, or to discriminate in the provision of access service to mobile phone companies, or to use excessive access fees to compete unfairly in mobile telephone markets. If we accept these predictions, it would seem appropriate to limit government policy to a passive role where intervention is limited only to the resolution of disputes.

We explain the Chicago School approach with a simple hypothetical example involving an incumbent local telephone company that also owns a mobile telephony business. A competing mobile phone company seeks to negotiate an interconnection agreement that would allow its customers to call customers of the existing fixed-line network.

Assume in this example that the incumbent's mobile phone company charges \$0.20 per minute for all mobile phone calls that terminate on the incumbent's fixed-line network. Assume further that, if the incumbent lost a mobile phone customer to a competitor, that the incumbent would save \$0.05 per minute in costs. The Chicago School predicts that the incumbent will naturally have an incentive to propose an interconnection fee of \$0.15 per minute, and that the resulting price would motivate efficient competition in mobile telephony. The efficient access fee is derived by starting with the retail price of \$0.20 per minute, and then subtracting the costs of \$0.05 that the incumbent would save if it lost the mobile phone customer to a rival.

We now explain why the proposed access fee of \$0.15 would appear to be efficient. The incumbent's incremental costs of handling the call are only \$0.05. Our example simply measures incremental costs by asking how much the incumbent's costs would decline if it lost the customer. If the competing mobile phone company is efficient, then it should also have incremental costs of \$0.05 per minute or less. Any efficient competitor can therefore afford to pay an access charge of \$0.15, incur the costs of serving the customer, and still generate a profit at a retail price equal to or lower than the incumbent's \$0.20 per minute.<sup>41</sup>

Finally, we complete the standard Chicago School theory by explaining why the incumbent would voluntarily offer the \$0.15 per minute price, and why the incumbent would have no incentive to delay access or to provide inferior access service to rivals. The access price of \$0.15 per minute is high enough to indemnify the incumbent from

against the incumbent's \$0.20 per minute retail price.

<sup>&</sup>lt;sup>41</sup> The proposed access fee of \$0.15 would also seem efficient because it deters inefficient competitors from entering the market. An inefficient mobile phone company would have incremental costs equal to or greater than the incumbent's costs of \$0.05 per minute. The \$0.15 per minute access fee would ensure that the mobile phone competitor cannot earn a profit, given the need to compete

any losses that from the development of competition in mobile telephony. For every mobile phone customer that the incumbent loses to a competitor, the incumbent loses the opportunity to earn \$0.20 per minute, and the incumbent simultaneously saves \$0.05 in costs. The net loss is \$0.15 per minute. If the incumbent charges \$0.15 per minute in access fees, then the incumbent will be indifferent between keeping the customer, and losing it to a rival in exchange for the \$0.15 per minute access revenue.

The incumbent can actually earn more money by providing access to rivals at \$0.15 per minute. If the incumbent is inefficient, then several mobile phone companies may have incremental costs that are lower. If efficient competitors have lower incremental costs of \$0.03 per minute, then they could pay the \$0.15 access fee, reduce retail prices to \$0.18 per minute, and still survive in the market. The incumbent would make more money by letting the efficient mobile phone companies take over the market. The net reduction in consumer prices, from \$0.20 per minute to \$0.18 per minute, would stimulate demand and benefit the incumbent. Before the arrival of the efficient competitors, the incumbent was effectively making a profit contribution of \$0.15 per minute.<sup>42</sup> The Chicago School predicts that, by sacrificing market share to efficient competitors, the incumbent will earn the same profit margin as before, but on a greater volume of calls as lower retail prices stimulate demand. Since the incumbent will at worst preserve its financial position by offering access to rivals at \$0.15 per minute, and may even improve its finances if efficient rivals stimulate demand, the incumbent will have no incentive to thwart access. The incumbent will maximise profits by promoting efficient competition in the mobile telephone market.

Essentially these same arguments can be found in the seminal Chicago School book on competition law called *The Antitrust Paradox*, <sup>43</sup> and were also made in the celebrated interconnection dispute of *Clear v. Telecom* of New Zealand, where respected Professors William Baumol and Robert Willig defended an incumbent's proposal to charge interconnection fees derived in the same manner as the \$0.15 per minute in the above example. <sup>44</sup> More generally, the access price of \$0.15 per minute in this example has been defended by numerous economists as the "Efficient Component Pricing Rule" or "the parity principle". <sup>45</sup> However, the efficiency of the \$0.15 per minute charge has been analyzed closely in the economic literature without many economists noting how its

 $<sup>^{42}</sup>$  The profit was measured as \$0.20 per minute in revenues, minus \$0.05 per minute in incremental costs, but was applied to a lower total volume of traffic.

<sup>&</sup>lt;sup>43</sup> Bork, R. The Antitrust Paradox: A Policy at War with Itself (1997).

<sup>&</sup>lt;sup>44</sup> William J. Baumol & Robert D. Willig, "Brief of Evidence; Economic Principles for Evaluation of the Issues Raised by Clear Communications Ltd. on Interconnection with Telecom Corporation of New Zealand Ltd.," *Telecom Corp. of N.Z. v. Clear Communications Ltd.* (1992) 5 T.C.L.R. 166 (H.C.)

<sup>&</sup>lt;sup>45</sup>Baumol, W.J. and Sidak, J.G. "The Pricing of Inputs Sold to Competitors," *Yale Journal on Regulation*, Vol. 11, No. 171, p. 176 (1994).

underlying economic rationale provides the principal support for a policy of voluntary negotiations.

We acknowledge independent arguments in favor of voluntary negotiations, which can involve concerns about adopting inappropriate regulations, or a belief in the effectiveness of dispute resolution. Even someone who does not believe the Chicago School predictions, and is concerned with the potential manipulation of access to thwart competition in mobile telephony, might fear that regulations could do little to improve the situation. Many observers of the telecommunications industry fear that rapid technological developments make it difficult for regulators to develop appropriate regulations. Some regulators share these concerns. With respect to interconnection policy, the fear is that constant changes in market incentives, products and services may convert seemingly innocuous regulations into obsolete impediments to progress. Even in the absence of change, the current complexity of the telecommunications industry may generate skepticism concerning the ability of regulators to develop appropriate rules. Economists in many countries also express concerns with "regulatory capture", which refers to the gradual loss of a regulator's independence in favor of incumbent bias. Concerns with ineffective regulation may be heightened in Latin America, as many countries lack truly independent regulators, and where even independent regulators are often young institutions that face the challenge of accumulating technical expertise. Together these concerns may explain a distaste for regulation and a natural preference in favor of a passive government role.

Cynics of regulation may have several reasons to prefer relying initially on voluntary negotiations and the threat of judicial intervention. First, voluntary negotiations may efficiently resolve some technical aspects of interconnection agreements that are not contentious. The simple threat of judicial intervention may motivate the parties to adopt reasonable negotiating stances on the more contentious issues. In the event of disputes, courts may offer the preferred solution. Courts do not risk regulatory capture, and can offer the advantage of well-developed procedural for the detailed evaluation of complex situations. Although courts may know little about the detailed issues concerning interconnection, they can rely upon expert witness testimony. Similarly, the threat of judicial intervention can prevent inappropriate behavior that might occur after the parties sign an interconnection agreement, such as service discrimination or the incumbent's use of interconnection fees to subsidize its success in the mobile telephone market.

We can summarize the case in favor of negotiated access as drawing upon several perspectives. The Chicago School economic theory would trust voluntary negotiations to derive efficient interconnection fees, and would also predict that incumbents lack incentives to engage in behavior that would distort competition in the mobile telephone market. Proponents of voluntary negotiations may also fear inefficient regulation, or may believe that the threat of judicial intervention will prevent inappropriate conduct, or trust judicial intervention to address the primary issues of concern in a thorough and objective manner.

#### The Case for Proactive Regulation

The Chicago School perspective contains several important insights that have changed the way that people analyse competition issues in network industries such as telecommunications. However, we see major problems with the potential use of the Chicago School perspective to justify an interconnection policy that relies primarily on voluntary negotiations, even if supplemented by broad guidelines and the threat of judicial intervention to resolve disputes.

For ease of explanation we refer to the same example presented in the previous section: an incumbent charges \$0.20 per minute for mobile phone customers, and the incremental costs are \$0.05 per minute. The Chicago School perspective predicts that the incumbent would voluntarily agree to an access price of \$0.15 per minute, which would stimulate efficient competition in mobile telephony. Below we scrutinize this simple example more closely.

A significant amount of economic literature assesses the efficiency of the gap between the \$0.20 per minute retail charge and the \$0.15 per minute access charge in the above example. The gap of \$0.05 per minute sets the landscape for competition in mobile telephony. Much of the literature analyses interesting issues concerning the complexities of telecommunications networks, which the gap of \$0.05 per minute might not reflect. While this literature is intellectually important for many reasons, it is neither necessary nor sufficient to reach appropriate conclusions concerning voluntary negotiations. The efficiency of the \$0.05 gap is not sufficient for assessing voluntary negotiations, because the underlying theories involve factors that are difficult to measure. It is difficult to tell from the literature whether the \$0.05 gap would be significantly higher or lower than the ideal figure, and whether a regulator would make matters better or worse by adjusting the \$0.05. The efficiency of the \$0.05 gap is not necessary for assessing voluntary negotiations, because we can simply presume efficiency and still reveal serious flaws in the case for voluntary negotiations.

Even if we accept the efficiency of the \$0.05 gap, a major question remains concerning the \$0.20 per-minute retail price that served as the point of departure for the analysis. If we rely on voluntary negotiations, then the retail prices in mobile telephony will be limited to either \$0.20 per minute, or to the sum of the \$0.15 access fee plus the incremental costs of the most efficient mobile phone company. Stating the outcome more generally, voluntary negotiations will convert the \$0.20 per minute into a benchmark for mobile phone prices. Prices will only fall by the extent of the cost savings that competing mobile phone companies could offer relative to the incumbent. However, the \$0.20 might reflect a significant amount of monopoly profits, even disproportionate to any issue concerning the incumbent's efficiency in the mobile phone market. If the \$0.20 per minute is a monopoly price, then government policy should not allow voluntary negotiations to convert the \$0.20 into an industry benchmark.

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<sup>&</sup>lt;sup>46</sup> For an excellent description of the access literature, see Armstrong, M. "The Theory of Access Pricing and Interconnection" in *Handbook of Telecommunications Economics*, Vol. I, Chpt. 8 (2002).

We explore the issue of monopoly profits by introducing a new assumption into the example above. Assume that the underlying costs of terminating a mobile phone call on the fixed-line network are only \$0.09 per minute. Together with the \$0.05 incremental cost of originating calls on the mobile phone network, the total costs are only \$0.14 per minute.

From a public policy perspective, the goal should be a competitive mobile phone industry with total retail prices of \$0.14 per minute. If the incumbent is first charging \$0.20 per minute, and we rely principally on voluntary negotiations to derive interconnection agreements, then the access price of \$0.15 per minute will never permit the retail price to fall as low as \$0.14 per minute on a sustained basis. Competition in mobile telephony may flourish, in the sense that efficient operators may find it viable to enter the market, but the high access price will prevent the final price to consumers from approaching reasonable levels.

There are only two ways to eliminate the problem of monopoly profits in the above example. The first approach would be to regulate retail prices in the mobile telephone market, setting a limit of \$0.14 per minute. If the incumbent is forced to charge \$0.14, and if we believe the predictions of the Chicago School, then we will trust voluntary negotiations to yield an access price of \$0.09 per minute. Recall the Chicago School's prediction that the incumbent will start with the retail price and subtract the incremental costs of \$0.05 per minute: \$0.14 minus \$0.05 is \$0.09 per minute. Of course, the problem with this approach is the absurdity of regulating mobile telephone retail prices. A basic premise of liberalisation is that the potential for competition eliminates the need to regulate retail prices. As we indicated above, the rationale for voluntary negotiations includes concerns with inappropriate regulation, and particularly with the failure of regulators to understand sufficiently the complex, dynamic telephone market. Clearly these problems would be magnified if a regulator were asked to regulate retail prices.

The second possible approach to eliminating monopoly profits in this example would be simply to regulate the price of originating calls on the existing fixed-line network. A regulator could set access fees at \$0.09 per minute in the above example, and trust competition among mobile phone companies to produce retail prices that converge on \$0.14 per minute. The incumbent could no longer sustain a retail mobile phone price of \$0.20 per minute, since efficient competitors could pay the \$0.09 access fee, charge retail consumers \$0.14 per minute, take the business away from the incumbent, and still recover all costs.

Under our second approach of regulated access prices, the gap between the \$0.14 per minute retail price and the \$0.09 per minute access price would match the efficient level of \$0.05 per minute heralded by the Chicago School. However, the gap would not be dictated by regulatory policy. The regulator would simply set the access charge at a level that prevents the incumbent from earning monopoly profits on the fixed-line network. Competition would determine the final price for mobile telephony, independently applying pressure to narrow the gap between the retail price and the access price. With intense competition, the same \$0.05 gap can be anticipated as in the initial Chicago School example.

Recall our earlier assertion that it is not important to explore sophisticated challenges to the efficiency of the \$0.05 per-minute gap. We can simply accept the assertion of the Chicago School that the \$0.05 gap is efficient, and show that the same gap can arise under two different processes: a) allowing the incumbent to charge a retail price of \$0.20 while trusting voluntary negotiations to produce an access price of \$0.15, or b) setting the access price at \$0.09 and trusting competition to produce a retail price of \$0.14. The issue of efficient competition in the mobile phone market cannot distinguish between these two processes, since both processes produce the same gap. The definitive choice between processes "a" and "b" should rest on the ability of "b" to eliminate monopoly profits with minimal regulatory intervention.

We now explore a final issue with our example that is necessary to derive robust conclusions concerning voluntary negotiations. A sophisticated reader might suggest the following policy: instead of asking a regulator set the access price at \$0.09 per minute in this example, simply pass a law prohibiting interconnection fees that exceed the costs of terminating calls on the fixed-line network. After passing this law, perhaps we could allow voluntary negotiations to address the details of interconnection agreements. If the incumbent insists on charging excessive fees that would yield monopoly profits, then the court could deal with complaints.

The combination of a proscriptive law and the threat of litigation may seem appealing. However, the proscriptive law would violate a key condition for the success of voluntary negotiations. The Chicago School predicts that incumbents will have no incentive to delay access, or to thwart competition in mobile telephony, as long as one condition applies. The key condition is allowing the incumbent to set an access price high enough to compensate for the prospective loss in mobile telephone market share to competitors. If a law places a ceiling on the access price that would prevent the incumbent from receiving monopoly profits, then the incumbent will immediately acquire incentives to delay or distort competition.

We consider the incumbent's incentives on the day that a law is passed requiring an access price of \$0.09 per minute. If on this day the incumbent is charging \$0.20 per minute to mobile phone customers, then the incumbent will be exposed to an enormous decline in profitability as competitors enter the market. Revenues will decline from the \$0.20 retail price to the \$0.09 access fee, offset only by a \$0.05 per- minute cost reduction. Loss of market share will therefore imply a net loss of \$0.06 per minute: \$0.20 minus \$0.09, minus the \$0.05 cost savings. A law requiring a cost-based call-termination charge will therefore create the circumstances in which the incumbent becomes hostile to the loss of market share in mobile telephony.

The incumbent's hostility to access will create several problems. The incumbent may stand to benefit financially from delaying entry, or insisting on unreasonable access terms, or by discriminating in the provision of access services to rivals. We discuss each of these problems below.

It is quite easy to understand the incumbent's incentives to delay entry. We limit ourselves here to exploring the possibility that courts could somehow overcome such issues by threatening incumbents with large fines, or by requiring incumbents to grant interconnection on certain preliminary terms while the court adjudicates disputes. In theory, a court could examine whether an incumbent had unreasonably delayed entry for a specified time period. The court in theory could also require the incumbent to pay an amount of damages that perfectly offset the financial benefits that the incumbent received from the delay. However, relying on courts to discourage interconnection delays is not realistic. It is extremely difficult to define the boundary between a reasonable delay and an unreasonable one.<sup>47</sup> It is also difficult to measure the financial benefits that an incumbent actually receives from delaying entry,<sup>48</sup> which would be necessary to deter such delays efficiently with fines.

Perhaps a court could solve the problem of delays by requiring interconnection on some terms that are only preliminary, and that might be revised when the court reaches a final decision. However, this option would expose entrants to more risks than incumbents.<sup>49</sup> Foreseeing the risks of uncertain litigation, potential mobile phone companies may prefer to accept unreasonable interconnection terms that would inhibit their growth. Potential entrants may also simply avoid the market.

We now discuss the potential problem of unreasonable access terms. The law may say that access fees cannot exceed underlying costs, but if we choose to rely on voluntary negotiations then the law must remain silent about the "fine print" in the interconnection agreement. Incumbents can abuse the fine print as a method of raising the total cost of interconnection to rivals. For example, the incumbent may insist on clauses that would prevent any compensation in the event that the incumbent fails to meet performance standards. Such clauses impose a clear economic cost on entrants. Imposing such a clause may be similar to raising the interconnection fee above the \$0.09 per-minute level in our

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<sup>&</sup>lt;sup>47</sup> The court process itself can delay entry, and the incumbent will have natural incentives to litigate as rigorously as possible, to extend the time-frame required for litigation. Interconnection disputes can last up to five years before all appeals are exhausted. However, it would not be reasonable to ask incumbents to pay damages for litigation-related delays. Such damages would undermine the rights of incumbents to access the courts.

<sup>&</sup>lt;sup>48</sup> Measuring such benefits would require projections of the entrant's market share, and the possible decrease in prices that the entrant might introduce to the market. Since the entrant has not actually entered the market pending the delay, such projections would not likely meet the normal standards that civil law countries apply to the measurement of damages. Only in the United States have courts relaxed the standards for measuring damages in cases where monopoly power excludes competitors from the market. Courts in the United States have concluded that defendants, if found guilty, should be held responsible for the absence of reliable evidence concerning damages. However, most Latin American countries would require significant changes in law and particularly in legal traditions before following the United States in this regard.

<sup>&</sup>lt;sup>49</sup> An incumbent's revenues are typically much larger than an entrant's, particularly where the incumbent simultaneously operates a fixed-line network and an established mobile network. The amounts in dispute therefore constitute a much smaller fraction of an incumbent's revenues than an entrant's. Interconnection fees are particularly important for an entrant's business, given that an entrant's network will naturally start out small and therefore experience a high percentage of internetwork calls. The uncertainty created by litigation will therefore have a disproportionate impact on the entrant's business.

example to something like \$0.10 per minute. However, measuring the cost of such clauses is extremely difficult. Assessing the reasonableness of such clauses may raise the prospect of court delays, which benefit the incumbent. Incumbents will therefore have natural incentives to insist on such clauses.

We do not discuss the problem of service discrimination in any detail, since it is intellectually comparable to insisting on unreasonable terms in an interconnection agreement. Detecting discrimination may require expensive and protracted litigation, and it is difficult to determine appropriate levels of compensation for companies who have suffered from such discrimination. We see an additional issue with service discrimination: proving discrimination requires access to detailed data concerning the service that an incumbent provides to its affiliates and other companies. Most legal systems outside the United States do not give courts the authority to compel the production of evidence in such cases. New and detailed laws would be required to compel the publication of information relevant to service discrimination. Regulators can be expected to offer more expertise than legislatures in identifying the categories of information that should be produced to monitor service quality.

In summary, voluntary negotiations would only work if incumbents were allowed to charge access prices that would indemnify them from the loss of market share in the mobile telephone market. Such prices are likely to be so high as to permit the recovery of monopoly profits. It would seem reasonable to prohibit monopoly profits by passing laws that require reasonable access prices. However, the creation of such laws would give incumbents incentives to engage in unreasonable behavior, such as delaying entry, insisting on unreasonable access terms, and discriminating against rivals. Courts cannot deter such conduct effectively.

The Chicago School theory has other serious flaws that we do not analyze in this paper. The flaws concern the failure of the theory to consider several real-world complexities, such as incomplete information, the costs of large sunk investments, and the potential desires of management to protect market share even at the expense of profits. One of the authors has already discussed these problems elsewhere, 50 so here we only note that these problems further undermine the case for voluntary negotiations.

We note a final problem with voluntary negotiations. In the previous section concerning market failure, we discussed the incentives of mobile phone companies to impose unreasonably high call-termination fees. Assume for the moment that voluntary negotiations produce a timely interconnection agreement acceptable to all telephone companies involved. Economic theory and experience indicates that the call-termination rates in such agreements may be acceptable to the telephone companies, but excessive for consumers. However, consumers in many countries face significant difficulties in

<sup>&</sup>lt;sup>50</sup> Lapuerta, C. and Mosell, B., "Network Industries, Third-Party Access and Competition Law in the European Union," *Northwest Journal of International Law & Business* (Vol. 19, No. 3 (Spring 1999), pp. 454-478, and Lapuerta, C. and Tye, W.B, "Promoting Effective Competition Through Interconnection Policy", *Telecommunications Policy*, Vol. 23, No. 2 (March 1999), pp. 129-146.

bringing court cases that would seek to overturn a privately-negotiated interconnection agreement. Each consumer would only face limited damages from the calls made to mobile phone customers on different networks. The damages for any individual consumer are unlikely sufficient to finance litigation, and in many countries consumers also face difficulties joining forces to bring "class-action" lawsuits. Voluntary negotiations cannot be trusted to produce the best results for consumers.

The discussion above ignores the greater independence, and the potentially fairer procedural rules for the examination of evidence, that courts may offer relative to regulators. However, many Latin American countries have problems concerning the perceived quality of their judicial systems. Entrants to the mobile phone market are often foreign companies, which may be concerned with bias against foreigners in the national courts. It remains unclear whether courts can make better decisions than regulators. In any event, in the next section we offer recommendations intended to address concerns with inappropriate regulation or the investigation of disputes by regulators.

#### **Recommendations**

We recommend proactive regulation of interconnection for mobile telephone networks, considering the need to keep regulation simple while permitting flexibility.

Our first recommendation is to avoid dictating all the terms of interconnection. In the previous section we expressed concerns with the incentives of incumbents to insist on unreasonable terms. However, the regulator can take several measures to prevent incumbent abuse without specifying all terms of interconnection. We recommend the use of a "model interconnection" contract. Regulations would require the incumbent to offer the model interconnection contract, but would not oblige entrants to accept the contract. Regulations would permit incumbents and entrants to sign contractual provisions that deviated from the model contract.

A model contract would serve several purposes. It would protect entrants from incumbent abuse, since all entrants would be guaranteed a reasonable offer from the incumbents. The model contract would also permit flexibility, since entrants would be able to negotiate different terms if they chose. The flexibility to negotiate different terms would reduce the risk of inefficient regulation. If a regulation is inefficient, then by definition it creates scope for both parties to an interconnection agreement to improve their situation simultaneously. An inefficient regulation may benefit one side at the expense of the other. The party who suffers should see scope to improve its position by proposing an efficient alternative. It can induce acceptance by offering to compensate the other side for any losses. The party who suffers from the regulation will be able to afford the compensation and still be better off, since by definition the costs of an inefficient contract to one side of the agreement must exceed the benefits to the other side. This is a core concept in economics, widely known as the "Pareto principle". If the model contract is inefficient, then the flexibility to negotiate alternatives will motivate amendments. At the same time, the entrant will be protected from incumbent abuse, because the model contract establishes a benchmark of reasonableness, from which the entrant will not depart unless the amendments offer a net improvement.

Another key benefit of the model contract is to avoid interconnection delays. If the incumbent is required to offer a model contract, then a delay strategy will no longer make sense. The entrant may be interested in negotiating amendments to the model contract, which could take some time. However, the incumbent will not be able to drag out the negotiation process without risking that the entrant will counter by insisting on immediate interconnection pursuant to the model contract. As described above, we would only anticipate amendments that could make both sides to the agreement better off. By delaying agreement on proposed efficient amendments, the incumbent would risk sacrificing the potential benefits of those amendments.

We also believe that it would be possible to derive reasonable model contracts without tasking the expertise of the regulator excessively. We would recommend that the regulator conduct a consultation process with industry representatives, to obtain their views concerning the appropriate terms of interconnection. The regulator should propose as a starting point a sample interconnection agreement actually used in a country where competition in the mobile phone business has already demonstrated success. The goal of the consultation process should then be to seek the opinions of the incumbent and potential entrants concerning the changes to the sample agreement that would better consider the local market or legal framework, and that would improve efficiency. Our experience has been that the companies involved have strong incentives to contribute productively to such a consultation process. Often they contribute their management expertise, or hire outside experts to express views in formal reports for presentation to the regulator. The regulator itself could hire an independent expert to review the sample agreement and propose changes.

We conclude that a consultation process focussed on a sample agreement would significantly reduce the risk of inefficient regulation. Combined with the possibility of voluntary amendments to the finalised model contract, we believe that the proactive regulation of interconnection contracts should be superior to relying on voluntary negotiations where the incumbent has strong incentives to insist on unreasonable terms, to delay agreement, and to force litigation.

We perceive a possible concern with amendments to model contracts. The regulator may fear discrimination among different entrants. Perhaps the incumbent would agree to efficient amendments with one mobile phone company, but then become obstinate when a second company proposes identical changes. Through such behavior an incumbent may give one competitor a material advantage over others, limiting the scope of competition. Preferential treatment of one competitor may limit the market to only two companies: the incumbent's mobile phone business and the favored competitor. Economic theory and experience indicates that mobile phone companies can sustain prices above competitive levels if the market is limited to only two competitors.

To solve this problem, we propose a requirement to disclose all amendments to the model interconnection agreement, and to offer identical amendments to all companies. Companies often protest that the terms of interconnection agreements should be confidential. However, international experience indicates that incumbents can thrive commercially in regulatory regimes that do not even permit negotiated contracts. In

countries with such regimes, each company knows the regulated terms of interconnection, and therefore knows the terms that apply to its rivals. We find it difficult to believe that confidentiality cannot be a serious issue.

We should clarify the term "incumbent" in the context of our proposals. Much of our discussion involves the access problems presented by the owner of the existing fixed-line network. However, similar problems can occur whenever a large, established mobile operator is asked to sign an interconnection agreement with a potential new entrant to the market. We therefore recommend that all established incumbents be obliged to offer model contracts, to disclose amendments, and to treat rivals equally. Even small mobile companies have an effective monopoly over access to their customers, and all telephone companies rely on interconnection to make their services attractive. For ease of discussion we have discussed the concept of a single model contract, but we do not preclude the emergence of two different model contracts, one for mobile-mobile calls and another one for calls that cross between fixed-line and mobile networks.

Limitations to human thought and the precision of language mean that no model contract will be perfectly clear or perfectly anticipate all issues. The model contract should therefore anticipate litigation. We recommend that the model contract require the parties to follow certain procedures in resolving disputes. We recommend procedures that would mitigate potential investor concerns of bias against foreign companies in the domestic judicial system. We also recognize concerns that the regulator may display bias in favor of the incumbent, or may lack the necessary expertise to make appropriate decisions, or may fail to apply procedural rules that facilitate objective decisions.

Specifically, we propose that the model contract require the resolution of disputes pursuant to the rules of international commercial arbitration. However, the regulator would sit as the head of the arbitration tribunal. However, the regulator would be only one of three arbitrators under the typical rules for international commercial arbitration. The regulator would chair the panel, and each side would appoint an additional arbitrator. The two additional arbitrators would help supplement the expertise of the regulator, as could experts appointed by the tribunal or offered by the parties as witnesses. The international arbitration rules would provide a framework for the examination of factual evidence. Our proposal would avoid the pressure on regulators to develop quickly an independent dispute resolution department within the regulatory agency. Our proposal would also permit the regulator to draw upon outside expertise, reducing the need to keep many full-time members with deep economic, technical and legal expertise. Our experience suggests that our proposal will be important especially for the smaller countries in Latin America.

Foreign investors may still be concerned with the potential bias of regulators towards the incumbent. However, we do not believe that it would be realistic to forfeit the regulator's involvement in resolving disputes. Participation of the regulator is important, because decisions concerning interconnection disputes will indirectly become domestic industrial policy. To alleviate concerns of regulator bias, we make two recommendations. One recommendation is to ensure the independence of the regulator from the government, which often has ownership stakes in the incumbent telephone companies or

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may have political motivations to choose a particular side in the dispute. We do not dwell on this recommendation, since we believe that an international consensus has recently developed concerning the importance of independent regulators. We only mention that true independence requires such measures as: a) preventing members of the regulatory commission from simultaneously holding other jobs in government, b) ensuring that members of the regulatory commission have employment contracts of greater duration than the time between elections, c) severely restricting the grounds for dismissing members of the regulatory commission, and d) protecting regulators from personal liability in lawsuits that might otherwise intimidate them into taking particular decisions. Although personal liability would seem to increase accountability, unfortunately it has been abused to intimidate regulators. Unfortunately, the measures that we recommend are not yet standard in Latin America.

In addition to recommending independent regulators, we recommend publication of the decisions by the arbitration tribunal. This recommendation should provoke less controversy or political resistance than the potential restructuring of the regulatory authority. Publishing the tribunal's decision will create natural pressure on the regulator to be impartial and to undertake rigorous analysis. If a regulator chooses to publish a biased, poorly reasoned decision, then it will risk the acute embarrassment of a critical dissenting opinion from one of the other two arbitrators. We would anticipate that each side of the dispute would naturally appoint arbitrators of considerable expertise and authority, anticipating that the threat of a persuasive dissenting opinion should help discipline the regulator. We conclude that the publication of arbitration decisions is critical.

We now turn to recommendations concerning the level of interconnection fees. We expressed significant concerns with monopoly profits in the previous section concerning the case for proactive regulation. The legal framework should therefore require interconnection fees based on underlying costs. However, many issues remain for setting interconnection fees, which we describe generally as the difficulty of measuring costs allocating costs to different interconnection services. The scope of this paper does not permit us to answer all these issues. Below we provide some recommendations concerning particular issues where we can provide clear answers that should not depend on the particular telecommunications networks or countries involved.

Some economists interpret the term "costs" quite broadly. A reduction in profit can be viewed as a cost. The Chicago School perspective uses the term "opportunity cost" to describe an incumbent's loss of revenue when a customer stops paying the retail price of its mobile telephone service, and switches to a rival who only pays the incumbent an interconnection fee. We recommend that the legislation contain sufficient clarity to preclude the interpretation of costs as including foregone revenues.

We generally support the use of complex computer models to measure the costs of interconnection, but we make several warnings. First, the wisdom of using such models depends greatly on the expertise and resources of the regulator. Developing rigorous computer models can help measure costs more accurately, but can cost several hundred thousand dollars, and can take several months. Regulators may have to develop

significant internal expertise to update the models effectively or to perform sensitivities as conditions warrant. Regulators should not rely on such models unless their budget, time scales, and independent resources permit.

Our experience has also been that interconnection models can consume extensive of resources without ensuring superior results. In some cases a model's offer of superior accuracy is more than offset by a failure to measure the cost of capital for the underlying investments. Most all costs of interconnection involve the costs of having appropriate investments in place. Interconnection could be viewed fairly reasonably as a rental of existing investment on one network by another. Analogizing the interconnection fee to a rental payment, it becomes evident that the appropriate level of the fee depends critically on one's beliefs concerning the appropriate return on investment. The appropriate return on investment, which we call the "cost of capital", can vary enormously from one Latin American country to another because of discrepancies in their domestic interest rates and the stability of their economies. Our experience has been that enormous sums can be spent on an interconnection model without performing any rigorous analysis concerning the cost of capital.

To solve the problem, we recommend that regulators insist on a rigorous cost-of-capital analysis as a prior condition to reliance on interconnection models. The legal framework should specify that the cost of capital used by the regulator to derive interconnection fees must be defended objectively by statistical analysis that the regulator must publish. The regulator should be required to follow internationally-accepted financial techniques for measuring the cost of capital.

Another problem with interconnection models is their lack of transparency. A model may contain several problems, but market participants will not be able to identify the problems and recommend changes unless the regulator makes electronic copies of the model, with all the inputs, available to market participants. At times key inputs to the model will come from incumbents, but the incumbent does not have any obligation to publish the inputs on a regular basis. We believe that full disclosure is essential, and should include obligations to publish updated inputs.

If proper implementation of a model would demand excessive resources, we suggest the alternative of deriving interconnection fees by reference to international comparisons. International comparisons are also imperfect. Appropriate comparisons require the identification of networks with similar geographic scope and penetration, and in countries whose economies pose similar investment risks. Most of all it is important to select examples where another regulator has not clearly set the fees too low or high, which can be difficult to determine. The regulator would have to derive conclusions concerning the financial viability of companies in the relevant country, and the success of competition. Nevertheless, our experience indicates that the admittedly difficult alternative of international comparisons can be implemented more quickly, and places fewer demands on the regulator.

In previous sections we expressed concern over the excessive call termination charges on mobile networks. Since awareness of the problem is relatively recent,

international comparisons must proceed carefully. Regulators should avoid accidentally importing the unreasonable call termination charges that may exist in another country. If the regulator is using a complex interconnection model anyway, then setting call-termination charges does not present a separate issue from call origination. However, if the regulator uses international comparisons, we recommend a different approach for call-termination charges. We propose linking call-termination charges to call-origination charges, and to the charges for calls completed within a mobile network.

Competition has proven effective in reducing the charges that a mobile business will offer to its customers who call someone else within the same network. These charges implicitly contain a charge for a call-termination service. Each mobile network typically has a separate charge for calls that terminate on another network. These calls are typically charged at a mark-up over the other network's call-termination fee. The mark-up itself is effectively a "call origination" charge to the customer. Competition tends to restrain the call-origination charge. By subtracting this call-origination charge from the total cost of a call that remains within the same network, we can deduce an implicit competitive "call-termination" charge to the network's own customers.

Reasonable regulations could tie the call-termination charge in interconnection agreements to either the call-origination charge, or to the implicit call-termination charge that a mobile phone company charges for calls that remain within the network. It could also be reasonable to charge a small fee to recover the costs of interconnection interface costs, since specialized equipment is often necessary to communicate between networks. Reasonable regulations of this nature would likely produce far lower call-termination charges than independent mobile networks have derived, and would not rely on complex computer models to measure costs.

#### Summary of Recommendations

- 1. We propose regulating the terms of interconnection by reference to a model interconnection contract.
- 2. The model contract should be adopted pursuant to an open consultation process that asks market participants for their views concerning a sample interconnection contract taken from another country. We recommend that the regulator select a sample contract from another country in which the mobile telephone market has developed successfully.
- 3. The legal framework should permit voluntary amendments to the model interconnection contract. We recommend requiring publication of all voluntary amendments to the model contract, and prohibiting incumbents from discriminating among companies in its willingness to accept amendments.
- 4. We suggest requiring a dispute resolution mechanism based on the rules for international commercial arbitrations. The regulator should be the head of the arbitration tribunal, but each party should be allowed to appoint an independent arbitrator.

- 5. The legal framework should contain measures to ensure the independence of the regulator, concerning such issues as the potential employment of regulators in other parts of government, the duration of employment, the grounds for termination, and the exposure to personal liability in lawsuits.
- 6. The regulator should be required to publish all arbitration decisions, as well as any dissenting opinion.
- 7. We recommend a requirement for interconnection fees to be no greater than the underlying costs of providing the services. The concept of "costs" should be sufficiently clear to exclude "lost profits" as a possible interpretation.
- 8. Complex computer models can play a useful role in deriving appropriate interconnection fees, subject to three conditions: a) the regulator must have sufficient resources to implement the model successfully without undermining other important tasks, b) the regulator must first commit to publish a rigorous, objective analysis that determines the cost of capital for use in setting interconnection fees, and c) electronic copies of the model with its inputs should be given to industry participants for full transparency.
- 9. If it is not feasible to satisfy all three conditions above for the use of interconnection models, we propose the use of international comparisons to derive interconnection fees. We recommend that the international comparisons consider the following aspects of the comparison countries: a) their geographic scope, population density, and penetration, b) the interest rates and investment risks of their economies, c) the financial performance of their telecommunications companies, and d) the success of competition.
- 10. International comparisons should proceed with special care in evaluating call-termination charges, which experience indicates are apt to be excessive. We would recommend the alternative of tying call-termination charges to either the call-origination charges that each network charges to its customers for calls that cross networks, or to the implicit call-terminating charges that each network implicitly charges for a call that terminates in the same network. In setting call-termination charges, we recommend accounting for the costs of specialised network interface equipment.

# 4. Incumbent Participation in Mobile Telephony

Access regulation presents several challenges that involve the potential for abuse of the mobile phone market by an incumbent local-service provider. Abuse can be avoided simply by prohibiting the incumbent from entering the mobile telephony business. However, prohibiting incumbent participation raises several efficiency issues, and is often impossible given the history of the industry or political considerations. Here we focus on the efficiency issues, and we describe some alternatives to outright prohibition. We recommend considering these alternatives if historical or political reasons make prohibition impossible.

Interconnection with local-service providers is crucial for the success of mobile telephone companies. If an incumbent local-service provider enters the mobile phone business, then it will have natural incentives to discriminate in the provision of access service to other mobile phone companies. When a technical problem occurs in the interface with a competing mobile phone company, we find it difficult to see how the incumbent local-service provider could be motivated to address the problem promptly or effectively. A technical interconnection problem may frustrate the incumbent's local-service customers, but would likely have a far greater impact on the customers of the competing mobile phone network. The competing mobile phone network would naturally be much smaller than the incumbent's local-service network, and would therefore depend to a much greater extent on inter-network calls. Frustrating the customers of a competing mobile phone network could help the incumbent's own mobile business. An incumbent local-service network therefore has natural incentives to provide better interconnection service to its own mobile phone network than to competing mobile phone businesses.

Regulators find it extremely difficult to detect, punish and prevent service discrimination. Proving a problem can require access to large volumes of data over an extended time period. The incumbent may seem unusually slow in responding to technical problems that confront a competing mobile telephone business. However, conclusive proof of service discrimination would likely require detailed documents concerning the response times to technical problems with both the incumbent's own mobile business and the competitor's business. Courts in Latin American countries typically do not compel the incumbent to disclose all relevant business documents in litigation. The absence of sufficient written evidence places competing mobile phone companies at a disadvantage in offering proof. Even if the incumbent provides sufficient documents concerning its interconnection service, discrimination is likely to be detected only after occurring over a sustained period. By then the discrimination will have inflicted serious damage.

In most Latin American countries, mobile phone companies would face serious difficulties proving the full extent of damages from service discrimination. Damages are likely to involve a diminished reputation, which reduces a company's market share. It is difficult to establish with objective evidence a change in the reputation of a company, and even more difficult to measure the financial consequences. A company's market share may fall from 30% to 10% after experiencing service discrimination, but it would not be responsible to conclude that service discrimination is responsible for the 20% difference. Perhaps for other reasons the company's market share would have fallen from 30% to 12% in the absence of the service discrimination, leaving the service discrimination responsible for only 2% (calculated as 12% minus 10%). Perhaps for other reasons the company's market share should have increased from 30% to 50%, making the service discrimination responsible for 40% (calculated as 50% minus 10%). A plaintiff's attempt to prove damages is always vulnerable to accusations of speculation.

We conclude that competing mobile phone companies would logically fear service discrimination. Service discrimination is difficult to prove, and can usually be proved only after occurring over a sustained period. Even if a company can prove service discrimination, it can expect difficulties proving the full amount of financial loss. We have mentioned some specific problems involving the production of business records in court, and measuring damages in litigation. Although we directed these comments specifically at court proceedings, similar comments apply even if a regulator chooses to handle disputes. Regulators often have difficulty compelling the production of documents, and would logically face difficulties measuring the market-share impact of disputed conduct.

The problem of service discrimination would appear to support a policy of prohibiting incumbent participation in mobile telephony. The most celebrated exercise of this policy was in the AT&T litigation of the United States, which concerned the abuse of local fixed-line networks to distort competition in long-distance telephony. The United States federal court saw serious evidence of service discrimination, and doubted the regulator's ability to prevent such discrimination, or to compensate the victims of discrimination adequately. The federal court therefore felt compelled to prevent local fixed-line incumbents from competing in long-distance markets. The same logic applies to mobile telephony.

The AT&T decision was both applauded and criticized seriously for more than a decade, until effectively overturned by the 1996 Telecommunications Act. Praise of the decision focused on the subsequent rapid development of effective competition in United States long-distance markets. Latin American countries could anticipate similar benefits for the development of competition in mobile telephone markets, especially in countries where the regulatory regime is not strong enough to police service discrimination effectively.

Much of the criticism of the AT&T decision is either unrelated to the wisdom of barring incumbents from participating in other businesses, or reflects unique characteristics of the United States regulatory regime. One major criticism was the usurpation of regulatory powers by the federal court. However, Latin American countries can avoid this issue by ensuring that the regulatory authorities take the initiative to restrict incumbent participation in mobile telephony. Another major criticism of the AT&T decision involved the belief that subsequent industry developments rendered it obsolete. Some observers pointed to signs of developing competition in local service markets. Some competitive local exchange carriers (CLECs) had developed significant businesses under liberalization measures that permitted large customers to bypass the incumbent's connections to public switches. Although CLECs had focussed almost exclusively on corporate clients with large traffic volumes, CLEC success created optimism on two fronts: the prospective erosion of local service monopolies, and the ability of regulators to prevent service discrimination. CLECs had thrived despite the potential for incumbent abuse through service discrimination. Their success therefore seemed to confirm that strict regulation could avoid problems. We note that few countries in Latin America have witnessed significant CLEC success in the provision of local service.

The 1996 Telecommunications Act permitted incumbent local-service companies to enter long-distance markets, if incumbents could demonstrate effective competition in

local-service markets. In a regulatory order implementing the Act, the FCC specified the conditions necessary to demonstrate effective competition. Several of the conditions focussed on the absence of service discrimination. We might advocate a similar approach for Latin American countries with respect to incumbent participation in mobile telephony. However, this approach can only succeed in the presence of strong, independent regulators with the power to compel the production of sufficient documents concerning service performance. We see strong reasons to restrict incumbent participation in countries where regulators do not possess these characteristics.

We recognize several conceivable efficiency advantages to incumbent participation in mobile telephony. Advantages can include the use of an established local brand image, leveraging local market knowledge, efficiencies with respect to administrative costs, or even technological efficiencies if the incumbent already provides wireless local-loop services. However, we find it difficult to believe that these advantages would warrant a policy of incumbent participation in mobile telephony.

Experience in Latin America suggests that incumbent local-service providers have reputations for poor service quality. Consumers have been open to purchasing mobile phone services from foreign operators that are new to the market. In most cases it would be mistaken to view the incumbent's brand image as a valuable resource that would be wasted by limiting the incumbent to local telephone service.

The incumbent's local market knowledge presents a more interesting issue, but we do not believe that it would justify participation in mobile markets. Much of the local knowledge can be transferred between companies. A foreign company would naturally offer premium salaries to employees of the incumbent telephone company if they have valuable knowledge of the local market. Some local market knowledge may involve the database of existing local-service customers, but the incumbent could sell this data to entrants, perhaps under regulatory guidelines. Access to the incumbent's customer information has proven important to the development of competition in several countries.

Incumbent local-service providers might save on administrative costs by entering the mobile telephone market. Incumbents may be able to offer consolidated mobile and local telephone bills to customers. However, consolidated bills would raise questions concerning a level playing field in mobile telephony. Entrants would logically complain that the incumbent's ability to offer consolidated bills does not reflect superior management efficiency, but simply the incumbent's good fortune to have inherited a local service monopoly. Entrants would logically demand the ability to consolidate mobile telephone bills with the bills for the incumbent's local service. One of the authors has elsewhere concluded that an incumbent's refusal to permit consolidated bills with other carriers constituted an abuse of a dominant position.<sup>51</sup> Answers to these complicated issues may vary depending on specific circumstances, and the scope of this

<sup>&</sup>lt;sup>51</sup> Telstra New Zealand, Ltd. v. Telecom New Zealand, Ltd. (High Court of New Zealand, Auckland Registry, Commercial List CL No. 16/99), "Affidavit of Carlos Lapuerta in Reply and in Support of Interlocutory Application by Plaintiff for Interim Restraining Orders (May 26, 1999).

report does not permit a full analysis. However, we can safely conclude that the potential administrative cost savings of incumbent entry into mobile telephony do not present clear or compelling policy justifications that could override concerns with service discrimination.

If incumbent local-service providers already use wireless local loop technology, they may be able to provide mobile telephone service efficiently by maximizing the use of their existing technology and infrastructure. Such efficiencies could provide compelling justification for incumbent participation in mobile telephony. However, incumbents can realise efficiency benefits without actually offering mobile phone service to retail customers. An incumbent could build a mobile network under a long-term lease agreement with an independent mobile phone company. The long-term lease could reward the incumbent for its efficiencies in creating a mobile phone network, without simultaneously giving the incumbent perverse incentives to distort competition in mobile telephony. Fixed annual lease payments could reward the incumbent, without giving the incumbent a financial interest in expanding the market share of the lessee. We recognise that the use of leases would raise complex issues, but we believe that the potential for leasing arrangements has not yet been explored sufficiently. We believe that it presents an extremely interesting avenue for maximizing efficiency while reducing problems of service discrimination.

We recommend that countries consider another interesting policy, which could permit incumbent participation in mobile telephony while reducing concerns over service discrimination. Countries should consider allowing incumbents to participate in mobile telephony, but only outside their local service areas. In a country with two large cities, the local service provider in one city could be allowed to offer mobile service in the other city. Incumbents might complain that customers want national coverage. We would agree, and would therefore allow an incumbent to offer national coverage by signing roaming agreements with independent mobile phone companies who operate inside its local service area. Our recommendation would allow incumbents to receive efficiency benefits from participating in mobile telephony, but would reduce their incentive to discriminate in the provision of access.

We find it difficult to believe that a roaming agreement would give an incumbent strong incentives to discriminate in favor of an independent mobile phone company. A rational incumbent should realize the dangers to distorting competition in favor of its roaming partner. If the roaming partner acquires a local monopoly, then it might use the resulting profits to fund predatory competition against the incumbent's mobile business outside the local service area. An incumbent may also fear discriminating in favor of the roaming partner, because a lack of mobile competition in the incumbent's local-service area would grant the partner additional negotiating leverage when the current roaming agreement expired. Incumbents would naturally prefer effective competition in the area where they will have to rely on future roaming agreements.

Political or institutional factors may make it impossible to restrict incumbent participation in mobile telephony, either absolutely or partially as suggested above. If the incumbent already participates at the retail level in its local-service area, then at least we

recommend strict separation of its fixed-line and mobile businesses. Below we discuss and recommend four levels of separation: accounting, management, legal, and ownership separation.

Accounting separation means the preparation of separate audited accounts for the mobile telephony and local service businesses. Accounting separation helps identify the costs and revenues of each business separately, which helps a regulator evaluate potential claims of cross-subsidization.

Management separation implies restrictions concerning the interaction between the employees of the incumbent's local-service business and its mobile business. Managing the businesses separately should help give confidence in the separation of the accounts. If the two businesses are managed as one, then the separate financial accounts may rely heavily on rules of thumb for splitting the costs of shared resources. Such rules of thumb are difficult to evaluate properly. Shared management could therefore hide potential cross-subsidies.

Strong management separation should involve restrictions on the methods of compensating, promoting and dismissing employees. An employee of the incumbent's local-service business should not receive a bonus tied either directly or indirectly to the financial performance of the mobile service business. An employee of the incumbent's local-service business should not be disciplined or dismissed if its decisions have adverse consequences for the mobile business. A popular idea in the European Union is the requirement to hire "compliance officers" who monitor the separation between two businesses, to ensure the effective implementation of management separation.

Legal separation refers to the creation of separate legal entities for handling the activities of each business. Legal separation offers two important benefits. One benefit is the increased difficulty of cross-subsidizing activities. In the absence of legal separation, a mobile business cannot borrow independently. When a loan is signed with the owner of two businesses, it is never clear whether the financial strength of one business indirectly supports the loan made to finance the other business. A regulator or court could not easily determine whether the incumbent's local-service monopoly reduced the costs of borrowing funds for use in mobile telephony. Legal separation would involve the creation of a separate mobile phone subsidiary, which would have the legal authority to sign separate contracts such as loans. If a lender to the mobile subsidiary wants the local-service business to provide financial support, the lender would insist on clear language in the loan. A regulator can reduce the likelihood of cross subsidies by preventing loan agreements that contain financial guarantees backed by the incumbent's local-service monopoly.

The second benefit of legal separation involves the use of contracts between the incumbent's mobile phone business and its local-service business. If the incumbent's mobile phone business has an independent legal status, then it can sign interconnection contracts with the local-service business. A regulator or court could see whether the contract was more favorable than the contracts signed with other businesses, reducing the risk of discrimination.

Ownership separation involves a different distribution of investors for the incumbent's mobile phone business and its local-service business. Complete ownership separation requires the incumbent to sell 100% of its mobile phone business to an independent company. Full ownership separation would eliminate all of the incumbent's incentives to engage in service discrimination or other behavior intended to distort competition in mobile telephony. However, immediate ownership separation is rarely feasible politically. However, countries should explore the possibility of setting a deadline for the sale of an incumbent's mobile phone operations after a specified number of years. Giving the incumbent time would allow several benefits. The incumbent could accumulate a track record for the performance of its mobile business with separate management and accounting. The accumulated track record would reduce the uncertainties faced by potential acquirers of the mobile phone business. With a reliable history concerning the independent performance of the mobile phone business, potential acquirers are likely to offer a higher price. Waiting some years for full ownership separation may also help reduce political opposition to the move, in part by allowing employees to anticipate and respond to the potential impact of an ownership transfer.

Partial ownership separation involves the retention of an ownership stake by the incumbent. Partial ownership separation could significantly reduce incentives to engage in service discrimination or other anti-competitive behavior. If an incumbent local-service provider retains only a 20% interest in its mobile phone subsidiary, then efforts to distort competition in mobile telephony might not seem worthwhile. The incumbent might have to fight expensive lawsuits against other mobile phone companies, while retaining only 20% of the total value that the disputed conduct might confer upon its mobile phone business.

## **Recommendations**

- 1. We recommend prohibiting incumbent local-service companies from entering the mobile telephone business.
- 2. We acknowledge that it may not be feasible to exclude incumbents from mobile telephony. If not, then we recommend exploring either of two restrictions: a) keep the incumbent out of retail mobile phone operations, while allowing the incumbent to build mobile telephone infrastructure for lease to independent companies, and b) permit the incumbent to offer retail mobile telephone service, but only outside its local service area.
- 3. If an incumbent must limit mobile phone operations to outside its local service area, then the incumbent should be permitted to offer national coverage by signing roaming agreements with mobile phone operators inside its service area.
- 4. If it is not politically feasible to impose any of the restrictions discussed above, then we recommend requirements to separate the accounts, management, legal status, and ownership of the incumbent's local-service and mobile businesses.
- 5. Management separation should include rules concerning the compensation, promotion, and dismissal of employees. Employees of the local-service business

- should not be rewarded or penalized based on the performance of the mobile phone business. We recommend using compliance officers to monitor separation.
- 6. Legal separation should be implemented to ensure that a company does not use its local-service monopoly to finance its mobile-phone activities. An incumbent's mobile business should not be allowed to sign loan agreements that involve financial guarantees supported by the assets or cash flows of the local-service business.
- 7. Legal separation should carry an obligation for the incumbent's mobile phone business to sign interconnection contracts with the local-service business, which should be compared with the contracts of other mobile phone companies to prevent discrimination.
- 8. We recommend full ownership separation because it eliminates all incentives of local-service providers to distort competition in mobile telephony. However, we recognise that immediate ownership separation is rarely feasible. We therefore propose two alternatives. One alternative is to give the incumbent a fixed period of years before requiring the sale of its mobile business. Another is to seek partial ownership separation—selling part of the incumbent's ownership interest in its mobile phone subsidiary to independent investors.

## 5. Regulating Entry

Many governments have borrowed the idea of *competition for the market*, which refers to the delineation of a market with a limited number of participants, at times only one, and reliance on a competitive tender process to assure a reasonable outcome. In Latin America, entry in mobile telecommunications usually involves some form of competition for the market. Long-term concessions are typically granted for specific geographic areas, with either an exclusivity period to encourage investment or a limitation on the number of competitors. Auctions may be used to grant a specific number of national licenses. Competition for the market commonly involves one of two parameters: paying the fee that generates maximum income for government, or committing to charge customers the lowest tariff. Competition for the market makes sense for industries characterized by pervasive scale economies and no technological progress. However, we question the usefulness of the concept for liberalizing mobile telephony.

Five factors suggest that limiting the number of entrants in mobile telephony will only reduce consumer welfare. First, scale economies are less of a problem in Latin-American mobile telephony than in other network industries, partly because the low level of fixed-line penetration permits high rates of demand growth. The case of El Salvador illustrates that mobile telephony is not a "natural monopoly". El Salvador has roughly 6.3 million people with a modest average income, yet has five mobile operators. Second, spectrum is not scarce in Latin-American countries, in contrast to industrialized countries where military and other uses crowd out spectrum. Third, the market borders of mobile telephony are artificial: mobile telephony overlaps with long distance, wireless local-loop services and value added services (data and video transmission). Mobile telephony can compete in these market niches. Fourth, technology changes are frequent and mobile networks can be installed in a very short time. Fifth, from a purely financial view, exclusivity periods facilitate investment by making licenses attractive, in part by reducing risk. However, if risks are significant, or if the market is not attractive, then there will be few companies that enter the market anyway.

Mobile service has decisive advantages for increasing the gap in penetration between industrialized and developing regions, but many Latin-American countries do not maximize the opportunity by liberalizing entry. Entry in the mobile telephony industry is over- regulated. The reasons cited to limit entry are ideological and political. Spectrum is simply assumed to constitute a valuable resource that belongs to the state, which therefore should not be given away for free, especially to large foreign companies.

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<sup>&</sup>lt;sup>52</sup> Mobile telephony started operations in 1998 in El Salvador, when teledensity was lower than 10, and has become the dominant telecommunications medium in the country. We are not saying that the current number of operators will prevail. Consolidation might occur at a later stage. But that is another story.

Restricted entry has served either as an indirect form of taxation to raise government funds ("taxation by regulation"), or to set seemingly low prices within a market structure that is paradoxically designed to be noncompetitive. The quick spread of mobile telephony seems even more remarkable in light of entry restrictions.

We perceive the following problems with entry restrictions:

- Under *taxation by regulation*, the mobile phone operator's need to recover the entry fee will produce inefficiently high prices. The welfare of the country as a whole does not improve. Even if the government makes money from selling artificially created "monopoly" rents, the citizens end up paying. Political disputes will inevitably arise over allocating the proceeds among conflicting goals. Disputes will inefficiently dissipate part of the rents.
- Even if the "monopoly" rents are totally devoted to a noble goal such as universal service, we see better ways to finance universal service. We see no reason why mobile customers should be targeted to fund universal service indirectly by paying monopolistic prices. Competitive mobile telephony can foster competition and innovation in other telecommunications sectors, and mobile telephony is often the cheapest technology to expand penetration. Indirectly taxing mobile telephony might reduce penetration and have adverse effects on other markets. Governments should estimate the funds necessary to finance universal service, and raise them directly. If direct funding is not feasible (as in might be the case in HIPC countries), then the burden of universal service should be spread more widely among all telecommunication users. Universal service can be addressed through license obligations to serve customers in specific areas, without limiting the number of licenses granted and without charging entry fees.
- In a dynamic setting, government insistence on entry fees may discourage investment by latecomers to the market. Monopoly rents persist at the expense of insufficient penetration. And if a government decides not to charge latecomers once the first generation of mobile operators has paid the entry tax, legal disputes requesting "fair compensation" are likely to appear.<sup>53</sup>
- We see problems with the award of licenses to the bidder who offers to charge the lowest tariff. When competition for entry is keen, entrants may accept investment targets than later prove financially unfeasible. Experience has already shown that frustrated entrants will ask the regulator to modify the tariffs or grant other relief. On the other hand, if competition for the market is weak, entrants will enjoy rents during the exclusivity period at the expense of insufficient penetration.

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<sup>&</sup>lt;sup>53</sup> Sidak and Spulber, Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States (1998).

Restricting entry can impede competition between mobile telephony, fixed wireless
and long distance. The absence of competition can undermine the benefits of quicker
penetration, product diversity and lower prices.

## **Recommendations**

We recommend allowing unrestricted entry in mobile telephony. Concerns with excess entry may arise in infrastructure sectors where assets have longer economic lives, and investment is irreversible (like water works and power plants). However, the government should not worry about the prospects of excessive entry in mobile telephony. We recommend leaving the market to worry about the issue, as there is nothing wrong in starting out with "too many" competitors. A policy of unrestricted entry does not automatically produce an excessive number of participants in the market. If "too many competitors" enter the market, it will only be because each company independently believed it had an advantage relative to the others, or that the market could accommodate all of them. As long as "too many competitors" remain in the field, consumers will benefit from low prices. Additionally, if spectrum had any positive value at all, unrestricted competition would transfer its value from mobile phone firms to customers. The benefits of the country's scarce resource would accrue to consumers.

Market participants are likely to make better decisions than the regulator concerning entry into mobile telephony. Regulators will typically know less than mobile phone companies about product innovation, technological change and specific business opportunities. We prefer trusting management judgment on such issues, since management has natural financial incentives to assess markets accurately. Neither regulators nor legislatures have inherent advantages in choosing the appropriate number of companies.

We recognize a possible "first-mover" argument concerning entry in mobile telephony. Perhaps the first company in a market would reduce risks for subsequent entrants. Conceivably, no one would enter the market initially because all potential competitors would prefer someone else to enter. However, a "first mover" also acquires natural advantages. The first mover can target the most attractive part of the market first, and can market easily as the sole provider of mobile telephony. It seems speculative to believe that the "externality" of reducing risk for others could more than offset first-mover advantages.

We also recommend avoiding elaborate procedures such as auctions, which might be used to select the best participants for the market or allocate spectrum. Auctions are *in vogue* these days, perhaps partly because of recent advances in the underlying economic theory, and because of perceived success in some contexts. However, Many Latin-American countries lack strong regulatory and antitrust traditions. Auctions can create problems in this context. Exclusive rights can create powerful firms, which may not be in the interest of a country with a weak regulator. In theory, the firm with the most powerful lobbying abilities could afford to bid highest in an auction, anticipating increased profits from subsequent domination of the regulator. Opportunities to increase profits include the potential extension of exclusivity periods, lowering quality standards and investment

obligations, increasing tariffs more than contractually agreed, or manipulating call-termination charges on other networks. Economists often discuss the *winner's curse* in auction theory, which describes the tendency of the bidder to over-value the product for sale. With power firms and weak regulators, the winner may not be cursed at all.

We recognize that a policy of unrestricted entry can increase the likelihood of subsequent industry consolidation. Some firms may not be able to survive, or global corporate strategies may prompt takeovers. Consolidation may go too far and create market power. To protect competition, Latin-American governments must develop analytical capabilities and monitor the extent of competition continuously.

In addition to strengthening the competition authority, we recommend that mobile telephony licenses should make mergers, acquisitions or disposals of assets subject to regulatory approval. The regulator must have an obligation to make approval contingent on a finding that the proposed transactions will not harm competition unreasonably. The regulator should be required to establish a panel of experts to analyze potential mergers and assess their impact on competition. The decision-making procedures and criteria should be clearly stated, as should the rules concerning the composition of the panel.

We also recommend that a government's responsibility should not stop with allowing unrestricted entry. A government should also take measures to encourage entry. In small countries, harmonizing license rules and technologies with neighboring countries can increase traffic and facilitate investment. Additionally, entry can be encouraged by rules allowing firms to use the spectrum as they see fit without restrictions. We recommend permitting companies to trade spectrum, and recommend against restrictions that would prevent the use of mobile technology to provide fixed wireless services. Permitting entry in fixed-wireless services will help promote entry in mobile telephony while also increasing competition for local services, as in the Dominican Republic.

## Summary of Recommendations

- 1. Governments should allow unrestricted entry into mobile telephony. Spectrum auctions and entry fees should not be used to increase government revenues or to fund universal service.
- 2. Government policy should emphasize strengthening the competition authorities, to prevent excessive consolidation in the industry.
- 3. Licenses should make mergers, acquisitions or disposals of assets contingent upon regulatory approval. Regulators should be obligated to consider the impact of proposed transactions on competition before granting approval. When reviewing mergers in the telecommunications industry, regulators should have obligations to apply transparent rules for convening expert panels and making decisions.
- 4. Governments should encourage entry. Small countries should consider harmonizing their rules with neighboring countries as a method of encouraging entry. Companies should be permitted to trade spectrum, and should not face

restrictions on its use. We specifically recommend against policies that would prevent mobile phone companies from using their spectrum to provide fixed-wireless services.