

Research Article

Mobile Communications in Mexico in the Latin American Context

Judith Mariscal

judith.mariscal@cide.edu
Telecommunications Research
Program
Centro de Investigación y
Docencia Económicas CIDE
Carretera México-Toluca 3655
Col. Lomas de Santa Fe
01210
Mexico City, Mexico

Eugenio Rivera

eugenio.rivera@cide.edu
Telecommunications Research
Program
Centro de Investigación y
Docencia Económicas CIDE
Carretera México-Toluca 3655
Col. Lomas de Santa Fe
01210
Mexico City, Mexico

Introduction

The Latin American region has embraced the zeal for mobile technology that is sweeping the world. Indeed, the use of mobile telephony has increased dramatically, vastly surpassing all expectations for the industry. The level of mobile penetration in Latin America has grown so rapidly and in such magnitude in the past few years that it has left fixed telephony behind: today, the penetration of mobile telephony is twice that of fixed telephony and projections for growth point toward a further widening in the gap between the two.

Although the tendency observed in the region mirrors a worldwide trend, the way mobile services are used in a developing region such as Latin America is very different from the developed regions of the world. Access to telecommunications is largely mobile and not fixed; mobile services are a substitute—not a complement—to other services. While during the mid-eighties mobile telephony was considered a device to be used by the richest segments of the population, today mobile telephones reach into the poorest segments of the population, providing their only source of access.¹ In fact, for some of the poorest segments of the population mobile telephony has become the *central* mode of communications in Latin America. In the region, despite several economic slumps, the number of mobile subscribers increased from 4 million in 1995 to almost 200 million at the end of 2005.

One factor that has contributed to the expansion of the mobile network is the relatively more competitive market context in which it has developed. Compared to fixed telephony, mobile has since its inception faced less regulatory restraints and has a significantly higher number of operators. Competition between mobile carriers has encouraged innovation, expanded the network, and reduced prices. Indeed, innovative pricing strategies such as prepaid subscription and calling party pays have contributed very significantly to the dramatic growth in mobile subscription.

Today, however, this more competitive market structure appears to be confronted with the increasing market concentration the telecommunications sector is experiencing in Latin America. Despite the implementation of numerous promarket reforms whose objective was to promote the entrance of new players into the market, Latin America may be heading toward a duopoly market. Today, the Spanish firm Telefonica and the Mexican corporation Grupo Carso Telecom, owners of Telmex and Amer-

1. In 1984, AT&T estimated that by 1999 there would be one million mobile users. That same year, the actual number of users in the United States alone was close to 90 million (Hausman 2002).

ica Movil, have operations in fifteen countries of the region and together service 90% of the regional market. This context poses a serious challenge to regulatory policies that promote competition.

This article analyzes the particular form of expansion that the mobile sector has experienced in Mexico in the context of the Latin American region. It attempts to identify the driving forces behind this growth and the process by which the mobile industry in Latin America is increasingly being dominated by two providers. The argument here is that, as the mobile market became a business with a very favorable perspective, the firms in the sector began to compete through global operations and the two companies that were able to consolidate their regional expansion were those that, through a strong position in their home markets, implemented an aggressive acquisition strategy.

The first section will present the transformation of the Spanish firm Telefonica and the Mexican group Telmex–America Movil into central actors in the regional market as a result of national champion policies implemented in their home countries, as well as the business strategies these firms followed to attain this position. Moreover, this acquisition process has provided mobile companies with economies of scale that have strengthened their position in each country as their regional presence increases. The sections that follow offer an overview of the development of the mobile market in Mexico evaluating it within the Latin American context and describing how pricing strategies such as prepaid have provided a means of access to low-income segments of the population and with this created a new source of demand for mobile services. In turn this created a sustainable business model in Latin American countries where there are low expenses per capita.

How Two Carriers Dominate the Regional Mobile Market

After more than a decade of promarket reforms, today the Latin American market is dominated by two carriers. Instead of an open market with numerous players that compete for a share, the region today experiences the consolidation of the same two grand players that compete with one another in vir-

tually every country. While the Spanish firm Telefonica consolidated a strong position after the acquisition of the mobile operations of Bellsouth in many countries of the region, the Mexican firm Telmex and its sister firm America Movil have recently developed an aggressive acquisition policy in local telephony as well as in the mobile sector. These results are unexpected, not only because the objective of the reforms was to generate an atomized market, but also because the companies that today control the market were far from being the strongest in the world. By this process, Telmex and Telefonica were transformed into central actors in the international telecommunications sector.

During the 1990s, the reforms undertaken in the telecommunication sector in Spain and Mexico favored the creation of large companies with a strong position in all segments of this market. The strategy implemented in both cases was the result of policies that were directed toward the creation of national champions, and the success of these policies created the basis for their internationalization.

In the case of Spain, on the eve of the creation of the European Common Market, the Spanish government strengthened Telefonica before it faced competition in an open market. At the time, Spanish telecommunications were among the least modernized systems in Europe, so the government feared that Telefonica would be absorbed by the major European operators or, in the best possible scenario, that it would play a minor role within an integrated European telecommunications sector.

The regulatory framework established a generous pricing policy, together with “cheap money” financing policy and the decision not to distribute dividends. During the first half of the 1990s, the pricing policy was focused on financing the modernization of the company and balancing tariffs. Telefonica benefited from the support of the Spanish government through solid financing mechanisms.² Telefonica began acquiring companies that held market power with exclusivity periods in Argentina, Chile, Peru, and Brazil.

In the case of Mexico, as a cornerstone of the country's modernization process, Telmex was privatized and sold as a vertically integrated company in 1990. Achieving a privatization successfully meant

2. This policy was not exclusively for the telecommunications sector but was developed also in other sectors, such as infrastructure and banking.

overcoming a number of political and economic obstacles. A vertically integrated company served the purpose of satisfying the demands of the key actors in the system: the national private sector and the unions, which were lobbying against the disintegration of the company and favored the creation of a national champion.

Initially, the Mexican group Telmex–America Movil did not have a significant participation in the process of privatization in Latin America. Its interest in the Latin American telecommunications sector began only during the second half of the 1990s and followed two different paths: the acquisition of privatized fixed telephony companies in Guatemala, El Salvador, and Nicaragua and, most important, the expansion of its mobile telephony operations to several countries in South America in 2003.

The Latin American experience shows that those companies that competed in the fixed telephone segment of the market acquired a significant advantage that allowed them to consolidate a very strong position in the telecommunications market. The control of the incumbent position in Spain, Mexico, Argentina, and Chile, for example, established important obstacles to the consolidation of competitors within those markets. The U.S.-based companies that entered the Latin American telecommunications market in what appeared to be the dynamic sectors at the beginning of the last decade—such as mobile and long distance—were not able to secure their position and today have lost all significant share of the Latin American market. Even procompetitive regulatory policies were not enough to create a truly level playing field that would counteract these initial strong positions.

Until 1997, mobile telephony was a secondary business option for the incumbent companies. Fixed teledensity by far surpassed mobile penetration, and investment in fixed telephony, being sheltered from competition and operating within a relatively weak regulatory environment, seemed to promise a major source of income. Mobile telephony firms, by contrast, were subject to intense competition. Therefore, as the mobile companies were facing serious difficulties in generating positive returns, the firms in the fixed sector owning mobile sister companies did not consider this branch of the business to be very promising. After 1998, whereas fixed teledensity tends to stagnate in most countries, mobile telephony begins to grow at two digit ratios. The aver-

age annual growth of mobile telephony users during the 2000–2003 periods was 33% in the region, while growth in the case of traditional telephony was only 7%.

Regulatory changes in the industry and pricing strategies such as “calling party pays” contributed to support this development and contributed to dramatically change the access to voice communications. Interconnectivity with the fixed users of the incumbent company has had vast repercussions on the development of mobile telecommunications in Latin America. The main issue regarding interconnectivity was defining the criteria for access charges. Normally, the fixed telephony operators operating within the same concession zones determined symmetrical access charges. The most common modality has been “sender keeps all,” whereby the company originating the call retains the full payment of the user. The second modality is to establish a formula to share the income, usually distributing 50% to each of the operators involved in a successful communication. In the case of mobile telephony, because of the differences in convergence, coverage and maturity between fixed and mobile technologies, symmetrical access charges did not allow for mobile operators to generate enough income to finance their companies. Therefore, the most common solution was initially for the user of mobile telephony to pay for both outgoing and incoming calls. The high costs for the user of this solution greatly limited the number of subscribers.

A number of changes in the regulatory environment, as well as the business strategies of several mobile telephony companies, created the conditions to change this limitation on the growth of the sector. In 1997, Chile changed its regulations to introduce the “calling party pays” modality, which transferred the payment for mobile calls to the originating party. In addition, the country’s regulatory agencies determined access charges for mobile companies by applying the same methodology to them as to operators in noncompetitive conditions, thereby having the fixed operators pay the charges for the call. By the end of 1999, Mexico introduced a similar reform, while Brazil adopted the calling party pays modality at the time of the reform.

However, the introduction of calling party pays with a prevalence of high termination introduced a cost to the growth of fixed-line use. When a call is made from a fixed line to a mobile, the fixed-line

MOBILE COMMUNICATIONS IN MEXICO IN THE LATIN AMERICAN CONTEXT

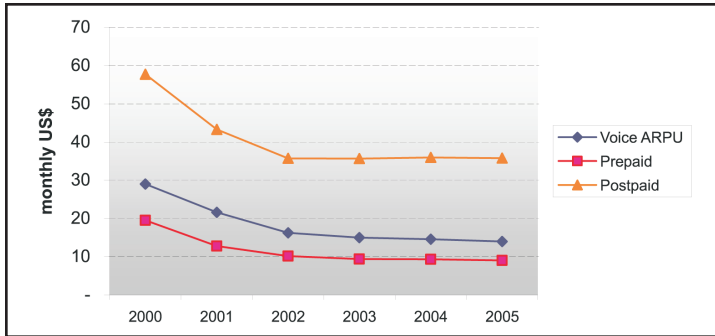


Figure 1 Mobile market in Latin America: Average revenue per user (ARPU) (month US\$)

Source: Telecon Data-CIDE.

customer will pay for the originating call and for the mobile service of terminating the call. Terminating services tend to be high, because mobile companies have no incentive to offer low fees as their customers do not pay for them. Therefore, there is a case to be made for regulating terminating fees to mobile companies. Lapuerta, Benavides, and Jorge (2003) suggest proactive regulation of interconnection for mobile networks as opposed to allowing for voluntary negotiations between providers. Brazil’s regulatory agency, ANATEL, established maximum access charges, which are applied to the different mobile companies. Within this context a consolidation process is emerging in most of the region. With the exception of some countries such as Brazil, the mobile market is dominated by two companies.³

Indeed, mobile telephony became the focus of attention for the region’s two largest operators: America Movil and Telefonica Moviles. As the previous section contended, government support of both companies during their reform process led to the formation of national champions with the necessary scale to compete abroad. In the case of Telefonica the financial support through a “cheap money policy” facilitated the acquisition process. The acquisition process of these two companies involved an aggressive campaign to attract customers and the deprecation of local markets in the fight for regional positioning, which in some cases involved a reduction in average income per user (ARPU) (see Figure 1) during this time period as the number of

users increased. Even though the region is characterized by a mostly low-income population, mobile services are increasing its penetration among previously unserved segments of the market. As we shall show in the following sections, while demand from high-end users is being met, the bottom of the pyramid is becoming a business target as potential mobile customers. Mobile telephony initially appeared as a means of communications restricted to the highest income groups and is now being transformed into the principal

means of access to telecommunications of the poorer sectors of the region. This has generated a scenario of global survival as opposed to one of collusion among companies.

Moreover, the mobile business is no longer an appendix of fixed operations, as the companies decided to separate both operations to maximize their operations. The Spanish firm Telefonica restructured its operations by creating companies specializing in mobile communications, long distance, mobile telephony, data, Web services, and call centers. The companies lost their national personalities and were integrated into regional companies maintaining the generalized use of the Telefonica brand. The business strategy is no longer determined by the company in the fixed business, but rather the different segments develop their own strategies and are coordinated at a higher level. Nevertheless, the companies do take advantage of possible economies of scope that generate significant advantages over specialized operators.

As mobile telephony became a business with a very favorable perspective, the firms in the sector began to fight for global operations. One of the central objectives has been to hold a central position in Brazil; both Telefonica and Telmex—America Movil entered the Brazilian market with full force to compete with TIM (Italia Telecom) and Oi.

The biggest step undertaken by Telefonica to become the central operator of the mobile segment in

3. Even though, in 2005, Telefonica and America Movil are large players in the Brazilian mobile market, they are closely followed by the Italian firm TIM and the Brazilian company Oi. This is probably because of the procompetition policies implemented in the telecommunications sector as well as the mere size of the country.

Table 1. Market participation by country and segment (2004), Telefonica Moviles vs. America Movil 2004, Market share

Country / Segment	AMX (%)	TEM (%)	AMX+TMX (%)	Mobile density in the country
Argentina	27.8	26.1	53.8	34
Brazil	25.6	49.8	75.5	37
Chile	—	35.1	35.1	61
Colombia	57.5	32.6	90.1	23
Ecuador	63.9	30.8	94.7	28
El Salvador	32.2	23.9	56.1	23
Guatemala	45.6	26.2	71.8	23
Honduras	28.3	—	28.3	10
Mexico	75.6	14.8	90.4	36
Nicaragua	58.1	40.4	98.4	13
Panama	—	73.1	73.1	12
Peru	—	51.9	52.0	15
Uruguay	1.0	35.6	36.7	16
Venezuela	—	45.7	45.7	30

Notes: Mobile density in the country is calculated as the number of subscribers per 100 inhabitants. Decimals were omitted. AMX: America Movil & TEM.

Source: Telecom Data-CIDE based on the annual report America Movil and Telefónica and regulator's web pages.

the region was the purchase of all Bellsouth operations in Latin America. As depicted in Table 1, at the end of 2004 Telefonica had mobile operations in thirteen countries, with market participations (excluding the case of Mexico) that fluctuate between 24% in El Salvador and 73% in Panama, with a special emphasis on Brazil, where its participation is close to 50%. Telefonica began its mobile operations in Mexico in 2002 with the purchase of Pegaso, thereby strengthening its position as the second-largest supplier of mobile services in the country.

In 2001, Grupo Carso followed a similar path and decided to separate Telmex from Telcel, the mobile company, which becomes the international conglomerate America Movil. Through this company, the group expanded its influence to the entire Latin American region and reached the position described in the table. By the end of 2004, the Mexican firm was operating in eleven countries, including the United States. In the same year, market share participations in those countries fluctuated between 25% in Brazil and nearly 76% in Mexico. In 2005, America Movil expanded to Paraguay and Perú and entered the Chilean market through the acquisition

of Smartcom, the third-largest operator of that country. The company ended the year with a presence in fourteen countries.

After more than a decade of promarket reforms, competition in the Latin American mobile industry is in risk of becoming a regional duopoly. By 2004, the operations of the Mexican group America Movil and of the Spanish firm Telefonica Moviles covered fourteen countries in Latin America, with a joint participation within some countries surpassing 90% of the market, as is the case of Nicaragua, Colombia, Ecuador, and Mexico (see Table 1). There are few countries, such as Brazil that still show a competitive market structure.

The aggressive expansion strategy undertaken by both companies through acquisition has generated a self-fulfilling process. The presence of these operators in most countries of the region has provided them with the advantages associated to a regional scale. Initiated by government policies of creating national champions, both America Movil and Telefonica acquired the experience of operating in Latin American countries and the economies of scale of using common providers for the region. Even though a significant increase of the customer base is

MOBILE COMMUNICATIONS IN MEXICO IN THE LATIN AMERICAN CONTEXT

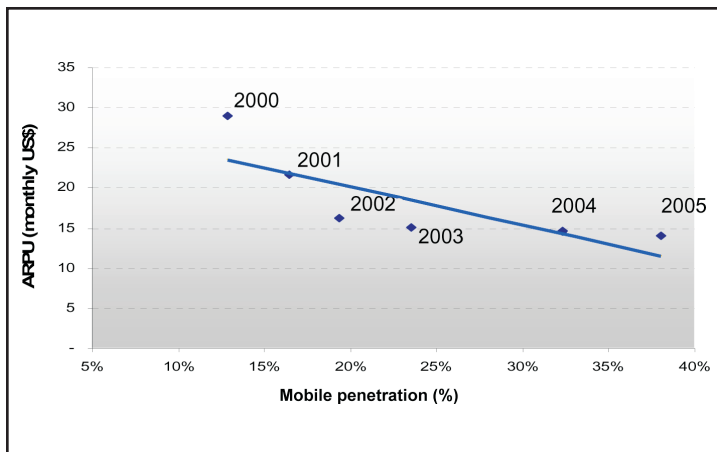


Figure 2 ARPU versus Mobile Penetration: Latin America

Source: Telecom Data-CIDE, Telecommunications Indicator Data Base.

composed of prepaid clients, as can be seen in the next section, and thus low expense users, mobile services continues to be a sustainable business model. Figure 2 shows how the ARPU declined considerably in 2000 but struggled to maintain at the same level from 2002 to 2005 as the mobile penetration increased.

In fact, Telefonica and America Movil have given

Table 2. America Movil operation results (2001–2005)

	2001	2002	2003	2004	2005
Revenues (000,000 MX\$)	49,409	64,396	93,412	139,234	182,153
Subscribers (000,000)	26.0	31.6	43.7	61.1	93.3
Investments (000,000 MX\$)	0	36.1	30.3	26.7	49.6
EBITDA (000,000 MX\$)	12,603	23,464	34,606	43,491	54,960
ARPU (MX\$)	1,900.35	2,037.85	2,137.57	2,278.79	1,952.34

Source: America Movil annual reports.

Table 3. Telefonica Moviles operation results in Latin America (2001–2005)

	2001	2002	2003	2004	2005
Revenues (000,000 MX\$)	2,686.0	2,291.5	2,568.9	3,552.4	7,704.5
Subscribers (000,000)	10.1	19.3	27.8	52.7	70.5
Investments (000,000 MX\$)	915.7	399.6	692.5	989.4	1,557.8
EBITDA (000,000 MX\$)	683.9	592.9	579.1	567.6	1,755
ARPU (MX\$)	265.31	118.45	92.25	67.36	109.23

Source: Telefónica annual reports.

a rapid pace to subscriber expansion in the past five years, mainly in the prepaid market but have managed to increase their total revenues and EBITDAs as well. Tables 2 and 3 show operation results and key figures for both companies.

How Mobile Has Surpassed Fixed Telephony

In most of the Latin American countries, the growth in mobile telephony by far surpasses that of fixed telephony. Figure 3 depicts the evolution in the penetration of fixed and mobile telephony in Mexico compared to the average growth in the other Latin American countries.

As can be seen in Figure 4, the number of cellular subscribers per fixed lines grew significantly between 1997 and 2002. Paraguay constitutes an exceptional case of growth in the sample, followed by Venezuela. In 1997, the proportion of mobile subscribers did not surpass that of fixed lines, but by 2002 mobile subscribers exceeded fixed-line customers in all but five countries.

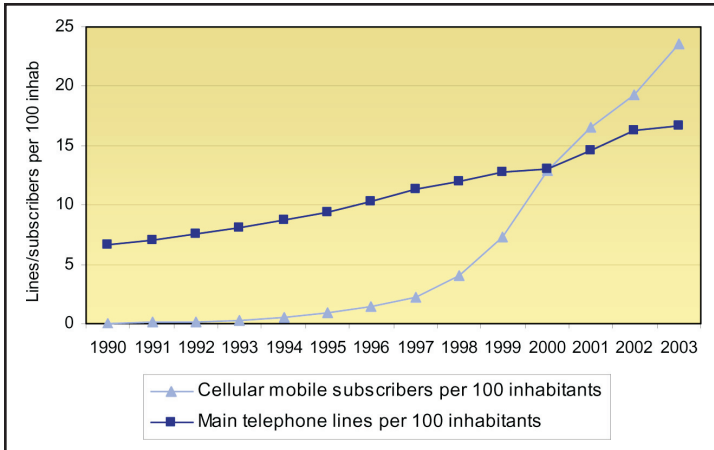


Figure 3 Fixed versus Mobile in Latin America

Source: Telecom Data based on ITU and operators.

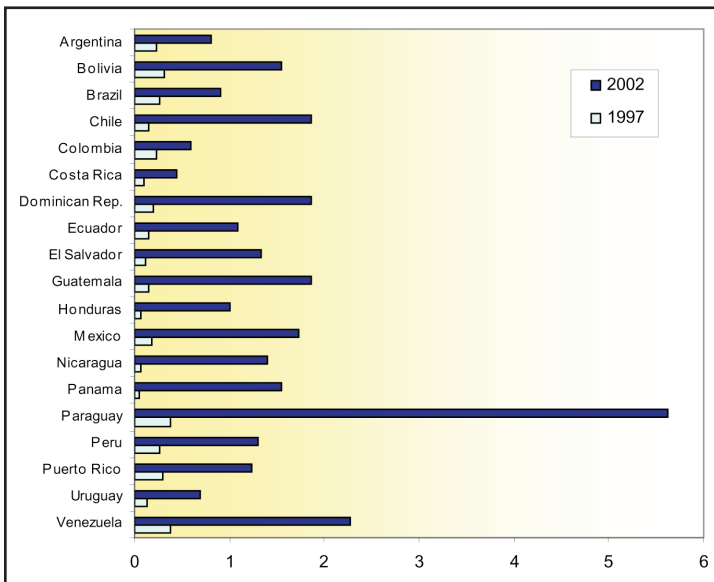


Figure 4 Mobiles per fixed lines in selected Latin American countries, 1997 and 2002

Source: Telecom Data based on ITU and operators.

It is important to note, however, that in some countries the low denominator represented by fixed teledensity (e.g., Nicaragua, Peru and Honduras) could produce a bias. Nevertheless, although there may be an effect in this direction, the mere balance that can be observed between fixed and mobile shows that mobiles play a major role in providing connectivity in the region.

Drivers of Growth

Although mobile telephony has existed for decades, before the invention of the cellular telephone, mobile telephony could use only a specific frequency, thereby severely limiting the number of potential users. With cellular telephony, the frequency can be reused via a hexagonal network of interconnected cells, allowing for an uninterrupted frequency. Technologically, this opened the field to a much broader number of uses. The combination of wireless telephones, Internet, and PDAs allows for electronic payment systems, for example. According to GSM Association, today the most widely digital standard used worldwide is GSM (Global System for Mobile Communications), the first of the second-generation technologies for mobile telephones; in the Latin American region, GSM use vastly surpasses CDMA (Code Division Multiple Access).

In terms of the market, mobile telephony has developed under a more competitive environment than that of fixed telephony; only a few countries in the region have assigned exclusive concessions in this field (Spiller, 2001). The relatively more competitive environment that has prevailed in the mobile industry may be explained by the fact that entrance into this sector is easier, because the technology it requires allows for the superposition of several carriers and

the initial investment is lower than in the case of fixed telephony as there are less sunk costs. Within this environment, there has been more flexibility in the determination of the pricing structure. In fact, prices of mobile telephony have become more competitive than those of fixed telephony, attracting an increasing number of low-income users (De Figueiredo and Spiller, 2000).

During the first stage of the development of this

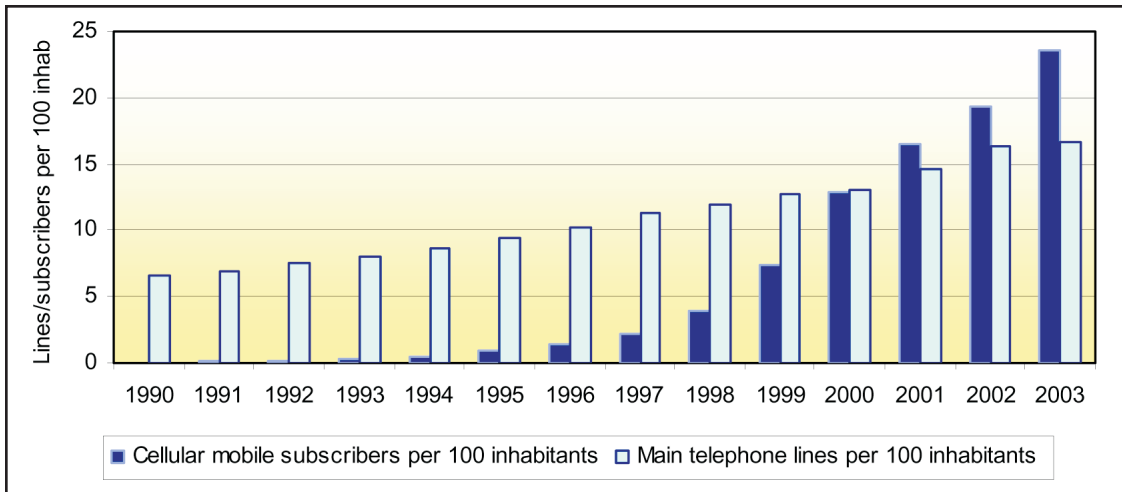


Figure 5 Average penetration fixed versus mobile in Latin America
 Source: Telecom-Data based on ITU and data obtained from regulators.

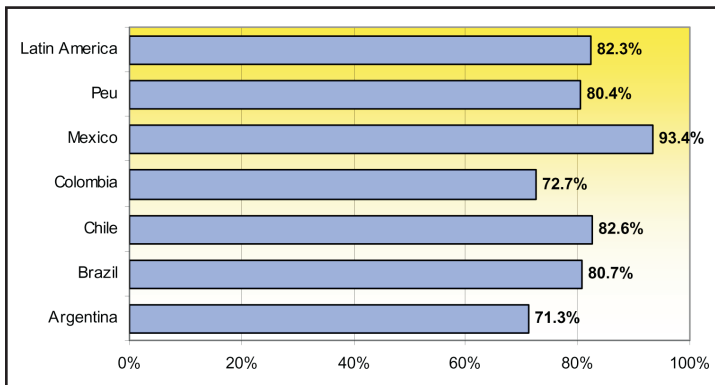


Figure 6 Prepaid subscribers as % of total subscribers, 2004
 Source: Telecom Data-CIDE.

market, however, its growth was limited by regulatory practices that were implemented regarding interconnection charges to the fixed carrier. The main issue here was defining the criteria for access charges (Laffront and Tirole, 2000). Normally, the fixed carriers operating within the same concession zones determine symmetrical access charges. The most common modality was “sender keeps all,” whereby the company originating the call retains the full payment of the user. The second modality was to establish a formula to share the income, usually distributing 50% to each of the operators involved in a successful communication. In the case of mobile telephony, because of the differences in convergence, coverage, and maturity between fixed and

mobile technologies, symmetrical access charges did not allow mobile operators to generate enough income to finance their operation. Therefore, initially the most common solution was for the user of mobile telephony to pay for both outgoing and incoming calls. The high costs for the user of this solution greatly limited the number of subscribers.

A number of changes in the regulatory environment as well as in the business strategies of several mobile companies created the conditions to remove this limitation to the growth of the sector. In 1997, Chile changed its regulations to introduce the “calling party pays” modality, which transferred the payment for mobile calls to the originating party. By the end of 1999, Mexico introduced the calling party pays, while Brazil adopted this modality from the beginning (OECD, 2000). In addition, the country’s regulatory agencies determined access charges for mobile companies by applying the same methodology to them as to operators in noncompetitive conditions, thereby having the fixed carriers pay the charges for the call.

As can be observed in Figure 5, before 1997, the number of mobile subscribers in Latin America was very low. The initial interconnection rules discussed above contributed to the slow growth of the sector.

The rapid diffusion of mobiles was promoted to a significant degree by the overall adoption of the calling party pays model in the region, which created the conditions for the explosive increase in mobile subscribers. Not having to finance incoming calls translated into a significant increase in demand and contributed to a major growth in coverage.

Another driver of growth was the introduction of prepayment in mobile telephony. With the post-payment modality, the possibility of fraud constituted a major limitation to the growth of the mobile network. Mobile users could contract the services of other mobile operators despite leaving a trail of unpaid bills. As lower-income subscribers began using mobile services, the risks involved in this modality were expected to increase.

The prepayment system created new options both for the operators as well as for the users. For the companies, the advantage has been reducing the risks of fraud, eliminating the need for monthly expense statements and reducing collection costs. Although the ARPU is lower in the case of prepayment, the company generates income through its subscribers' originating calls and through access charges payable by subscribers of other companies. In addition, the sale of calling cards is undertaken with low labor costs.

Consumers, on the other hand, have the advantage of controlling their telephone expenses and

thus eliminating the risk of escalating debts. The user has no fixed monthly charges but can determine its level of expense and usage. Even if the telephone no longer has credit, the user can continue receiving calls, allowing for a constant connection. As can be seen in Figure 6, Latin America is a pre-paid region.

Mobile as a Propoor Service

Several studies have identified the advantages associated to mobile telephony over fixed telephony and other traditional accesses to telecommunications for low-income groups (Dymond and Oestman 2004; NECG 2004; Stephens, Boyd, and Galarza 2005; Oestman 2003; Lewin and Sweet, 2005; Bonina and Verut, 2006).

The growth in mobile users and the prepayment modality have allowed for a significant reduction in unit cost of services. As can be observed in Table 4, the growth in the number of subscribers coupled with the close to marginal cost of incorporating a new subscriber has translated into a reduction in prices of mobile telephony. Therefore, the prices of the latter have fallen below those of fixed telephony, accounting for a stronger growth in subscribers for this sector. Table 4 compares fixed versus mobile initial as well as monthly costs for low density users in some Latin American countries.

These lower costs have led to an increasing growth in the use of mobile telephones by low-

Table 4. Cost comparisons between fixed and mobile telephony for low consumption users

Country	Start-up costs		Monthly costs/calls	
	Fixed	Prepaid mobile	Fixed	Prepaid mobile
Argentina	\$150.00	\$50.00	\$13.65	\$7.95
Brazil	\$27.00	\$40.00	\$7.90	\$4.50
Chile	\$43.00	\$67.10	\$11.40	\$8.10
Colombia	\$168.00	\$49.25	\$3.70	\$4.20
Mexico	\$119.00	\$46.20	\$16.25	\$6.90
Peru	\$131.00	\$60.40	\$13.95	\$4.50
Venezuela	\$102.00	\$54.00	\$11.60	\$6.15
Average	\$105.71	\$52.42	\$11.21	\$6.04

Notes: Values in US dollars (Oestman 2003). In the case of fixed telephony, initial costs include total connection costs, while in the case of mobile telephony, they refer to equipment and SIM card activation costs (in the corresponding cases). The monthly usage costs include the monthly rent and a package of 15 minutes of local calls in the case of fixed telephony and in the case of mobile the monthly usage costs were calculated on the basis of a minimum payment for the activation of the prepayment system plus 15 minutes of mobile to mobile calls (Oestman 2003, 1).

Table 5. Socioeconomic levels in Mexico

A/B Level	Level C+	Level C	Level D+	Level D	Level E
10.8 %		9.1 %	23.8 %		56.3 %
Level that includes the population with the highest level of life and income of the country	This segment includes people with life and income levels that are slightly above average	This segment includes people with medium life and income levels	This segment corresponds to people with life and income levels that are slightly below average, that is, the low income level with better life conditions.	Level D includes people with an austere level of life and low income	Level E is composed of the population with the lowest levels of income and life within the country's urban areas.

Source: Telecom CIDE (2005).

Table 6. Mexico: Mobile penetration by socioeconomic level, 2003

	Level A/B	Level C+	Level C	Level D+	Level D	Level E
Distribution of population		10.8%		32.9%		56.3%
Postpaid subscribers		19%		8%		6%
Prepaid subscribers		81%		92%		92%
Mobile penetration (per group)		85%		43%		9%

Source: Telecom CIDE (2005) based on data by Marketing Group.

income groups. To observe this tendency, we perform an empirical exercise, for the case of Mexico, using the concept of "socioeconomic levels" defined by the Mexican Association of Market Research and Public Opinion Agencies (AMAI). The levels are divided into five groups: A/B, C+, C, D, and E, where the A/B group includes the highest-income population of the country while the E group includes persons with the lowest income level and quality of life. Table 5 summarizes the characteristics of the population and its distribution.

As Table 6 shows, the data generated by the survey undertaken by marketing group provide a preliminary view of the use of mobile telephony by low-income groups.

As can be observed in Table 6, in 2003 the higher-income sector dominates the use of mobile telephones: 85% of the individuals falling within the highest income bracket are users of mobile telephony. In this year, within the lowest income, one in eleven had a mobile telephone. According to recent (and preliminary) data provided by PRM Interna-

tional, however, by 2005 the mobile telephone has become a common tool among the lower-income sectors. Whereas in 2003 only 9% of the individuals classified within the D and E socioeconomic levels were users of mobile telephony, by 2005 the number had tripled to 27% of the population within those income brackets. In the higher-income sectors, the numbers have not changed significantly. This could be expected because the percentage of the population using mobile telephones in that income bracket was already high. It is also interesting to note that the middle class associated with SEL C and D+ have also shown a growing use of mobile telephones as evidenced by an increase from 43% in 2003 to 51%⁴ in 2005.

It is likely that the increasing use of mobile telephones by the lowest income groups is mostly due to the low access and usage costs provided by the prepayment system and the "calling party pays" modality. When analyzing the segment of prepayment specifically, using Tables 6 and 7, both in 2003 and 2005, the groups most intensively using this

4. The 51% figure is a result of combining socioeconomic levels C and D+ according to the PRM data.

Table 7. Mexico: Mobile penetration by socioeconomic level, 2005

	Level A/B	Level C1	Level C	Level D+	Level D	Level E
Distribution of population	10.8 %		9.1%	23.8%	56.3%	
Postpaid subscribers	28%	12%	6%	6%	4%	
Prepaid subscribers	72%	88%	94%	94%	96%	
Mobile penetration (per group)	89%	75%	67%	42%	27%	

Source: Telecom CIDE (2005) based on data by PRM International.

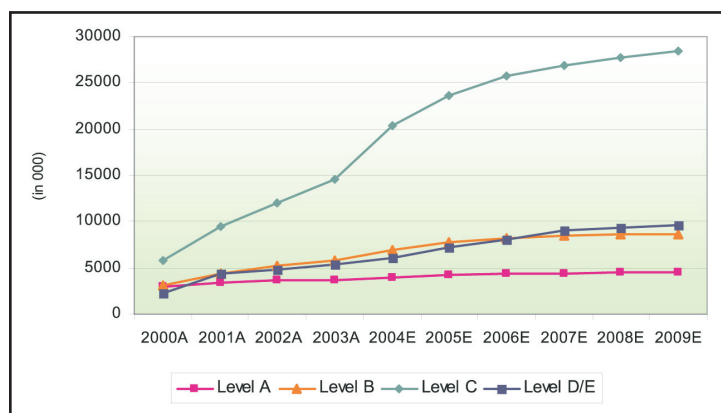


Figure 7 Growth of mobile users under prepayment plans by socioeconomic level

Source: Telecom CIDE with data from pyramid.

modality are those falling within the D and E socioeconomic levels. Prepaid mobile telephony provides them with increased autonomy from other alternatives such as community centers, where there are often restrictions to receiving calls. Moreover, the reasons mentioned by the mobile users of socioeconomic level D for purchasing a mobile telephone include the need to be located, making personal calls and making job-related calls.

Figure 7 illustrates the contribution of prepayment plans to the increased use of mobiles by the middle and low income brackets of the Mexican population.

In all cases, the middle class, falling within the socioeconomic level C, is the one experiencing the fastest-growing number of users as a percentage of total users of prepayment plans. Moreover, a temporary projection shows that, after group C, it is the

lowest income sectors of the population that will most increase the usage of prepayment plans.

In light of the market trends analyzed regarding the use of prepayment plans for mobile telephony (Figure 7), we may tentatively conclude that the increase in the number of users of mobile telephony will mostly be the result of the middle- and low-income groups adopting this service. If this is the case, mobile telephony has and will continue to provide social benefits, because it is becoming the favored means of communication for less-privileged segments of the population.

The Growing Use of Mobile Telephony in Mexico's Rural Sector

As mentioned above, technological change, shifting cost structures, and new payment mechanisms have brought about a reduction in prices of mobile telephony. Thus, this technology is today a very viable model to cover the demand for telecommunications in rural and isolated areas. As was mentioned by Navas-Sabater, Dymond, and Juntunen (2002), wireless networks have clear cost advantages over fixed telephony, in particular to provide services to isolated communities, and even small villages.⁵

In Mexico, as in many other Latin American countries, the rural population constitutes a large proportion of total population. In Mexico, 25 million inhabitants live in rural communities, most of them

5. The authors mention that the specific characteristics of mobile networks (speed and ease of equipment deployment and not having to install extensive cable networks) make these a more efficient solution than fixed telephony when reaching isolated communities or those difficult to access (Navas-Savater and Jununten 2002).

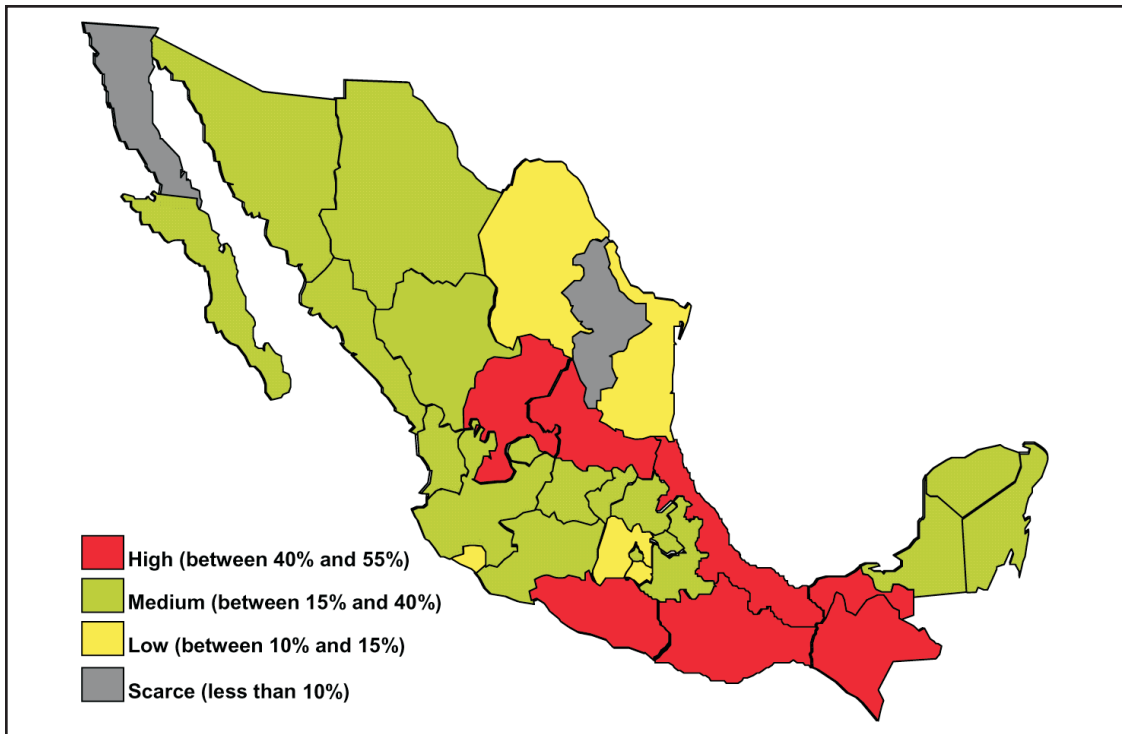


Figure 8 Concentration of rural population in Mexico, percentage by state
 Source: SAGARPA with data from INEGI (2001).

located in the States of Oaxaca (55.3%), Chiapas (54.5%), and Hidalgo (50.4%) (see Figure 8).

In addition to the social benefits previously mentioned for mobile telephony in general, in the case of rural areas there are specific additional benefits. Many of the rural Mexican families have members who have migrated to larger cities within Mexico or abroad, looking for better salaries, employment, and educational opportunities. For them and their families, being able to communicate constitutes a crucial need. This fact also creates commercial opportunities. As is documented by Dymond and Oestman (2004), the revenues of rural operators are mostly the result of charges on incoming calls. In Chile, for example, these revenues amount to 60% of total revenues (Dymond and Oestman 2004, 53).

In the case of Mexico, the largest number of mobiles are concentrated in regions 1 (Baja California) and 9 (Mexico City), which include some of the most urbanized areas of the country (see Figures 9 and 10). However, as Table 8 shows, in the states of

Oaxaca and Hidalgo, the most rural areas in Mexico, mobile surpasses fixed penetration.

In addition to mobile telephony, another solution for supplying low-income and rural users with communication technologies is the use of mobile pay phones. Several countries have used this modality to provide universal access. In Mexico, the regulating body Cofetel allows for public mobile telephony but there are no obligations related either to it or to universal access programs in general. The result has been a still-incipient use of mobile payphones to provide telephony services in rural areas, although this technology is increasingly being used in tourism zones where it has been identified as a good business opportunity.

To summarize, although mobile provides important advantages over fixed telephony in providing access to telecommunications in isolated or rural communities, in Mexico there are significant challenges ahead. A lesson provided by the evolution of this sector is that competitive strategies and less in-

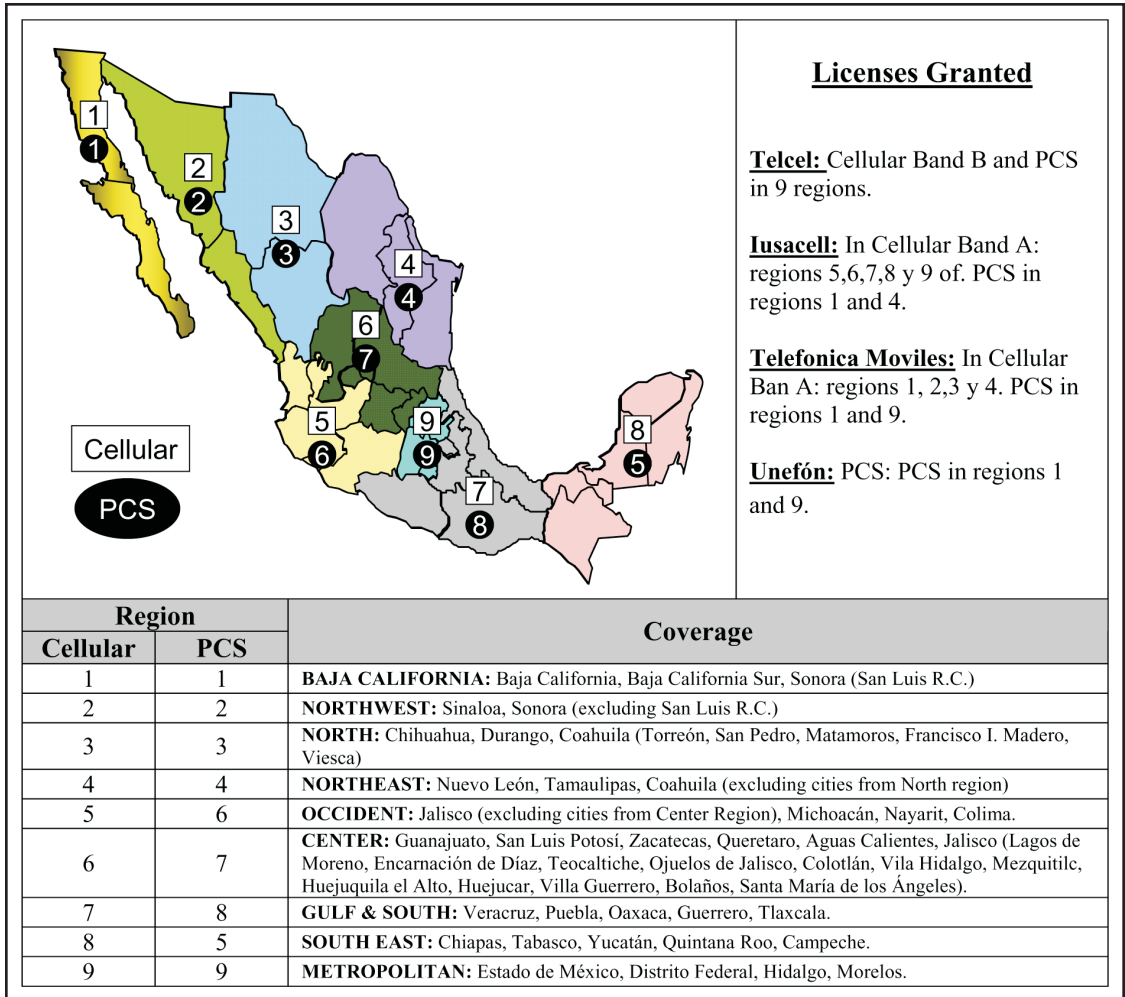


Figure 9 Regions of Mobile Telephony
 Source: COFETEL (Comisión Federal de Telecomunicaciones).

trusive regulations have led to a dramatic growth in mobile penetration.

Conclusions

As the Latin American experience shows, mobile telephony is a success story in the adoption and rapid expansion of a new technology. One of the key drivers of this success is the reduction in costs that offered the poorest segments of the population in Latin America the possibility of acquiring a form of access to telecommunications. The expansion of mobile telephony became a very powerful tool of universal access in the region, for example, mobile

service has had a significant impact on unserved rural areas.

The reduction in costs is not solely a function of technology; it has also been supported by a more competitive framework and innovative pricing strategies. Prepaid mobile services and calling party pays made access to these services more affordable. The strategies followed by private firms offer a lesson to be captured by regulators when designing universal access policies. There are market opportunities to be seized by firms in offering low-cost services, and regulators do not always need to offer subsidies to provide unserved areas. Instead, offering incentives

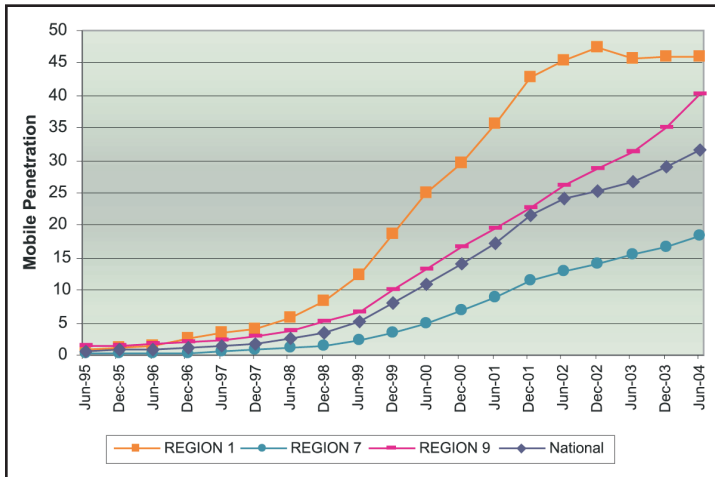


Figure 10 Mobile penetration by region
 Source: Telecom CIDE based on data by COFETEL.

that generate innovative strategies may be a more efficient policy.

Fostering competition has always proved to be a good rule of thumb in promoting the expansion of the network. The challenge faced by Latin American regulators today, however, is that the telecommunications industry is becoming increasingly concentrated. The region today appears to be a battlefield where Telefonica and Telmex are struggling for a privileged position in the regional market. As long as there is unmet demand and markets to expand, it is likely that there will be competition between them. This does not preclude, however, that in the medium term collusive strategies may be coordinated among them. Regional authorities may need to co-

ordinate policies that regulate the same two grand players in the region. ■

References

America Movil. (2000–2005). “Annual Reports,” México, D.F.

Comisión Federal de Telecomunicaciones (COFETEL). Telecommunications Market Statistics. www.cft.gob.mx.

De Figueiredo, J.P. Rui, and Pablo Spiller. (2000). “Strategy, Structure & Regulation: Telecommunications in the New Economy.” Michigan State Law Review, No. 1.

Dymond, Andrew, and Sonja Oestman. (2004). “The Role of Sector Reform in Achieving Universal Access.” In Bagdan, et al., eds. *Trends in Telecommunication Reform 2003*, chapter 3. Ginebra: ITU.

Hausman, J. (2002). “Mobile telephone” in M. Cave, et al. eds. *Handbook of Telecommunications Economics*, Holland.

International Telecommunications Union (ITU). (2005). “Telecommunications Indicators 2005.” CD-ROM. Geneva: ITU.

Laffont, Jean-Jacques, and Jean Tirole. (2000). *Competition in Telecommunications*. Cambridge, MA: MIT Press.

Table 8. Penetration of fixed and mobile telephony by state, 2002

	Fixed (%)	Mobile (%)
Baja California	20.8	45
Campeche	7.8	9
Chiapas	4.2	4
Distrito Federal	37.6	36
Hidalgo	7.6	12
Nuevo Leon	24.0	51
Oaxaca	5.2	8
Tabasco	6.6	8

Source: Telecom CIDE based on data by COFETEL and Select.

- Lapuerta, Carlos, Juan Benavides, and Sonia Jorge. (2003). "Regulation and Competition in Mobile Telephony in Latin America." Paper prepared for the First Meeting of the Latin American Competition Forum, April 7–8, Paris, OECD and IDB.
- Lewin, David, and Susan Sweet. (2005). "The Economic Impact of Mobile Services in Latin America." Elaborated for GSMA, GSM Latin America, and AHCIET, Indepen and Ovum, UK.
- Navas–Sabater, J., A. Dymond, and N. Juntunen. (2002). "Telecommunications and Information Services for the Poor: Toward a Strategy for Universal Access." World Bank Discussion Paper No. 432, Washington, D.C.: World Bank.
- Network Economics Consulting Group (NECG). (2004). "The Diffusion of Mobile Telephony in Latin America, Successes and Regulatory Challenges." Report for Bell South Latin America prepared for NECG. Canberra.
- OECD. (2000). *Competition Policy and Regulatory Reform in Brazil: A Progress Report*. Paris: OECD.
- Oestman, Sonja. (2003). "Mobile Operators: Their Contribution to Universal Service and Public Access." INTELECON Research. http://rrv.worldbank.org/Documents/PapersLinks/Mobile_operators.pdf.
- Spiller, Pablo. (2001). "Telefonía Móvil: El motor de la Competencia en América en Telecomunicaciones." *El Cronista Comercial*, Buenos Aires, 27 April.
- Stephens, Robert, Jeremy Boyd, and Juan Galarza. (2005). "Telefonía celular: nuevo instrumento para el acceso universal en Latino America." *In Latin.tel*, Regulatel, Year 1 No. 1, March.
- Telecom Data-CIDE. (2005). "Telecommunications Indicators Data Base." Centro de Investigación y Docencia Económicas, A.C. (CIDE), México.
- Telecom CIDE. (2005). "Contribuciones Sociales y Económicas de la Telefonía Móvil En México según un análisis de las fases de Maduración del Mercado." elaborated for Telefonica Movistar México, México, DF.
- Telefonica Moviles. (2000–2005). *Annual Reports*. Spain.