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**Telecommunications and Development in Latin America:  
The Role of Multinationals**

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## **Abstract**

There is an oft-cited relationship at the macroeconomic level between both the spread of telecommunications technology and investment in information and telecommunication technology on the one hand, and growth on the other hand, especially productivity growth. The size of this effect, however, typically varies widely across countries and over time.

This paper pries further into this relationship by examining the relative roles of investment by different actors and by looking within countries. Multinationals have had a particularly important role in carrying out investment in telecommunications in Latin America, following the privatization and liberalization processes. Technological evolution, and especially the mobile revolution has also played a major role, not only in increasing entry, but also in giving opportunities for more democratic patterns of penetration across income groups.

Moreover, the paper examines inequality in access to telephony across countries based on quintile access rates from micro-data. While aggregate connectivity gaps have been reduced coinciding with increased investment by private foreign actors, there remain substantial internal gaps in access to service within countries and across income groups. While there is a strong relationship between aggregate telephone density and inequality, historical investment patterns and market concentration are only weakly related to observed inequality. Regulation and access promotion policies have a key role to play in ensuring wide access to telecommunications services.

With a comparative perspective and a special focus on Latin America, this paper examines the contribution of the private sector in the telecommunication industry to the improvements in telecommunication quantity and quality indicators and to the extension of the benefits to the wider population.

## 1. Introduction

Since the early 1990s, foreign direct investment (FDI) has increased rapidly all over the world. In Latin America, the 1990s were a period of significant FDI inflows, led by OECD-based multinational corporate investments in newly privatised or liberalised sectors in the region.

The telecommunications sector lies at the intersection of patterns of inward and outward FDI in Latin America. Two multinationals dominate FDI in the sector: Spain's Telefónica and Mexico's Carso group. The former came into the region riding the wave of privatisations in the 1990s. The latter, owner of Telmex and América Móvil, moved, in little more than five years, from being a national monopoly to becoming a major regional player.

The performance of the telecommunications sector is also important because of its implications for aggregate economic performance in Latin America. Telecommunications services are a key means of information transmission. As such, not only does the rollout of telecommunications infrastructure profoundly change the way business is done, it has the potential to significantly improve the efficiency of markets as the cost of obtaining information is radically lowered, and thus also to contribute sizeably to economic growth and development. Moreover, these benefits for the economy as a whole display increasing returns, so that as service coverage approaches universality, the benefits increase more than proportionately (Röller and Waverman, 2001; Waverman *et al.*, 2005). The degree of people's and firms' access to telecommunications services is therefore crucial.

This paper analyses the factors that have driven the evolution of telecommunications service coverage, and measures the sector's progress both in terms of overall coverage and in terms of providing access to different segments of the population. Section 2 describes investment patterns in telecommunications and the strategies that underpin them. Section 3 summarises the performance of the region in increasing density and presents a new indicator for inequality in access to service. Section 4 assesses the drivers of that performance. Section 5 concludes.

## 2. Investment in Public Services and Multinationals: The Case of Telecommunications

Infrastructure plays a key role in economic development. By way of illustration, if the countries in Latin America with the largest gaps in infrastructure development – Bolivia, Guatemala, Honduras, Nicaragua and Peru – caught up with the regional leader, Costa Rica, their long-term growth performance is predicted to speed up by at least 5 percentage points and their income Gini coefficients (a common measure of income inequality) to drop by a significant 8 to 10 percentage points (Calderón and Servén, 2004).

Telecommunications are a particularly important part of a country's infrastructure. Not only do they open doors to new information and business opportunities, and shape how firms do business. They can deeply affect economic and political life as a whole, because information and communications technology (ICT) influences the transmission of information for all kinds of purposes. ICT development has been shown to be associated with lower levels of corruption, for example, as well as with lower inequality (Bandyopadhyay, 2006).<sup>1</sup>

The telecommunications sector has been, since the early 1990s, witness to the increasing internationalisation of Latin American economies. FDI flows to Latin America increased dramatically throughout the 1990s, in conjunction with widespread privatisation in the region, from less than

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<sup>1</sup> Bandyopadhyay (2006) finds inequality to be negatively related to ICT development for her whole sample but positively for the developing country sample, suggesting a non-linear relationship

\$10 billion in 1990 to a record \$89 billion in 1999 (averaging \$39 billion a year for the decade). Despite a notable fall in the early 2000s, the annual flow rose again in the middle of the decade to around \$70 billion. Still, Latin America's share of global FDI flows, at 8 per cent in 2006, remains well below the 14 per cent peak reached during the 1970s and again in 1997.

Not only that, the increasingly rapid pace of internationalisation of a relatively small number of Latin America enterprises has given rise to a major increase in outward FDI from Latin American countries, a pattern that has also affected the telecommunications industry, through the rise of sister companies América Móvil and Telmex. Indeed, the telecommunications sector provides a particularly important example of the recent wave of developed-country multinational corporate investment in the region together with the rise of Latin American multinationals, and their interaction.

Like other key areas of infrastructure, the telecommunications sector requires substantial capital investment. Amongst developing regions, Latin America has been at the forefront in allowing private capital into its telecommunications industry. Following the path opened by Chile in 1987, other countries, including Jamaica (1989), Argentina (1990) and Mexico (1990), privatised their incumbent operators. These privatisations brought in substantial amounts of private capital – the privatisation of Brazil's Telebras system alone raised \$34 billion in 1998, for example. In the majority of cases privatisation was also an avenue for foreign capital to enter the industry. Of course, such has not always been the case, as in Mexico – where regulatory restrictions on FDI in the sector have prevented entry, and foreign participation remains limited to 49 per cent outside of mobile telephony – and in a few countries, notably Ecuador and Paraguay, which have failed to secure the interest of private investors.<sup>2</sup>

With ICT greatly facilitating the internationalisation of firms and economies, companies that supply ICT services face significant potential gains from internationalising their activity. The very drive of telecommunications enterprises to become global players, accompanied in the last five years by a process of consolidation in the ICT industry, has in turn given rise to a battle for supremacy in the Latin American telecommunications industry.

### ***Privatisation, Multinationals and FDI in Telecommunications***

Between 1990 and 2003, FDI in the telecommunications sector in Latin America amounted to \$109.8 billion, well above that in any other developing region; the lion's share (70 per cent) of this amount is the result of privatisation transactions (Guilain and Qiang, 2006). Despite a slowdown since the beginning of 2000s, FDI in the sector still amounted to \$909 million in 2004 and \$870 million in 2005.<sup>3</sup> But the objectives of FDI in the sector have changed. While consolidation has driven a series of corporate mergers and acquisitions, on the one hand, mobile telephony accounts for more than half of FDI in the sector since 2000, and the rise of mobile telephony has led to a growing share of greenfield investments, on the other.

Indeed, the telecommunications sector has witnessed increased internationalisation and consolidation worldwide since the early 1990s, and Latin America is no exception to the rule. A number of foreign investors, including Spain's Telefónica, entered Latin America with the privatisations of the land-line incumbents during the 1990s. Despite difficult financing conditions after the burst of the dot com bubble in 2000, the large expenses incurred in purchasing third generation licenses and devaluations in Brazil and Argentina, the rise in demand from 1995 to 2005

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<sup>2</sup> See Rozas Balbontín (2005) for a detailed presentation of successes and failures in privatisation.

<sup>3</sup> OECD Development Centre (2007); based on World Bank PPI Project Database, 2005 update, <http://ppi.worldbank.org/>, accessed 23 March 2007

for telecommunications services, especially mobile telecommunications, kept private enterprises in the game. At the same time, the region witnessed a gradual process of consolidation, led by Telefónica in 2000 and followed by the growth of América Móvil – a Telmex spin-off operating in the mobile segment – from 2002 to 2005. Reinforcing this trend, Telmex, the privatised Mexican land-line incumbent, invested \$4 750 million between 2003 and 2005 to compete with Telefónica in the land-line and data-transmission markets.

Table 1. **Main Telecommunications Operators in Latin America (March 2007)**

in thousands of serviced lines

	Telefónica	América Móvil	Telmex	Telecom Italia	Millicom
Land lines	23 810	2 913	20 374	5 173	--
Mobile customers*	85 637	122 434	--	38 656	10 438
<b>-- of which</b>					
Mexico	9 320	44 946	18 284	0	0
<b>Central America</b>	<b>4 042</b>	<b>9 231</b>	<b>0</b>	<b>0</b>	<b>5 917</b>
Brazil	41 064	24 608	2 068	26 300	0
Argentina	16 441	10 927	n/a	13 426	0
<b>South America</b>	<b>96 085</b>	<b>71 170</b>	<b>n/a</b>	<b>56 109</b>	<b>4 521</b>
<b>Total</b>	<b>109 447</b>	<b>125 347</b>	<b>20 374<sup>+</sup></b>	<b>43 829</b>	<b>10 438</b>

Notes: \* including fixed mobile; n/a. not available ; -- no operations ; + total of available data.

Source: OECD Development Centre (2007); based on enterprise reports for first quarter 2007, complemented by regulator Web sites.

### *Latin Sisters? The Internationalisation of Telefónica, Telmex and América Móvil*

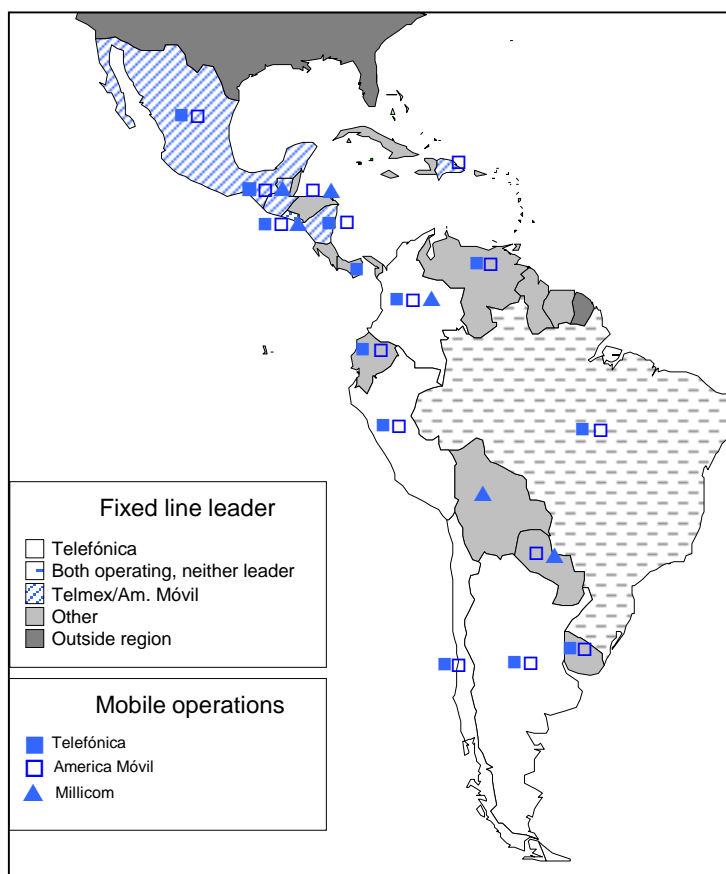
Telefónica and Telmex – together with América Móvil, Telmex’s mobile-telephony spin-off – compete for supremacy in the telecommunications sector in nearly all of Latin America (see Figure 1). Brazil and Central America are exceptions, in that Telecom Italia, Deutsche Telecom and France Telecom are also important players in the former, and a third player, Millicom,<sup>4</sup> is strongly present in the latter.

The processes by which the two leading multinationals – one from each side of the Atlantic – have come to dominate telecommunications in Latin America exhibit important similarities. Both firms were built into national champions when they were privatised under the shadow of increasing international competition, and both successfully internationalised to fend off that competition when their home markets were opened to foreign enterprises. Since most countries regulate most branches of the telecommunications sector, the firms’ ability to deal with public authorities and the telecommunications regulator in different countries is key to understanding their successful internationalisation. Indeed, while operators in regulated industries, like most other investors, prefer to operate in politically stable countries, they are more likely than many other investors to enter countries

<sup>4</sup> M.I.C. (Millicom International Cellular) is incorporated in Luxemburg and has operations in Central and South America, Africa and Asia.

where government has discretionary power and can, for instance, alter regulations or grant licences (García-Canal and Guillén, 2005).

Figure 1. Latin America, Main Telecommunications Operators



Source: OECD Development Centre (2007); based on operators' annual reports and regulator Web sites data.

In the early 1990s, when the first wave of privatisation and liberalisation started in Latin America, two strategies were available to new entrants in the sector. One was to enter less regulated segments – typically business and data-transfer services, and to a lesser degree mobile telephony – in order to avoid the pressures and costs associated with regulation. Another strategy was to bid for the incumbent operator to benefit from the existing infrastructure and often monopoly power in the local distribution loop. Telefónica was amongst the firms that opted for acquiring the incumbent, taking advantage of its knowledge of regulated markets and its ability to exploit existing infrastructure and inherited market position. In Mexico, Telmex, when privatised, developed a similar strategy, albeit initially within its own borders.

Both multinationals' strategy of acquiring the incumbent in their overseas investments originated in their home country's decision to create a national telecommunications champion. Spain and Mexico, when privatising their state telecommunications monopolies, created the conditions for the newly privatised companies, Telefónica and Telmex, to become such champions. Argentina, Chile and Brazil, for example, purposefully forwent that possibility. But it was a clearly stated strategy in both

Spain and Mexico. Indeed, in privatising Telmex, Mexico required bidding consortia to have a Mexican majority. Nor was creating a national champion without costs: in 1996, Telefónica's bid in the privatisation of the Panamanian incumbent, INTEL, was rejected because the Spanish administration still owned a controlling stake in the company.<sup>5</sup>

Both Telmex and Telefónica thus relied on safe domestic markets to launch their international expansion. The Spanish land-line market was liberalised in 1996, after Telefónica had been prepared for competition by gradually rebalancing user tariffs during the first half of the decade while maintaining a pricing policy that was favourable to the former public operator. In Mexico, the market was formally liberalised in 1995, five years after the privatisation of Telmex, but licenses for local service were not granted until 1998. Even today, moreover, market conditions, over which a weak regulator (COFETEL) has little control, contribute to Mexico's continued high prices for telecommunications services – notwithstanding substantial falls in the price of telephony in recent years – compared with those of other OECD countries, especially for small and medium enterprises (OECD, 2004, 2005, 2007).

Other countries in the region, as noted earlier, preferred to spur competition in the industry from the start of privatisation, counting on competition amongst world-class operators to modernise the sector. Brazil's choice of establishing a competitive market by licensing regional duopolies has also contributed – especially because Brazil is the region's biggest market – to spurring the expansion of both América Móvil and Telefónica in the region as a whole, and made Brazil the frontline in the battle for regional supremacy.

With a strong foothold in their home markets, both Telmex and Telefónica looked abroad to expand their customer base. In an industry whose services are essentially not tradable across borders due to regulation, and where brand recognition plays an important role and technological edge can be decisive, the leading competitors' search for customers leads them to pursue market-seeking “multi-domestic” multinational investment strategies.

Despite the advantage of their relatively safe home markets, however, neither Telefónica nor América Móvil initially took up the regional battle alone. Both began their foreign acquisitions with other partners. Telefónica initially bid for privatised firms (TeleSP, Telefónica Argentina, and Telefónica Perú) in consortia, and in 2000 América Móvil set up a joint venture with Bell Canada and SBC to form Telecom Américas. But by 2000, Telefónica had bought off its partners through 11 simultaneous takeover bids in what came to be known as “*Operación Verónica*”. And in 2002, América Móvil bought out its partners in Telecom Américas in order to restructure the corporation. América Móvil's positive experience was also instrumental in Telmex's February 2004 decision to purchase AT&T's assets in the region, which gave it presence in the largest markets (Argentina, Brazil, Chile, Colombia and Peru).

Both multinationals have thus relied on their knowledge of regulated economies, on safe home markets at least initially, and on their knowledge of the region. However, the two competitors differ in terms of structure, which gives rise to important differences in their strategies. Telefónica, while still under the control of the Spanish administration, began its internationalisation in conjunction with the opening of the European market, which limited the strategic viability of a monopolistic organisation. Telmex's internationalisation, in contrast, started eight years after its privatisation, when the home market had been substantially strengthened.

Telmex's and América Móvil's internationalisation was also less gradual than Telefónica's, due both to strategy and to circumstance. It started in 1999, coinciding with the Argentine crisis and a time of difficulty for the international telecommunications sector, when a number of operators were seeking to sell their non-strategic Latin American assets. Telmex and América Móvil have also gone

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<sup>5</sup> A 21 per cent share was sold in the market in 1997, the Spanish administration keeping a “golden share” that was expected to expire in 2007 and was finally abolished at the end of 2005.

into markets that are geographically and culturally close to their Mexican home economy, and shown an ability to acquire key assets at very reasonable prices: Telmex took control of Embratel (then a Brazilian long-distance carrier) in 2004 by buying, for \$400 million, the shares owned by MCI, for which the latter had paid \$2.3 billion at the time of privatisation in 1998 – then spent a further \$271 million in subsequent years to achieve control over 90 per cent of voting shares. América Móvil's and Telmex's quick internationalisation also reflects their reaction to Telefónica's increased presence in the region, and the potential threat it constituted in their home market (Graham, 1998). In the five years to 2004, América Móvil and Telmex thus became large regional players.<sup>6</sup>

Telefónica and its Mexican competitors also differ somewhat in their treatment of mobile telecommunications. Whereas Telefónica now manages its mobile business as an integral part of the company,<sup>7</sup> América Móvil (then Telcel) was spun off from Telmex in 2001. Although Telmex and América Móvil have common ownership, América Móvil was made operationally separate due in part to regulatory concerns, and in part as a means of separating the higher risk involved in the international expansion of mobile operations. The two enterprises then followed different strategies, with América Móvil betting strongly on internationalisation, especially in mobile telephony – but also purchasing land-line assets in Central America – and Telmex originally focusing on its domestic market.

The Spanish and Mexican multinationals' different strategies also reflect substantially different corporate cultures (Mariscal and Rivera, 2005). Telefónica has major institutional investors (including BBVA, La Caixa, Chase Manhattan, Bank&Co and Citibank) and focuses on telecommunications. In contrast Carso Global Telecom, which controls both Telmex and América Móvil, is part of a family-owned holding company that has businesses in many other sectors as well – including retail distribution, financial services, etc. These differences have a great impact on the corporations' strategies: a flatter hierarchical structure and greater liquidity have allowed the Mexican corporations to be agile and aggressive in their acquisitions, while Telefónica's long history as a telecommunications leader has given it specific knowledge advantages over time. Its mastery of both analogue and digital technology gave it an edge over its U.S. competitors in the privatisations of the 1990s, and technology has consistently been an important competitive asset. For example, ADSL service was launched in São Paulo by TeleSP (part of the Telefónica group) in 1999, even before it was launched in some European countries (Blanco Bermúdez, 2002).

### **3. The Performance of the Telecommunications Sector in Latin America**

Latin Americans do not have a positive perception of the privatisation of public utilities in their region. According to 2005 survey data (Latinobarómetro, 2005), only one-third of the region's population is satisfied with it. These opinion data bundle together the privatisation of water and electricity, where the entry of foreign private capital has often been more controversial, as well as telecommunications, where privatisation and liberalisation were widely preceded or accompanied by a rebalancing of user tariffs. Whereas previously, very costly long-distance calls often "paid for" extremely low-cost local calls and the sector's infrastructure, operators moved to eliminate this cross-subsidisation, thereby raising the cost of telephone services for those who make less use of international services, and hurting the poorer segments of the population.

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<sup>6</sup> A similar pattern of accelerated internationalisation of latecomer multinationals from emerging markets has also been noted in other sectors, such as the white-goods sector (Bonaglia, Goldstein and Mathews, 2007), although the strategies differ between manufacturing and services sectors.

<sup>7</sup> Telefónica's mobile business was floated independently in 2000 and reintegrated in 2006. Since mid-2006, Telefónica is organised by regional divisions (Telefónica España, Telefónica O2 and Telefónica Latinoamérica).

The performance of Latin America's telecommunications sector has nevertheless been exemplary since privatisation started in the late 1980s in terms of increased aggregate availability and quality of services. The most commonly used aggregate indicator of progress in telecommunications is telephone density (or teledensity) in lines per 100 inhabitants. Given the substitutability of land and mobile lines for voice communications (OECD, 2007), the sum of the two is taken as a measure of access to private telephone lines. Telephone density is a useful indicator of the connectivity gap across countries (though only a very rough indicator of equality of access within countries, other than in countries that are close to universal service). Table 2 presents the evolution of telephone density for the countries in the region since 1990. On average, the region has gone from single-digit density to serving the majority of the population in 15 years, catching up and surpassing the world average.

**Table 2. Telephone Density in Latin America**  
telephone lines (mobile and fixed lines) per 100 inhabitants

	1990	...	1995	...	2000	...	2005
Argentina	9		17		39		82
Bolivia	3		3		13		33
Brazil	6		9		31		68
Chile	7		14		44		90
Colombia	7		11		22		65
Costa Rica	10		15		29		58
Cuba	3		3		4		9
Dominican Rep.	5		8		20		51
Ecuador	5		7		13		60
El Salvador	2		5		22		49
Guatemala	2		3		13		46
Honduras	2		3		7		25
Mexico	7		10		27		62
Nicaragua	1		2		5		23
Panama	9		12		30		56
Paraguay	3		4		20		36
Peru	3		5		12		28
Uruguay	14		21		42		66
Venezuela	8		13		33		60
<b>Latin America &amp; Caribbean</b>	<b>6</b>		<b>10</b>		<b>27</b>		<b>61</b>
<b>OECD Average</b>	<b>40</b>		<b>52</b>		<b>97</b>		<b>127</b>
<b>World Average</b>	<b>10</b>		<b>14</b>		<b>28</b>		<b>54</b>

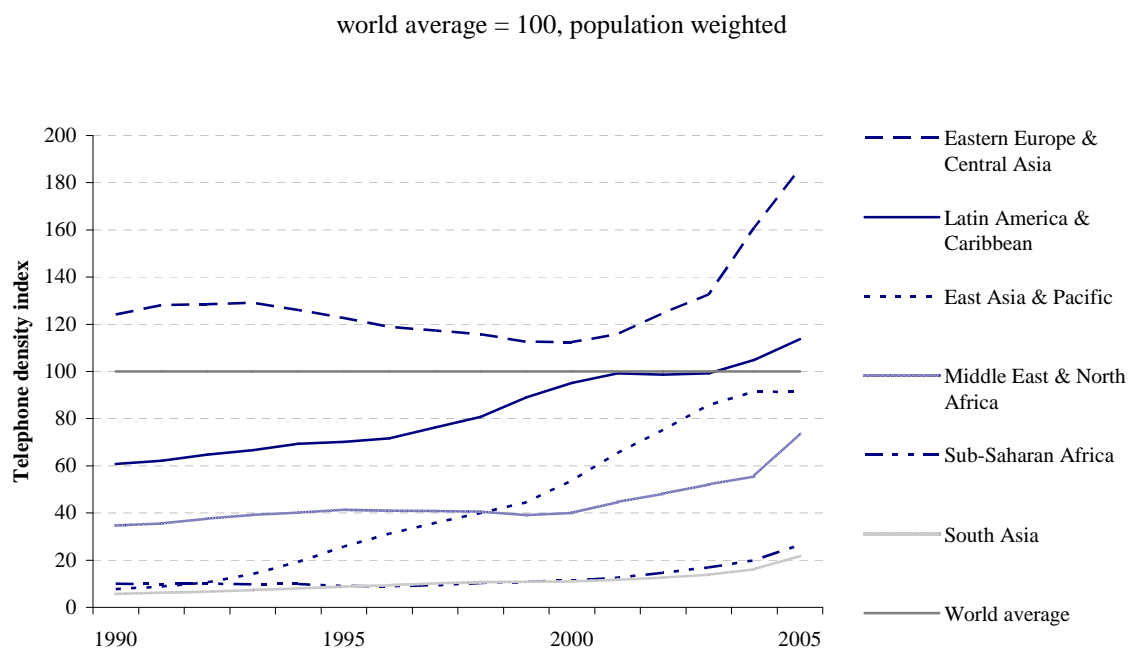
*Source:* OECD Development Centre (2007); based on International Telecommunication Union (ITU) (2006) data.

The performance is also good relative to other regions. Figure 2 shows that in terms of telephone density, while Latin America remains in third position – after the industrialised countries (not shown in the figure, much above all other regions) and Eastern Europe and Central Asia – in 1990 it was lagging well behind the world average, and caught up in 2001.

Latin America's aggregate success in catching up with the world average in telephone density hides a diverse picture amongst countries in the region. Chile and Argentina are far ahead, with 90 and 82 telephone lines per 100 inhabitants, respectively. On the other hand, two countries, Haiti and Cuba, have yet to experience take-off in telephone access and uptake, while the poorest Central American

and Andean countries have only recently started their catching-up phase: in Ecuador, for instance, annual growth in teledensity accelerated from around 30 per cent in the early 2000s to 53 per cent in 2005.

Figure 2. Telephone Density in Developing Regions

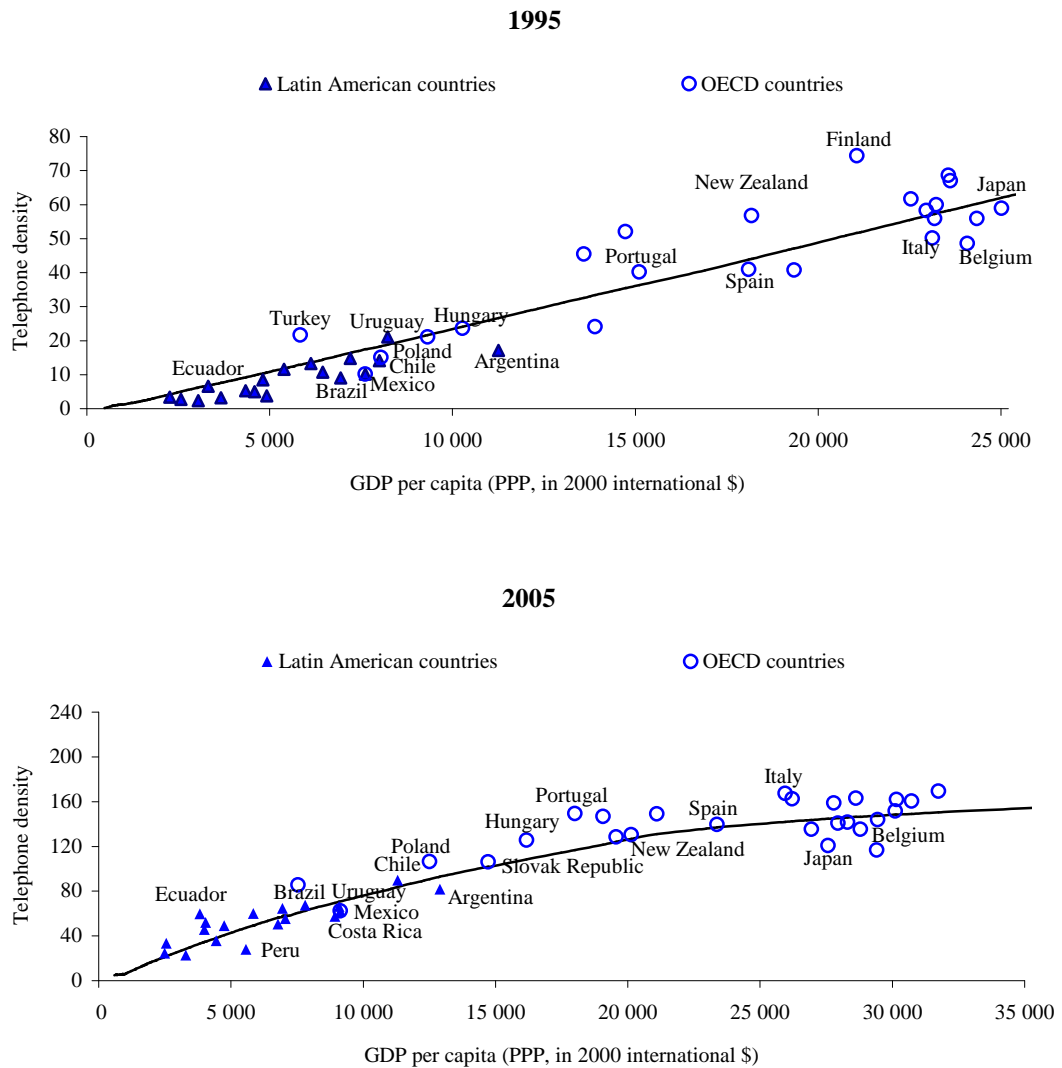


Source: OECD Development Centre (2007); based on ITU (2007) and World Bank (2006b) data.

The difference in performance across countries is related to differences in aggregate economic performance: as much as 80 per cent of the variation in telephone density across countries can be attributed to variation in GDP per capita. This statistical correlation does not mean that the connectivity gap across countries will necessarily be closed by convergence in per capita income levels, however, or that such convergence is necessary to close the connectivity gap. Indeed, the relationship across countries between telephone-service density and GDP per capita has substantially evolved over time, as more developed markets have reached saturation levels and middle-income countries have extended service more quickly than would have been predicted by income growth alone (Figure 3). While this relationship between teledensity and per capita income was essentially linear until 1995, by 2005, that linearity had disappeared – a disappearance that is consistent, among other interpretations, with threshold effects in network extension. The relationship between income levels and teledensity has limits, in other words, both in terms of its causal interpretation, and in terms of the degree to which it can be used to infer policy recommendations.

Figure 3 **Income Per Capita and Telephone Density: An Evolving Relationship**

GDP per capita (PPP, in constant 2000 \$) and telephone density (lines per 100 inhabitants)



*Note:* The solid line is a non-parametric smoother based on data from all available countries at each date.  
*Source:* OECD Development Centre (2007); based on ITU (2006) and World Bank (2006) data.

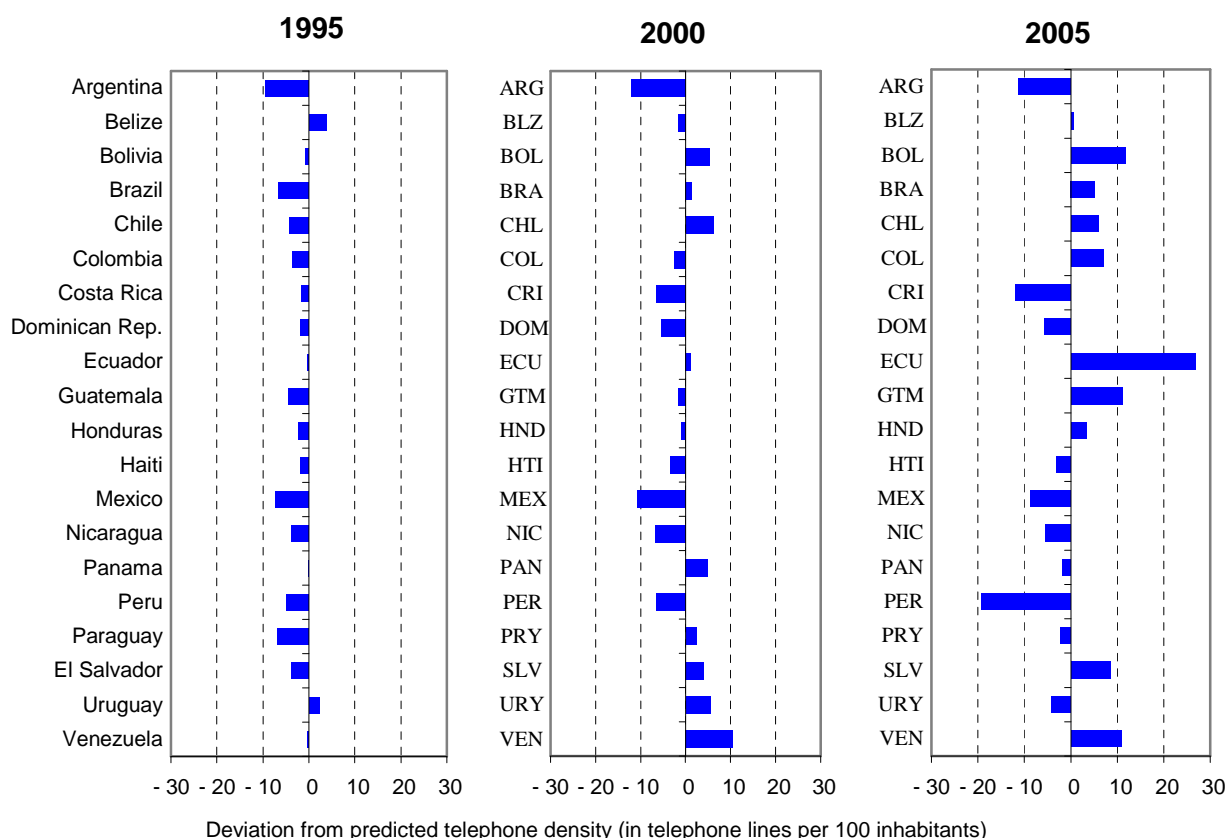
Figure 4 attempts to account for both the effect of GDP per capita and the evolution of the changing relationship between per capita income and telephone density. Country-level results are presented for 1995, 2000 and 2005, with each graph showing the deviation of each country's actual telephone density from the value predicted by the country's GDP per capita. Negative figures mean

that a country is below the teledensity expected from its level of income, positive figures mean that the country's teledensity is above the expected level.<sup>8</sup>

In 1995, almost every country in the region exhibited a substantial lag in density of telephone services relative to the level its per capita income would predict. The only exceptions were Belize, one of the pioneers in the privatisation process, and Uruguay, which maintained the incumbent public operator; other early privatisers, including Argentina, Guyana, Mexico and Venezuela, had not yet achieved significantly better results. Five years later the picture was brighter. Chile, one of the first countries to liberalise the market, had more than caught up with the level of connectivity predicted by its level of income, and Brazil had also reduced the difference between actual and predicted connectivity. In both countries, foreign operators played a leading role.

**Figure 4. Telephone Density and Per Capita GDP (1995, 2000 and 2005)**

deviations from non-parametric prediction of telephone penetration based on GDP



Note: Data for Haiti, 2005, are actually from 2004.

Source: OECD Development Centre (2007); based on ITU (2006) and World Bank (2006) data.

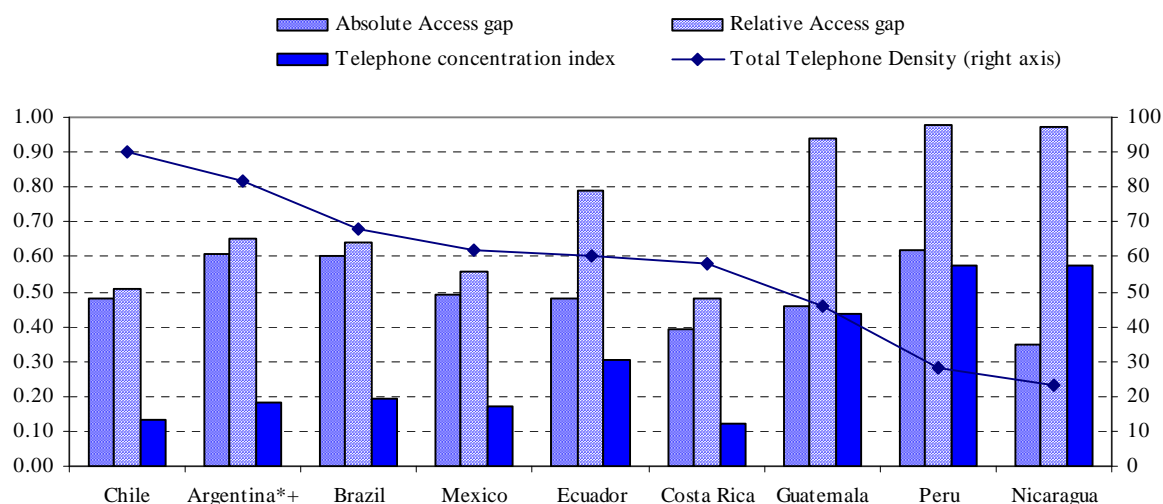
<sup>8</sup>. The actual model fitted is a non-parametric lowess smoother of telephone density over GDP per capita in PPP terms. The results are broadly unchanged if a parametric approach is used by applying the best-fitting Box-Cox transformation to per capita GDP for each year

Yet the latest data (2005) still present a mixed picture for the region. While several countries that privatised their incumbent telephone provider perform well, even when accounting for the rise in income levels (Brazil, Chile, El Salvador and Guatemala all exhibit more connectivity than expected), others, including Argentina, Mexico and Nicaragua, which have also privatised their incumbent operator, are behind their expected levels of connectivity. The remarkable case of Ecuador, which is clearly outperforming its peers both within and beyond the region, came about through a doubling of mobile subscribers in 2005 – probably the result of intense competition between the two major players, Telefónica’s Movistar and América Móvil’s Porta, spurred by the entry in 2003 and rapid expansion in coverage of a third mobile operator, Alegro.

Despite good aggregate performance, the degree to which the poor have benefited from the region’s increased access to telecommunications varies greatly across countries. Figure 5 displays both the gap in rates of access to telephone services between the highest and lowest income quintiles (the absolute access gap), and the size of this gap relative to the proportion of individuals with telephone services in the highest income quintile (the relative gap).<sup>9</sup> The table in the Annex gives these inequality indicators for all countries in the region for which they are available. Very high relative access gaps, such as those found in Bolivia, Guatemala, Haiti, Nicaragua and Peru, reflect very low telephone connectivity amongst the poor in those countries. While both the relative and the absolute gaps therefore depend on the total level of connectivity, substantial differences exist across countries with comparable average levels of connectivity. For example, in the six countries that have telephone densities between 57 and 65, the relative access gap ranges from 0.48 (Costa Rica) to 0.79 (Colombia and Ecuador).

Figure 5. Access Gap in Telephony for Selected Latin American Countries

latest data available



Note: + Urban areas only.

Source: OECD Development Centre (2007); based on SEDLAC (2007) data except \*, based on IADB (2007) data.

<sup>9</sup> The relative gap is  $(Q5-Q1)/Q5$  where  $Q_i$  is the proportion of individuals in income quintile  $i$  with access to a telephone. This measure is therefore between 0 (perfect equality) and 1 (if no one in the lowest quintile has a telephone).

Figure 5 also displays the telephone concentration index. While both the absolute and the relative access gaps measure the differences in access between the highest and lowest income quintiles, the telephone concentration index also reflects the rates of access to telephone service in intermediate income quintiles.<sup>10</sup> As in the case of the two access-gap measures, a higher telephone concentration index corresponds to higher inequality in access. Importantly, the data in Figure 5 reveal an inverse correlation between the concentration index and total density, which suggests that as telephone density increases, households in the poor (but not the poorest) segments of a country's population gain access.

These measures of telephone access inequality rely on household data and are based on telephone-line *ownership*, rather than access strictly speaking. While it can be argued that having access to one's own telephone line is a qualitative improvement over public access, the main avenue for the poor to gain access to telephone and other information technology services is often through public pay-phones or communal-access telecentres. Data on the density of public pay-phone networks (table in Annex) show significant differences even within the group of countries with the most unequal access. Thus, while Peru and Nicaragua exhibit similar relative access gaps, of close to 1 (Figure 5), Peru boasts 5.42 pay-phones for every 1 000 inhabitants to Nicaragua's mere 1.27, and Bolivia's 1.75.

Although access gaps are generally high, relative access gaps exhibit a decreasing trend in almost every country for which a long enough data series exists. Brazil provides an important illustration: until 1997, the country's relative access gap was higher than 0.9 – similar to those found in the most unequal countries in Latin America today – but by 2004 it had fallen significantly, to 0.6, thanks to an increase in the access rate of the poorest quintile from 5 telephones per 100 persons to more than 30.

#### **4. Explaining the performance of the telecommunication sector in Latin America.**

This section reviews the drivers of the performance of telecommunications in Latin America. Two common explanations of good aggregate performance (privatisation and technology) are briefly presented, the specific roles of multinationals and regulatory frameworks are then examined with the help of the new performance indicators described in the preceding section.

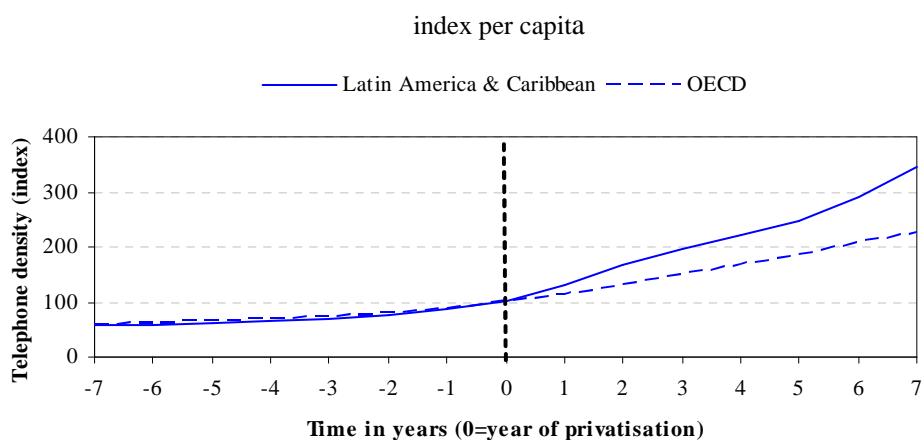
##### ***Privatisation and performance in telecommunications***

The good aggregate connectivity performance of the telecommunications sector in Latin America has often been attributed to the successful privatisation of incumbent operators (IADB, 2001). Figure 6 shows that indeed, on average, the rate of growth of connectivity per capita increased substantially, from 10 to 25 per cent per year, after privatisation. While these data may be interpreted as suggesting that privatisation played a key role in enhancing performance as measured by telephone density, such an interpretation is subject to important caveats. In addition to those noted earlier, it is important to recall that the 1990s saw the implementation of a series of reforms that accompanied privatisation: in some cases, as for example in Brazil, telecommunications markets were liberalised immediately after privatisation of the incumbent. Moreover, as the trends shown reveal, a second break has tended to occur in the upward trend of teledensity around year 5 after privatisation, probably due to the end of exclusivity periods and the subsequent opening of the market. Indeed, exclusivity periods have been shown to limit the benefits of privatisation substantially in terms of network extension (Wallsten, 2003).

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<sup>10</sup> The telephone concentration index measures the concentration of telephone ownership by the area over the Lorenz curve, plotting the cumulative share of owned telephones against income quintiles. It can be interpreted like a Gini coefficient: 0 is perfect equality (all individuals have the same probability of owning a telephone) and 1 perfect inequality (only individuals in the highest income quintile have a telephone).

Figure 6. Telephone Lines and Privatisation



*Note:* Time 0 is the year of privatisation of the incumbent operator; the scale of telephone density is normalised to be 100 at the time of privatisation. The plot is the average of data for countries in which privatisation had occurred at least seven years previously and had available data for the post-privatisation period (Argentina, Belize, Bolivia, Brazil, Chile, El Salvador, Guatemala, Guyana, Mexico, Panama, Peru and Venezuela).

*Source:* OECD Development Centre (2007); based on ITU (2006) data.

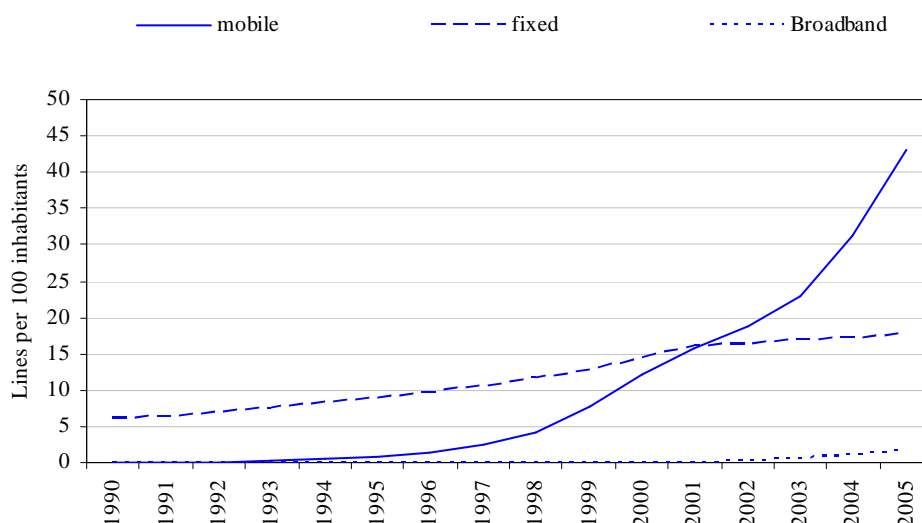
### ***The mobile factor: technology and performance***

Technology and innovation have played a major role in the success story of spreading telephony in Latin America. Figure 7 shows the respective contributions of land and mobile telephony to the growth of teledensity in the region. While land lines have become steadily more available, the great advances since the late 1990s correspond to rapid increases in mobile telephony.<sup>11</sup>

The rising importance of mobile communications, and the segmentation of land and mobile telephony that telecommunications markets have witnessed as a consequence, make assessments of the performance of telecommunications policies more difficult. Indeed, mobile communications have typically been less stringently regulated and led to more competitive markets than land-line communications. This difference reflects two factors: the lower initial investment necessary in mobile telephony, which reduces entry costs, and the absence of established public monopolistic providers.

<sup>11</sup> Comparable data on mobile phone coverage of the population for the countries considered that would allow a comparative perspective are not available.

Figure 7. **Mobile, Land Line and Broadband Penetration, Latin America**  
population weighted average



Source: OECD Development Centre (2007); based on ITU (2006) data.

The interaction between the diffusion of mobile technology and the consolidation process in the sector is one of the main determinants of the competitive structure of the sector. The spread of mobile communications was accompanied by a number of new entrants into the sub-sector and a segmentation of the market. Moreover, the absence of an incumbent in most cases was a unique opportunity to create competitive markets from the start. Yet subsequent technological advances have tended, on the contrary, to blur the lines between land-line, mobile and data transmission services, thereby reinforcing a process of consolidation and giving rise to fierce oligopolistic competition amongst a reduced number of actors.

### *The role of multinationals*

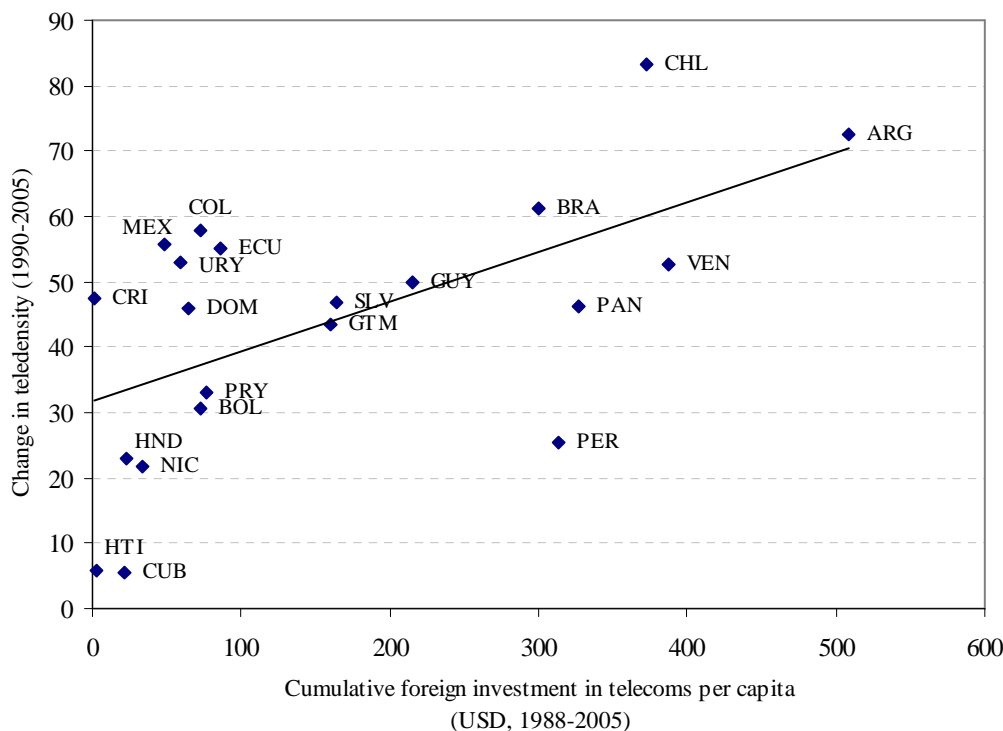
The entry and expansion of multinational firms in the telecommunications sector in Latin America has been driven by multinational firms’ market-seeking strategies observable not only in their cross-border activity, but also within countries, as competitors strive to acquire customers beyond the affluent classes. Indeed, providers, and especially mobile providers, spend substantial resources to acquire new customers. To attract customers, mobile-telephony enterprises have even shown themselves willing to bear a substantial part of the cost of new telephones, to make the acquisition of a telephone very attractive to new customers – essentially subsidising the price of terminals for customers. The average enterprise subsidy for the purchase of a mobile telephone is four times the average monthly revenue per customer in Ecuador, Peru and Colombia, for example, and six times the average revenue in Argentina and Brazil – meaning that the cost of the telephones is only recovered, on average, four and six months, respectively, after customer acquisition (Fundación Telefónica, 2007).

Such market-seeking multinational corporate behaviour explains the positive correlation visible in Figure 8 between the level of FDI in a country’s telecommunications sector and the change in the country’s telephone density between 1990 and 2005. While the FDI data in Figure 8 are limited in

terms of coverage and comprehensiveness, alternative data sources provide a similar aggregate picture.<sup>12</sup>

Figure 8. **FDI in Telecommunications and Telephone Density (1990-2005)**

cumulative investment in telecoms per capita versus change in telephone density



Source: OECD Development Centre (2007); based on ITU (2006) data, World Bank PPI database, and World Bank (2007) data.

The level of FDI inflows to the sector is only weakly associated, however, with lower inequality in access. While the impressive development of the mobile-telecommunications market has substantially lowered the cost of serving voice-telephony customers, market-seeking FDI has not yet brought private telephone service to the poorest segments of the population. Figure 9 thus shows a weak positive correlation between the *absolute* access gap and our measure of FDI in the sector; it also shows a weak negative correlation between the *relative* access gap and FDI in the sector. Since improvements in the absolute access gap require that more people in the poorest quintile gain access to service than in the highest quintile, whereas improvements in the *relative* access gap only require

<sup>12</sup> Sector-disaggregated data are not available from official sources in a comparable fashion. The data used are drawn from the World Bank's Private Participation in Infrastructure database. They do not therefore strictly correspond to the OECD definition of Foreign Direct Investment (OECD, 1999) and should be interpreted as a proxy. This database records total investment per project as well as the participation of foreign actors but seldom the participation (share) of foreign actors in each project and never its change over time. All investment data are weighted by the share in the joint venture when available. They will therefore underestimate (sometimes substantially) actual investment, especially in the case of acquisitions. Moreover, the data do not account for losses or repatriation of profits. For further details on the advantages and shortcomings of the database for this purpose, see Guislain and Qiang (2006).

that *proportionally* more poor people gain access than people in the highest income quintile, these data suggest that foreign entry has first addressed the needs of higher-income customers, only later turning to the less well-off.

Still, the increased connectivity rate displayed by countries in which the telecommunications sector has received substantial FDI has benefited the population as a whole, if not the lowest income groups. Figure 10 plots FDI in the sector against a measure of the concentration of telephone ownership across income groups that puts less weight on the lowest income group. Increased access by the less poor and the middle class tends to lower the concentration index, which can still be interpreted as signalling lower inequality in access. Again, the size of foreign investment inflows is weakly associated with lower inequality in access. While one cannot determine causality from this exercise, a probable explanation of the relationship is the attractiveness, for foreign capital in the sector, of markets with sizeable middle classes.

Figure 9 **Foreign Direct Investment and the Access Gap**

FDI in \$ per inhabitant, absolute and relative access gaps as in text

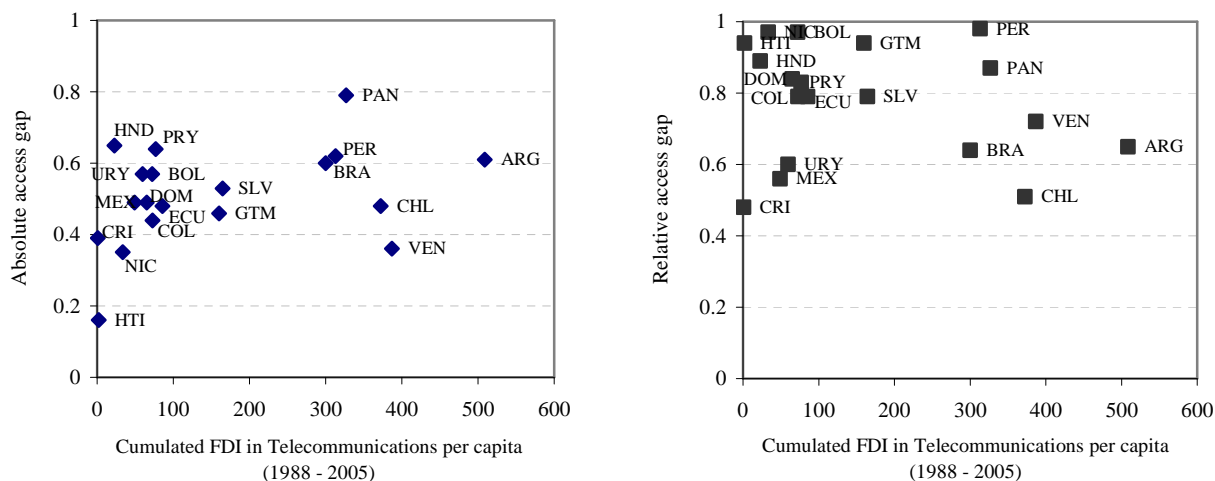
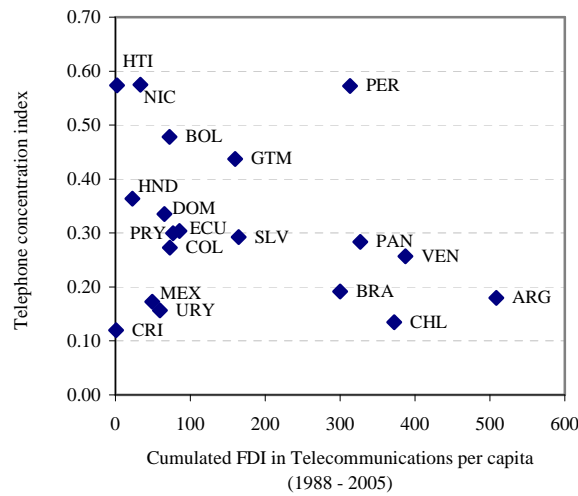


Figure 10 Telephone Concentration and FDI in Telecommunications (1990-2005)

index of telephone concentration (latest available) versus cumulated FDI in telecommunications (in \$)



Source: OECD Development Centre (2007); based on Sedlac (2007) data and World Bank PPI database (2007).

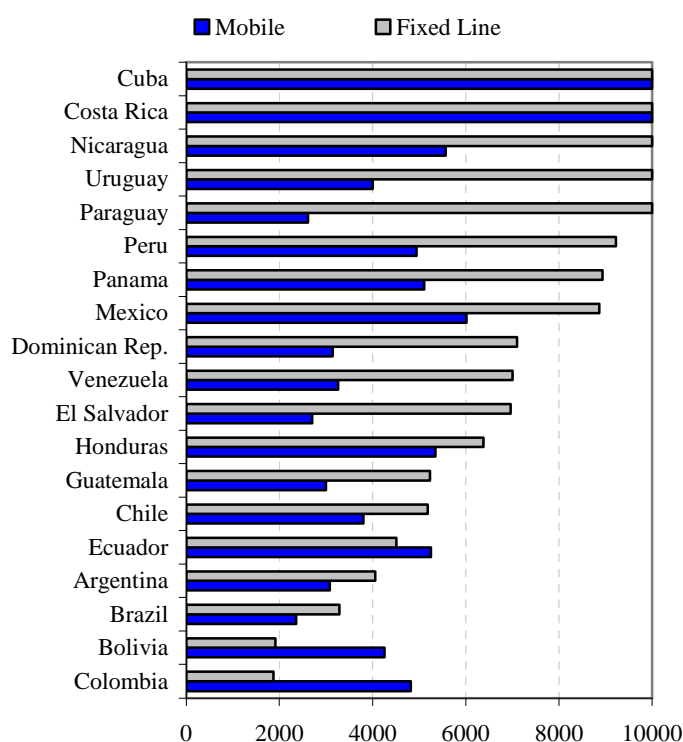
### Consolidation, competition and market structure

The consolidation process in the industry has raised concerns of an evolution towards an increasingly duopolistic market. This process notably accelerated in 2004, with Telefónica's acquisition of Bell South's Latin American mobile operations, on the one hand, and Telmex's purchase of AT&T's operations in Argentina, Chile, Colombia and Peru on the other. But the land and mobile segments of the market remain quite different, in terms of their competitive structures, and there is also wide dispersion across countries, as indicated by the Herfindahl-Hirschman Index (HHI) values presented in Figure 11. Mobile-telephony markets tend to be less concentrated than land-line markets (an observation that is only reinforced by the fact that the low values of the HHI for Colombia and Bolivia hide substantial local market power in the hands of local telephone co-operatives in those countries). Significantly, Brazil and Argentina, which have received large inflows of FDI and are the main battlegrounds for supremacy, exhibit HHI values consistent with effective competition. But it also true that amongst the major markets, Mexico displays very high concentration indexes – well above those of Brazil, Argentina, Colombia and Chile – and that the HHI tends to underestimate market power especially when competition takes place at the sub-national level.<sup>13</sup>

<sup>13</sup> Costa Rica stands out as the only country in the region where not only land-line but also mobile telephony remain state monopolies.

Figure 11 **Supply Concentration in Telephony (at end 2005)**

Herfindahl-Hirschman Index, by segment



*Note:* The Herfindahl-Hirschman concentration index is constructed as the sum of market shares in each segment expressed in percentages: 0 corresponds to an atomistic market, 10 000 to a monopoly.

*Source:* OECD Development Centre (2007); based on regulators' and operators' annual reports data.

The relationships between supplier concentration and the sector's performance, both in terms of density of coverage and in terms of equality of access, are fairly weak. Figure 12 presents the relationships in each segment – mobile and land-line – between supplier concentration on the one hand and performance outcomes in terms of density and total inequality (access indicators are not available by segment) on the other.

In the mobile segment, which is much more important than the land-line segment for almost all countries, there is a weak negative correlation between telephone density and supplier concentration (Panel A). The best performers in terms of total density (Chile, Argentina, Brazil) all exhibit fairly low supplier concentration. On the other end, the Costa Rican monopoly clearly stands out as having missed the great expansion of mobile telephony witnessed in the region since the mid-1990s, despite having achieved the highest density of land lines and the most equitable access in the region. Other relatively weak performers in mobile density include Peru, Honduras and Nicaragua, all of which have, in contrast to the previous group, very concentrated land-line markets. These patterns suggest that dominant positions in the land-line market may be hampering entry into the mobile market, while within the land-line segment supply concentration and teledensity are not strongly associated.

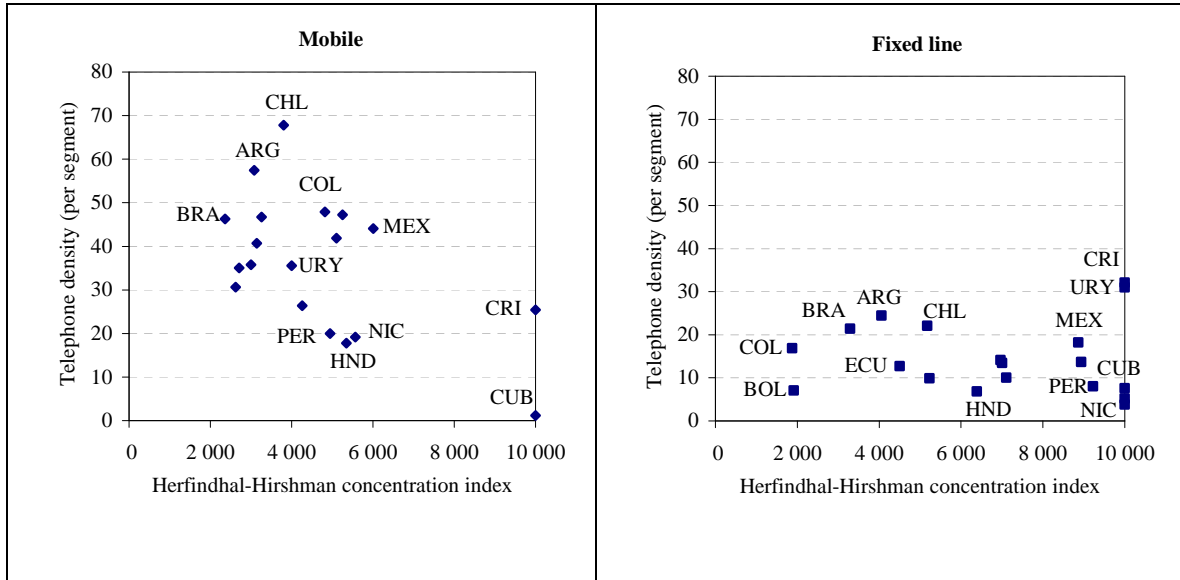
Panel B presents the relationship between inequality in telephone access and supply concentration. Once the particularities of the Colombian and Bolivian markets are taken into account (supply in both these markets appears fairly dispersed, but local suppliers have significant local-market shares), lower concentration in the supply of land telephony is associated with more equal access (in Brazil, Argentina and Chile). The sector's performance in terms of equality when the land-line incumbent remains a monopoly ranges from the lowest inequality (in the state-monopoly cases of Uruguay and Costa Rica) to the highest inequality (in the case of Nicaragua's monopoly, ENITEL,

whose privatisation was finalised in 2004) – showing that monopolies, as such, neither guarantee nor preclude good results in terms of equality of access.<sup>14</sup>

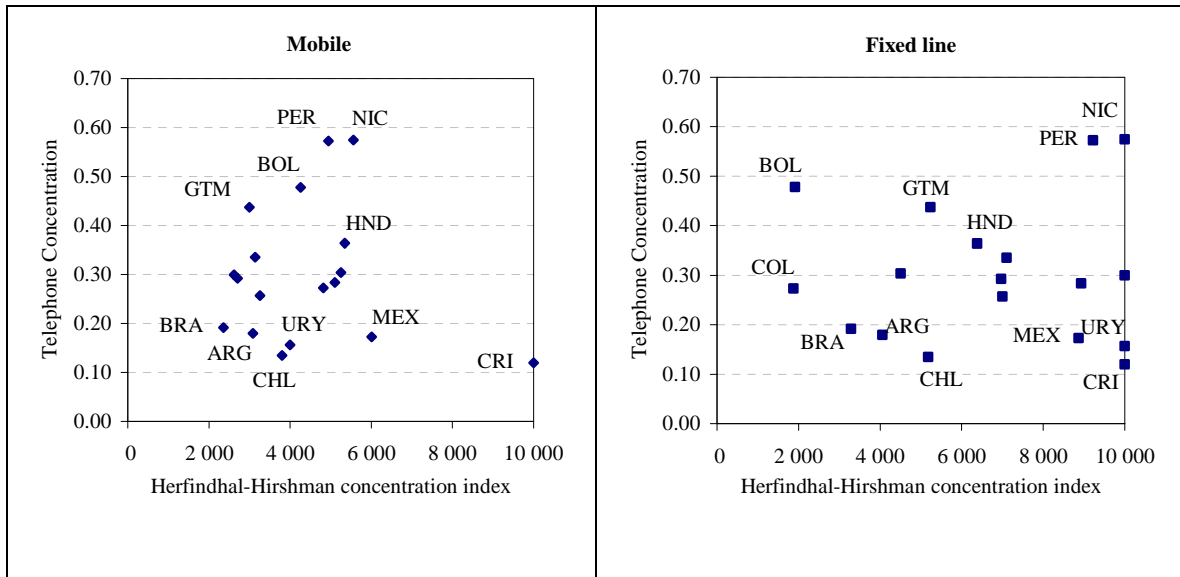
Figure 12. Market Concentration and Performance

market concentration at end 2005, performance at end 2005 or latest available

Panel A: Market Concentration and Telephone Density



Panel B: Market Concentration and Telephone Concentration



<sup>14</sup> ENITEL was privatised in two stages. It was controlled by the Honduran consortium Megatel between 2001 and 2004, and since 2004, by América Móvil.

Source: OECD Development Centre (2007); based on regulators' and operators' annual reports, and ITU (2007) and IADB (2007) data.

### **Regulation is crucial**

Regulation quality plays a key role in the link amongst market concentration, market power and sector performance. Independent regulators are needed to address two major commitment problems. One derives from the state's difficulty to credibly commit to not expropriating the substantial investments involved in telecommunications infrastructure after the cost of those investments has been incurred by investors. The other reflects the fact that effective regulatory independence includes independence from the industry, and often especially from the local-loop monopolist, or the incumbent, due to issues related to interconnection (the obligation of an operator to carry calls generated by another operator and the compensation it receives for doing so). When this independence is not effective, market power translates into excessively low density coupled with higher prices. The opportunities for rent-seeking that exist in regulated industries, both by the regulated and by politicians and regulators, link the performance of these industries with the political process in a country, and therefore with the institutions that underpin its political and regulatory checks and balances (Henisz and Zelner, 2001).

Most countries in Latin America have independent telecommunications regulators (although not always exclusively dedicated to the industry). The exceptions, according to the criteria set by the International Telecommunication Union, are Chile, Haiti, Peru, Suriname and Uruguay. Countries with independent regulators on average have received more FDI per capita in the sector, have progressed more in the last 15 years in terms of density, and have less unequal access to telephone service. But, there is great diversity within each group of countries – those with and those without independent regulators – and recent analysis suggests both that the statutory independence of the regulator is a weak indicator of the institutional environment (Baudrier, 2001) and that the importance of mobile telephony – whose infrastructure is both less costly and more easily removable (if threatened with expropriation for example) – reduces the sensitivity of the telecommunications sector to political conditions (Andonova, 2007).

**Table 3. Regulator Independence and Telecommunications Performance Indicators**

simple average of selected indicators

	Number of countries	Telephone density (2005)	Change in telephone density (1990-2005)	Telephone concentration index	Cumulative FDI in the sector (per capita)
With autonomous regulator	16	55.6	50.4	0.29	151
No autonomous regulator	5	49.6	43.0	0.35	58

Source: OECD Development Centre (2007); based on ITU (2006) and (2007) data.

The heterogeneity of regulatory regimes and market structures, even amongst countries whose regulators are categorised as independent, explains the relatively weak differences in teledensity between countries with and without independent regulators. Still, cross-country analyses of the importance of regulatory independence find that countries that have independent regulators at the time of privatisation tend to have lower prices (Estache *et al.*, 2006). An important reason is that independent regulators help ensure that an increase in prices due to tariff rebalancing in conjunction with privatisation does not erode the potential gains for users from technological progress brought about by more dynamic providers. Regulatory performance in turn depends both on the governance of regulation itself, and on the political environment that the regulator faces. Chile, which does not have an independent regulator but has a political environment characterised by relatively high levels of transparency and accountability, illustrates the latter point. Studies also suggest that political accountability improves regulatory performance (Gasmi *et al.*, 2006), and that while even corruption can lead to performance improvements in the face of resistance to needed change and red tape (Estache *et al.*, 2006), reform policies can lead to better performance.

Beyond ensuring competition, Latin American regulators have shown great commitment to extending service. The models used vary greatly, ranging from a commitment to market liberalisation, to the creation of funds to finance universal-access projects, to state-mandated command-and-control mechanisms (Stern *et al.*, 2006). Countries with strong land-line incumbents, including Bolivia, Panama and Mexico, have relied on universal-access obligations imposed on the incumbent with varying degrees of success and stringency. In Costa Rica and Uruguay, state or corporative objectives have achieved high levels of land-line connectivity. Other countries, including Guatemala and El Salvador, have created very liberal regulatory regimes that have achieved increased teledensity without reducing significant regional disparities. More balanced approaches, finally, notably Brazil's combination of a liberal licensing regime and universal-service obligations enshrined as regional development targets, have proved very successful.

The most noteworthy experiments have been in so-called universal access funds (UAFs). Most countries in the region have created such funds, although in some countries they have not begun their action (e.g., the Argentine fund was legislated in 2000 but was not yet in operation as of June 2007) and the accumulation of funds by the Brazilian *Fundo Fiduciario do Serviço de Telecomunicações* has raised questions about their future use. Chile's UAF is particularly innovative, and interesting, because of its competitive bidding mechanism, in which enterprises bid for universal-access projects with one requesting the lowest subsidy being awarded the project, and because the fund has been very successful: within five years of its establishment in 1995, the fund had succeeded in extending access to basic service to the majority of rural Chileans (Xavier, 2006). The majority of universal-access actions have been to provide public pay-phones and community telecentres that offer a wider array of telecommunications services, although Peru's UAF (FITEL) has also financed pilot projects that extend individual access to the local network.

Looking ahead, it is clear from the experiences in the region that, while an access policy with clear and stable rules is necessary and can be very successful, well-regulated open and contestable markets can do much to provide access on commercial terms to a large part of the population. Given the degree of supply concentration in much of Latin America's land-line segment, and just as eyes turn to Brazil's and Chile's successes in extending coverage, Brazil is in the process of shifting to new interconnection regulations, with rates based on a fully allocated cost model (OECD, 2007).

## 5. Conclusions

The evolution in Latin America of FDI inflows and outflows and of the strategies of multinational corporations, home grown as well as from outside the region, provides a lens through which to assess the progress and impact of the region's opening up to the global economy. Since 2000, the irruption of emerging-market multinationals, notably including Latin American multinationals – the so-called *multilatinas* has significantly altered this panorama.

### ***The challenges ahead: inclusion and mobile service***

Latin America's telecommunications sector has received substantial FDI flows in conjunction with three sectoral phenomena – privatisation, mobile telephony, and industry consolidation – of varying importance across countries. The market-seeking nature of these flows, the arrival of mobile technology, and an emerging political commitment to foster universal service have created a major opportunity to provide better service to more people. Despite recent progress, however, the gap in access to telephone services between the rich and the poor remains substantial in most countries.

Providing voice service can go a long way towards enhancing communications to strengthen social ties and increase physical, economic and social mobility. It can also improve the efficiency of markets by allowing timely communication between potential buyers and sellers (Jensen, 2007).

However, voice communication is only a first step to bridging the communication and digital divide. With mobile-phone-based internet still far from maturity in terms of coverage and expansion, there is dire need for the mobile-phone-based services that can bridge the immense disparity that still exists in such areas as e-banking and e-government (paying taxes or voting through the internet, for instance). Moreover, while internet access is outpacing the growth of land-line expansion thanks to communal forms of access, broadband access remains limited by the restricted expansion of the land network.

Indeed, notwithstanding great progress in most countries, access to land telephone lines remains difficult for many people. As both a medium of communication and a source of content, the internet holds great promise for enhancing transparency and governance. Yet to play this role for all, it needs to be accessible across all segments of the population. The rise of mobile banking in southern Africa, for example, shows how process innovations in business organisation can be as important as technological innovations – mobile banking actually started with customers using pre-paid telephone-card numbers as a vehicle for money transfers, and was then picked up by operators and the banking industry. Similarly, in Latin America, initiatives that allow individuals to use their mobile telephones to retrieve remittances from migrant family members have paved a new way for providers of banking services to establish and maintain relationships with low-income or other previously inaccessible populations.

### ***Lessons beyond telecommunications***

The prevailing institutional environment plays a crucial role not only in determining the incentives for both incoming and outgoing investment, but in determining the effective contribution of multinational corporations to development. The example of telecommunications shows that their contribution has been and will undoubtedly continue to be significant in this sector of vital importance for aggregate economic performance and development – albeit initially mainly to the benefit of the better-off segments of local populations, thereby also increasing access inequalities – in countries across the region.

The example of telecommunications also draws attention to the crucial importance of regulatory regimes, certainly in key public services. While some countries, most notably Costa Rica, have restricted the entry of private actors in telecommunications services and performed relatively well in terms of equity of access to existing services, those same countries have not performed well in terms of service extension, letting crucial opportunities pass them by. The experiences of other countries in the region show that a regulatory regime that allows foreign actors into the sector has great potential to accelerate service extension. The combined effects of significant new FDI, the competitive market-seeking behaviour of the main investors, the spread of digital mobile technology, and market liberalisation have been to greatly increase connectivity in the region – faster than in other regions. Effective access-promotion policies with clear and stable rules are nevertheless required to ensure access to the poorer segments of the population, which is vitally important for economic and political development. Well-regulated, open and competitive markets that encourage innovation from within as well as from outside will induce and facilitate corporate strategies that maximise the contribution of multinationals to development throughout the region.

## Annex tables

**Table A1. Inequality and access to Telephone service in Latin America**

	Telephone line subscription inequality			Year	Public payphones per 100 inhabitants (2005 or latest)
	Absolute Access gap	Relative Access gap	Telephone concentration index		
<b>Latin America</b>					
Argentina+*	0.61	0.65	0.18	2001	5.91
Bolivia	0.57	0.97	0.48	2002	1.75
Brazil	0.60	0.64	0.19	2004	6.83
Chile	0.48	0.51	0.13	2003	4.51
Colombia	0.44	0.79	0.27	2004	2.44
Costa Rica	0.39	0.48	0.12	2004	5.04
Cuba	..	..	..	..	3.07
Dominican Rep.	0.49	0.84	0.34	2005	1.47
Ecuador	0.48	0.79	0.30	2003	2.35
El Salvador	0.53	0.79	0.29	2004	4.04
Guatemala	0.46	0.94	0.44	2003	4.31
Honduras	0.65	0.89	0.36	2005	0.48
Mexico	0.49	0.56	0.17	2004	7.12
Nicaragua	0.35	0.97	0.57	2001	1.27
Panama	0.79	0.87	0.28	2003	2.54
Paraguay*	0.64	0.83	0.30	2004	2.54
Peru	0.62	0.98	0.57	2003	5.42
Uruguay	0.57	0.60	0.16	2005	5.44
Venezuela	0.36	0.72	0.26	2003	4.57
Latin America average	0.49	0.75	0.3	--	3.74

*Notes:* + urban areas only ; .. not available ; -- not applicable

*Sources:* OECD Development Centre (2007); based on SEDLAC (2007), except \* based on IADB (2007).

**Table A2. Foreign Investment in Telecommunications in Latin America**

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**Cumulative sum of private investment in  
telecommunications with foreign participation (1988-2005)  
weighted by foreign participation share**

	\$ per inhabitant	Total, \$ million
<b>Latin America</b>		
Argentina	508.7	18 001
Bolivia	72.4	589
Brazil	300.1	51 910
Chile	372.4	5 447
Colombia	72.8	2 986
Costa Rica	1.0	3
Cuba	22.2	244
Dominican Rep.	65.2	536
Ecuador	85.6	1 053
El Salvador	164.7	1 056
Guatemala	160.0	1 788
Honduras	22.7	153
Mexico	49.0	4 835
Nicaragua	33.4	175
Panama	327.0	903
Paraguay	77.0	412
Peru	313.2	7 727
Uruguay	59.5	191
Venezuela	387.0	8 932
 Latin America total	 215.6	 108 373

*Notes:* .. not Available ; -- not applicable

*Sources:* OECD Development Centre (2007); based on World Bank Private Participation in Infrastructure Investment database (World Bank, 2007).

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