

MOBILE TELEPHONY AND DIGITAL POVERTY IN LATIN AMERICA

Can the expansion of
cellular telephones reduce
poverty?

CARLA MARISA BONINA
MARTÍN RIVERO ILLA

*This study was carried out with help of funds provided to the IEP
by the International Development Research Centre, Ottawa, Canada.*

MOBILE TELEPHONY AND DIGITAL POVERTY IN LATIN AMERICA. CAN THE EXPANSION OF CELLULAR TELEPHONES REDUCE POVERTY?

2008

BONINA, CARLA

Mobile telephony and digital poverty in latin america. Can the expansion of cellular telephones reduce poverty? / Carla Bonina y Martín Rivero. Lima, DIRSI, 2008 – (Young researchers competition series, 3)

36 p. il.

MOBILE TELEPHONY, DIGITAL POVERTY, LATIN AMERICA



This document is under a Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 Unported License. To see a copy of this license clic here <http://creativecommons.org/licenses/by-nc-nd/3.0/legalcode>

MOBILE TELEPHONY AND DIGITAL POVERTY IN LATIN AMERICA

**Can the expansion of cellular telephones reduce
poverty?**

Carla Marisa Bonina*
Martín Rivero Illa**

*Centro de Investigación y Docencia económicas - CIDE, México, DF, México

**Instituto de Ciencia Política - ICP, Universidad de la República, Montevideo, Uruguay

Index

Summary	6
Introduction	7
1. Poverty, digital inequality and ICTs for development	9
1.1 Globalization, poverty and inequality in Latin America	9
1.2 ICTs, development and economic growth	10
1.3 The digital divide, expansion of cellular telephony and reported benefits	11
2. Expansion of mobile telephony and poverty in Latin America	13
2.1 The expansion of mobile telephony in the region	13
2.2 The expansion of mobile telephony and income and poverty indicators	16
2.2.1 Mobile phones, income and poverty indicators	16
2.2.2 Mobile phones and inequality: Lorenz curves	21
3. Mobile telephony and poverty in Uruguay	24
3.1 Overall socio-economic profile of Uruguay	24
3.2 State of ICTs	25
3.3 Mobile telephony and poverty in Uruguay	27
4. Conclusions	30
References	32

Summary

The strong pattern of inequality that marks Latin America and the Caribbean (LAC), the most unequal continent in the world, is repeated, although with different characteristics, in access to information and communication technologies (ICTs). Despite significant progress in universal implementation of some of these technologies, especially cellular telephones, LAC has not reached the levels of economic growth and reduction of poverty and inequality expected with the penetration of ICTs. Although extensive literature exists signaling the potential benefits of ICTs as tools for poverty reduction, the evidence is still incipient in Latin America.

This document is the final report of a study that had a dual purpose: to contribute to an understanding of the relationship among poverty, digital poverty and mobile telephony's potential contribution to improve the standard of living for the poor, and to move toward better statistical analysis of the cellular telephony in the poorest sectors of LAC. For a more in-depth assessment, a detailed analysis was done of the evolution of these variables in Uruguay, where fairly reliable statistics are available.

Although it is not currently possible to demonstrate empirically, in great detail, that mobile telephony penetration is making a substantive contribution to poverty reduction in LAC, the study sheds light on certain areas. First, mobile telephony penetration has been significantly higher than the others ICTs among the poorest sectors of the population. Second, Lorenz curves show that the distribution of mobile telephony is consistently more equitable than landlines among the population in LAC. Third, where poverty levels are equal, in just a few years mobile telephony penetration has reached levels far higher than those attained by fixed telephony over several decades. As a result, having a mobile telephone is a less reliable proxy indicator to estimate a household's socio-economic status than having a landline. Fourth, the high degree of mobile telephone penetration in poor sectors sparks new ideas about possible strategies and tools for promoting other ICTs (especially computer use and Internet access), which have had comparatively less impact so far.

In short, these elements contribute to an objective and methodologically valid argument that can be used in the design or redesign of public ICT-related development policies in the region.

Introduction

The strong presence of information and communication technologies (ICTs) in nearly all spheres of modern society is one of the most prevalent characteristics of the growing globalization. Having the broadest possible access to these ICTs is increasingly accepted as a necessary condition for the successful insertion of less-developed countries into the international economy.

Among those who call for the expansion of ICTs as a catalyst for development in the region, a series of public policies have been developed that focus on increasing universal access and connectivity. For example, in recent years many governments in Latin America and the Caribbean (LAC) have financed the creation of “telecenters” or community access centers based on Internet use as part of a strategy for promoting connectivity nationwide. But while many of these programs are considered successful, various studies have shown that these initiatives have had a limited impact on the eradication of poverty (Proenza et al. 2001).

Many of the efforts to disseminate ICTs for development have focused on providing computers and Internet access. Studies have therefore focused on the degree of universal access and its impact. The dissemination of other technologies (such as cellular telephones) and their impact on poverty reduction have received far less study, especially in Latin America. Since 2001, the number of cellular telephone lines in the region has grown significantly, doubling in only four years and reaching growth rates of 300 percent in some countries, such as Argentina and Peru. These penetration levels have far outstripped those of traditional landlines.

The spread of cellular telephony in the poorest sectors has attracted the attention of companies and development experts worldwide. In Africa and Asia, efforts have been made to understand both the social and economic contributions of mobile telephony in rural and low-income urban sectors, with favorable findings (Vodafone 2005, Souter et al. 2005, Zainudeen et al. 2006). In Latin America, there is still a lack of detailed evidence about the potential of mobile telephony as a tool for improving the standard of living of people who are poor or marginalized, as well as rural populations in the region.

LAC faces a combination of two problems: poor definition and measurement of indicators of digital poverty and, more importantly, the lack of evidence of the real impact of ICTs on poverty reduction. Although there is extensive literature touting the potential benefits of the spread of ICTs as tools for reducing poverty, the evidence is still incipient or comes from isolated cases. Nevertheless, a relatively dominant paradigm holds that access to and productive use of ICTs is a necessary condition for development. According to this strong ideological school of thought, which is both political and economic, insertion into the international market and participation in globalization are a necessary condition for increased development.

In this view, the feedback cycle between ICTs and globalization determines that greater promotion of ICTs can lead to a higher level of globalization, and therefore a higher degree of economic growth, which leads to more and better development in a given country. These causal relationships are debatable, to say the least. The assumption that + ICT => + productivity => + economic growth => + development is part of a paradigm that should be subjected to thorough analysis.

There is an opportunity to go further than the current evidence on ICTs and their relationship to poverty reduction in Latin America. Shedding light on these issues contributes to an objective and methodologically valid argument that can help support the design or redesign of public ICT-based development policies for the region.

1. Poverty, digital inequality and ICTs for development

1.1 Globalization, poverty and inequality in Latin America

It can be said that ICTs are both cause and consequence of the process of globalization. On the one hand, ICTs are a cause because they are one of the principal agents that make globalization possible, and which make it increasingly intense and diverse. But development of ICTs is also a consequence of globalization, since the existence of a more global market for the exchange of goods and services has expanded the use of these technologies to every corner of the planet. Nevertheless, there are significant inequalities in both access to and use of ICTs among and within countries. This has been termed the *digital divide* or *digital inequality*. This new type of inequality exacerbates the gaps that already existed, such as those related to income, social capital and other socio-economic variables (ALADI 2003).

In the early 1990s, the worldwide Internet boom led to excessive optimism about the potential of ICTs to contribute to economic growth and, therefore, to the development of the poorest countries. To a great extent, this optimism was based on the liberal view in which greater globalization is the main strategy for achieving economic growth and reducing poverty through “trickle down.” According to this school of thought, ICTs are the globalizing agent *par excellence*. Greater dissemination and penetration of the new ICTs in less-developed countries, therefore, will make them increasingly globalized and put them in a better position to achieve economic growth and, therefore, become less poor. This view relativizes the possible impact of redistributive policies on poverty reduction compared to the possible effects of freer trade and greater economic integration.

Nevertheless, the causal links and assumptions underlying these relationships are the subject of fierce debate in academic literature on the subject, as well as in the development programs of international organizations. Some economists hold that the indiscriminate freeing of trade, far from improving economic stability and spurring economic growth, has undermined it (Stiglitz 2004). According to this view, the effects of globalization on poverty and inequality worldwide have been, in net terms, negative during the past three decades.¹ There is a certain degree of consensus that while the relative income gap among the world’s countries has decreased, the absolute income gap has increased considerably and will continue to do so.²

This is particularly serious in Latin America. Most of the region’s countries have participated actively in the globalization process, opening up their markets to a great extent because of the reform and structural adjustment processes of the 1990s. Contrary to the claims of international financial bodies,

1 For the impact of globalization on the increase in poverty and inequality, see Wade (2004), Went (2003) and Woodward and Simms (2006).

2 When considering inequality at the global level, it is important to note that more than 75 percent of the world’s population lives in underdeveloped countries and an estimated 1.2 billion people live in extreme poverty. In addition, in 2002 income levels for the 10 richest countries were approximately 82 times greater than those of the 10 poorest countries. See Prabhakar (2003), Wade (2004) y Svedberg (2004).

these reforms did not have the expected impact on reducing poverty and inequality (Vos et al. 2002).³ Latin America and the Caribbean is still the most unequal region in the world, with a large proportion of the population living in poverty. According to the most recent report by the Economic Commission for Latin America and the Caribbean (ECLAC), in 2005 an estimated 209 million people (nearly 40 percent of the region's population) were living in poverty, 81 million of them in extreme poverty (ECLAC 2006).

Given this relative failure of the adjustment processes, ICTs began to carry greater weight on public agendas as a strategy for economic growth and poverty reduction in LAC.

1.2 ICTs, development and economic growth

In studies related to economic growth and its determining factors, which have a long history, telecommunications and other ICTs are playing an increasingly important role. Their significance as catalysts for economic growth lies essentially in the fact that the expansion of telecommunications reduces transaction costs, expands market boundaries and greatly increases the flow of information (Waverman et al. 2005). One fundamental contribution in the field of ICTs, development and economic growth is the work of Mansell and When, who note the significant impact of ICTs on this latter variable (Mansell and When 1998). Similarly, Roeller and Waverman (2001) defend the importance of investing in public networking infrastructure, as it correlates strongly with countries' economic growth.

In recent years, various works have focused on countries in the Organization for Economic Cooperation and Development (OECD), with a more optimistic view of the positive impact of ICTs on economic growth (Indjikian and Siegel 2005, OECD 2003). In Latin America, one notable study, done for the GSM Association, showed interesting figures for mobile telephony as a generator of economic, commercial and social value.

In the United Nations, the work coordinated by Matti Pohjola, while arguing that ICTs have had a positive impact on economic growth in developed countries, relativizes their impact on economic growth in the poorest countries (Pohjola 2001a).⁴

Skeptical views of ICTs also include those that hold that the information and knowledge society is not as revolutionary or novel as some people think, and that the basis for income accumulation and distribution is the same as in traditional capitalist society (May 2002). There are also some authors who distrust the capacity of technology to eventually skip stages of development (Primo Braga et al. 2002) or who, even assuming benefits from ICTs, believe that these are unlikely to reach the poorest and most vulnerable sectors of the population (Saith 2003). Even in developed countries that are considered successful, such as Ireland, some people question various aspects of the ICT "miracle" as a development strategy (Kirby 2003, 2004). Finally, some authors question whether we should apply ICTs to the Millennium Development Goals as a development paradigm (Heeks 2005, Schech 2002).

³ An exhaustive analysis of the impact of trade liberalization on poverty and inequality in Latin America can be found in the work coordinated by Rob Vos and Lance Taylor for the UNDP, which covers all the countries on the continent (Vos, Taylor and Barros 2002).

⁴ The author argues that ICTs have had a positive impact on economic growth in developed countries, but that this has not been true in the poorest countries. The author quotes Robert Solow's theory of growth: «You can see the computer age everywhere but in the productivity statistics» (Pohjola 2001b: 7).

While there are more and more studies of the contribution of ICTs to economic growth and development, few have included an in-depth examination of the impact of cellular telephony in particular, especially in Latin American countries. The following section describes the progress made in this area.

1.3 The digital divide, expansion of cellular telephony and reported benefits

The debate among academics, statisticians and professionals over ways of measuring poverty is far from closed in the world in general and our continent in particular.⁵ Because of different views of what constitutes “poverty,” the question arises: what is the best way to measure it? The debate becomes more complex with the inclusion of concepts such as “relative poverty” and “absolute poverty,” and “relative inequality” and “absolute inequality.” How we view the concept of poverty will determine the focus of possible tools for overcoming it.

The same debate arises over how to measure digital poverty and/or the digital divide. The first regional works on the digital divide in our continent were done by international bodies such as ECLAC, the Inter-American Development Bank (IDB) and the Latin American Association for Integration (*Asociación Latinoamericana de Integración, ALADI*) (ALADI 2003, ECLAC 2000a, ECLAC 2000b, Valenti 2002).

Until several years ago, almost all initiatives for reducing the digital divide were mainly aimed at providing computers and Internet access. The advance of cellular telephony, not just in Latin America but also in other regions of the world, has spurred various academics, consultants and industry experts to focus on studying the expansion of mobile telephony and its impact on developing countries. Authors like Torero acknowledge that this growth has not led to a decrease in unequal access, which is mainly seen in the differences between rural and urban areas (Torero et al. 2005). According to these authors, the relationship between ICTs and development is that ICTs can be a positive factor in socio-economic development. In that regard, they do not agree with the “skeptical” views of those who question the beneficial effects, both social and economic, and who hold that the digital divide is intrinsically related to other inequalities, and not exclusively a matter of access to technology.

Amid progress in and studies of cellular and mobile telephony, one study done in Africa by the telecommunications giant Vodafone sheds light on the enormous potential of mobile telephony for providing socio-economic benefits, particularly in rural and marginalized parts of that region (Vodafone 2005). Many of the benefits derive from the fact that mobile phones are the only telephone service option for the low-income population and for people in remote and rural places where there is no other means of communication (Vodafone 2005).

⁵ For an overview of the difficulties and importance of the debate over ways of measuring poverty, see Ravallion (2003), Székely, Lustig, Cumpa and Mejía (2004), and World Bank (2000). A good analysis of the different approaches to measuring poverty can be found in Ruggeri Laderchi et al. (2003).

From this and other studies in Africa and some Asian countries, a series of benefits can be inferred. One is in the labor market, where mobile telephony facilitates both the job search and the possibility of being located by potential employers. The latter is particularly important for independent workers or those with temporary jobs, as is often the case with semi-urban, rural or marginalized populations (Vodafone 2005).

Mobile telephones have also helped reduce emergency response time by facilitating immediate calls to the police or ambulance services. Along the same line, according to a study of the impact of telephony on rural populations in India, Tanzania and Mozambique, the cellular telephone is considered the most important means of emergency communication (Souter et al. 2005). This is particularly relevant if we consider that the poorest people suffer most from natural disasters and catastrophes.

Just as mobile telephony is the only means for many rural communities to communicate, it is also an effective way to stay in touch with family and friends. This is particularly important for families in which one or more members migrate to cities or other countries in search of better educational opportunities or employment (Vodafone 2005, Souter et al. 2005).

There are also education and health benefits, since mobile telephony provides long-distance access for consultations with professionals. In the case of health, the promotion of cell-phone games that focus on prevention of serious illnesses, such as HIV, is another benefit that mobile telephony can offer to low-income sectors (Mallalieu 2006).

Another novel contribution emerges from the results of a regional survey by LirneAsia of low-income groups in Asia. The purpose of the study was to understand patterns of use among people at the bottom of the income pyramid, the two poorest quintiles of the population (socio-economic sectors D and E).⁶ Besides high rates of telephone use in the region and a growing number of mobile telephones among the population surveyed, the study showed unsatisfied demand for telecommunications services. Moreover, in contrast with popular perceptions that people in the poorest sectors cannot afford mobile telephony, there are solid indications of a strong desire in these sectors to dedicate resources to the acquisition and use of mobile telephones (Moonesinghe et al. 2006, Oxford Analytica 2007). This finding was a novelty and also poses a challenge for service providers, which must innovate to adjust their plans and services to put them within reach of these communities.

In short, both the benefits and the findings reported in this section open up a world of potential opportunities for people in LAC who live in poverty, live in rural or remote communities, or have no access to ICTs. The following section presents an overview of statistics for the region, summarizing the state of access to cellular and mobile telephony and how it relates to income and poverty indicators.

⁶ The study was done in five countries — India, Pakistán, Sri Lanka, the Philippines and Thailand — in which questionnaires were used with population groups representative of low-income sectors, made up of people between ages 18 and 60. A series of focus groups were also held to obtain more qualitative data for each country (Moonesinghe et al. 2006).

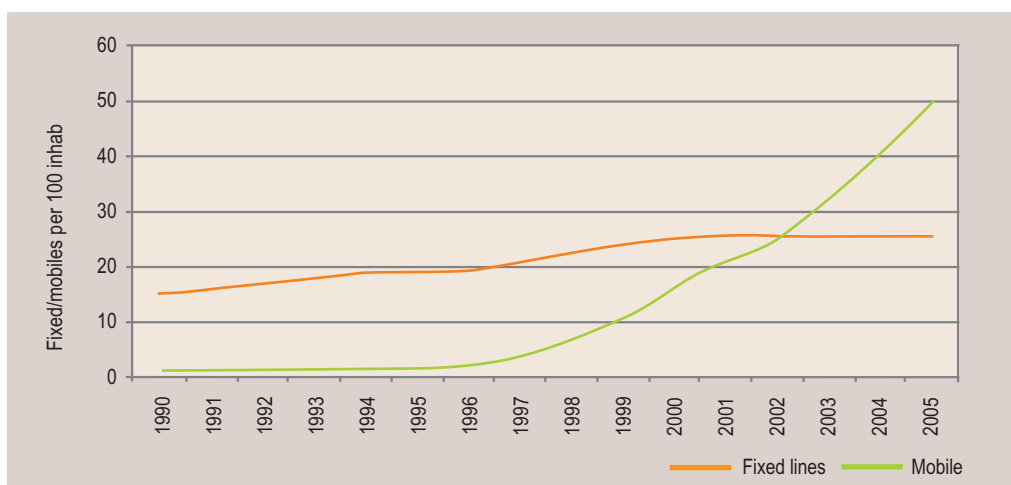
2. Expansion of mobile telephony and poverty in Latin America

In the field of indicators and statistics for measuring so-called “digital poverty” and its relationship to poverty in more general terms, there are enormous and interesting areas to explore. The difficulty in measuring digital poverty in general and in LAC in particular is recognized by various academics (Barja and Gigler 2005, Barrantes 2005). While obtaining new indicators that make it possible to quantify these relationships is not easy, it is an important challenge and will be extremely useful for solidly establishing new proof of the potential for ICTs in development. This section presents a review of the main data on mobile telephony expansion in the region and a detailed analysis of the relationship among variables related to access to mobile telephony and income, poverty and inequality indicators.⁷

2.1 The expansion of mobile telephony in the region

Figure 1

Fixed vs. mobile telephony in Latin America and the Caribbean



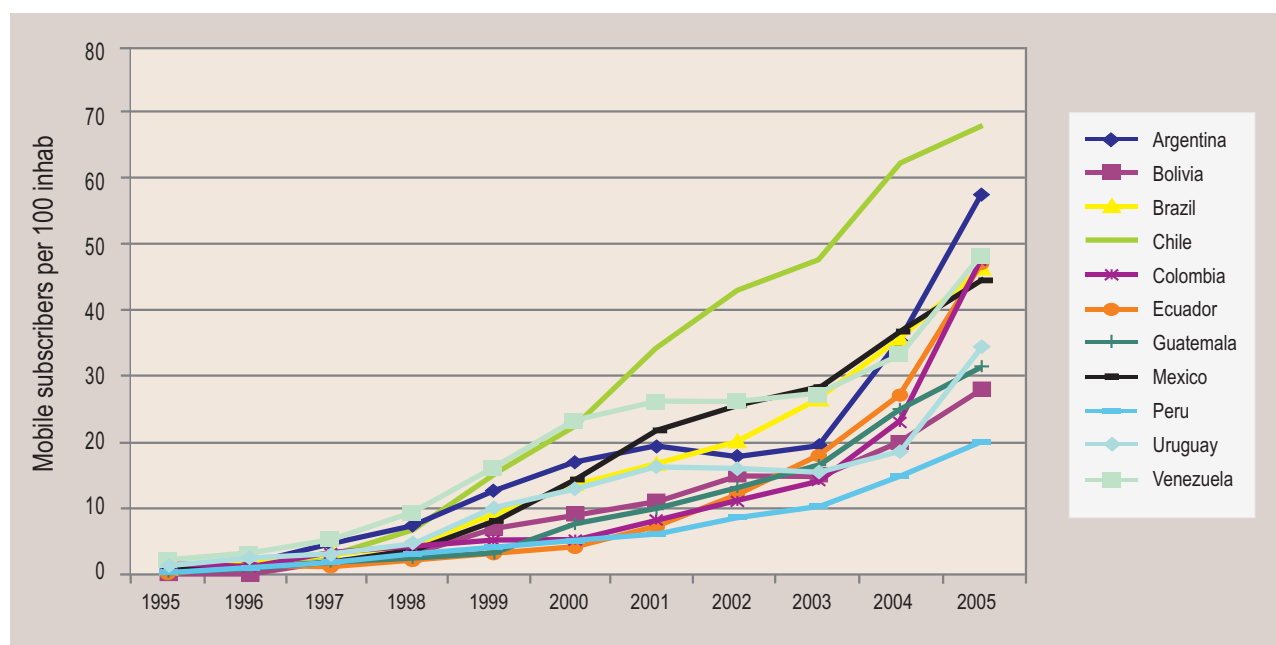
Prepared by authors based on data from the International Telecommunication Union (ITU)

In recent years, mobile telephony has expanded at high rates in all countries of the continent. New price structures (mainly prepaid cards) and the introduction of “calling party pays” (CPP) may be the variables that have carried the greatest weight in explaining the explosive growth of mobile telephone service in the region. Except for a few cases, by 1998 the great majority of countries had adopted both

⁷ Based on a group of 17 countries in the region chosen for data availability. It is important to note that the selected countries account for 98 percent of the region’s population and more than 95 percent of its income, and can therefore be considered representative.

incentives (the first a market mechanism and the second regulatory). Figure 2 and the accompanying table (Table 1) show the evolution of fixed telephony in certain countries in LAC; the increase in penetration rates and the significant rise in access figures as of 1998 are notable.

Figure 2
Expansion of mobile telephony in Latin America



Prepared by authors based on data from ITU and GSM Association.

Table 1
Expansion of mobile telephony in Latin America — number of mobile lines per 100 inhabitants

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Argentina	1.00	1.65	4.57	7.21	12.50	16.88	19.26	17.76	19.34	35.35	57.27
Bolivia	0.00	0.00	2.00	3.00	7.00	9.00	11.00	15.00	15.00	20.00	28.00
Brazil	0.83	1.58	2.85	4.44	8.95	13.66	16.73	20.06	26.46	35.67	46.25
Chile	1.38	2.22	2.80	6.51	15.05	22.36	34.23	42.83	47.66	62.08	67.79
Colombia	1.00	1.00	3.00	4.00	5.00	5.00	8.00	11.00	14.00	23.00	48.00
Ecuador	0.00	1.00	1.00	2.00	3.00	4.00	7.00	12.00	18.00	27.00	47.00
Guatemala	0.00	1.00	2.00	2.50	3.05	7.53	9.81	13.15	16.52	25.02	31.38
Mexico	0.73	1.07	1.82	3.50	7.94	14.24	21.68	25.45	28.08	36.64	44.34
Peru	0.31	0.84	1.73	2.99	4.02	4.96	5.92	8.62	10.17	14.75	19.96
Uruguay	1.25	2.45	3.00	4.60	10.00	12.83	16.19	15.94	15.40	18.51	34.38
Venezuela	2.00	3.00	5.00	9.00	16.00	23.00	26.00	26.00	27.00	33.00	48.00

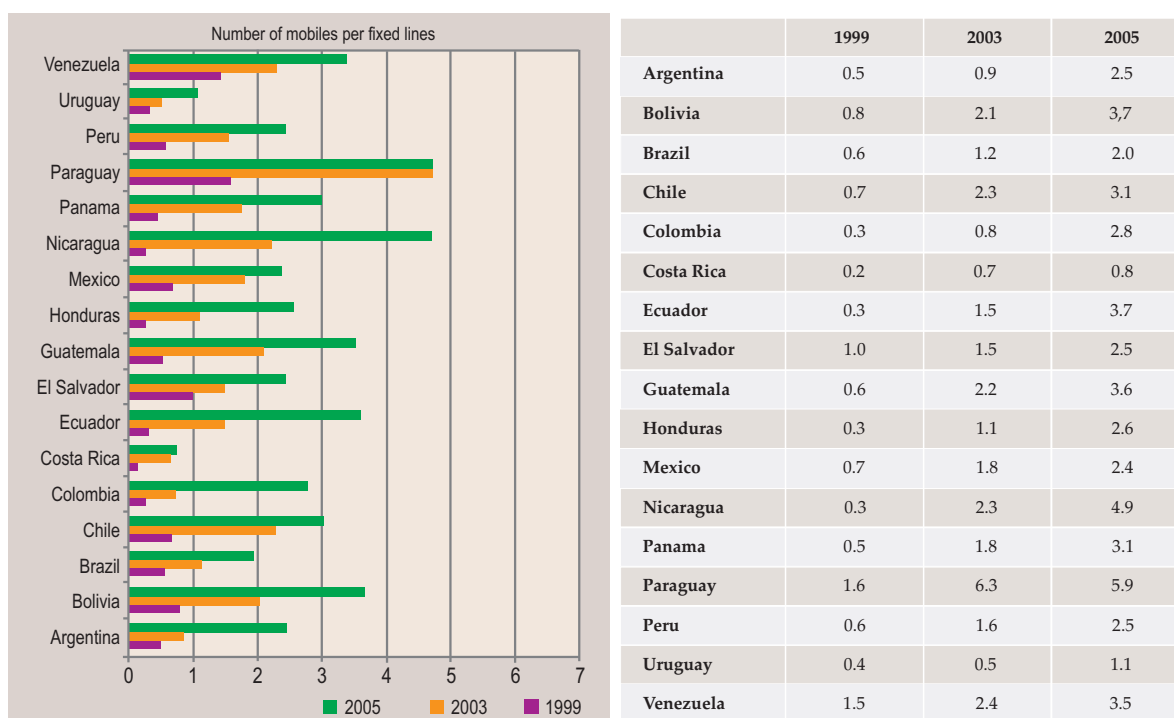
Prepared by authors based on data from ITU and GSM Association.

Both CPP and prepaid cards give mobile telephony an advantage over landlines, especially for low-consumption users (Dymond and Oestman 2004, NECG 2004, Stephens et al. 2005, Oestman 2003, Telecom CIDE 2006, Mariscal et al. 2006). These advantages include the relatively low costs incurred by users for starting up mobile phone service (activation of the line, SIM card, equipment, etc.),⁸ the possibility of controlling expenses and not being required to sign a contract, which means the user does not have to prove that he or she can qualify for a loan, which is extremely difficult in countries where economic instability and recurring crises make lines of credit scarce in general. The prepaid system, meanwhile, has benefits for the operator, who does not have to send monthly statements of charges and avoids the risk of users defaulting on contract payments.

While the slow growth of landlines made it nearly impossible to foresee anything approaching universal access in the 1990s, the boom in cellular and mobile telephony seems to be making this the predominant form of access to telecommunications and other services in the region.

By 2005, except for a few cases — such as Cuba and Costa Rica — the number of mobile telephone service subscribers in Latin America and the Caribbean surpassed that of landline subscribers. In countries such as Bolivia, Chile, El Salvador and Panama, access to mobile telephony was three times that of fixed telephony, and in more extreme cases, like those of Paraguay and Nicaragua, mobile telephone penetration was five times that of landlines.

Figure 3
Mobiles per fixed lines in Latin America



Prepared by authors based on data from ITU and national companies.

⁸ In part, the lower costs for first-time activation of service are a result of the lower fixed costs for a mobile service provider to connect a new user to the mobile network, compared to a landline operator's costs, when the mobile network is already installed.

While there is consensus that cellular telephony should be considered complementary to fixed telephony in developed countries, substitution between the two services is characteristic of developing countries (Dymond and Oestman 2004, NECG 2004). According to the data cited, in LAC cellular phone use may have started as a service complementary to landlines in the early stages, but it later became a substitute. It is also important to remember that in some LAC countries, various data transmission and ADSL connection services are provided through traditional copper cable landlines. The expansion of mobile telephony, therefore, reduces the gap in unequal access to telephone service, but does not close the household Internet connectivity gap to the same degree.

The advantages of CPP and prepaid cards also operate along this line. These studies are even more interesting when we consider that access to mobile telephone services is still difficult for low-consumption users in several countries (Barrantes et al. 2007). According to the conclusions of the study done as part of the DIRSI network's Mobile Opportunities project, in only two of the six countries analyzed, the low-volume set of prepaid services for mobile telephony was less expensive than that of fixed telephony.⁹ Nevertheless, mobile telephony continues to outstrip landlines, which leads one to look for factors other than rates to explain its preferred status.

2.2 The expansion of mobile telephony and income and poverty indicators

There have been few statistical analyses of the relationship between the expansion of mobile telephone service and its impact on low-income groups. In this section, we will review some of the links between mobile telephony penetration and income and poverty variables.

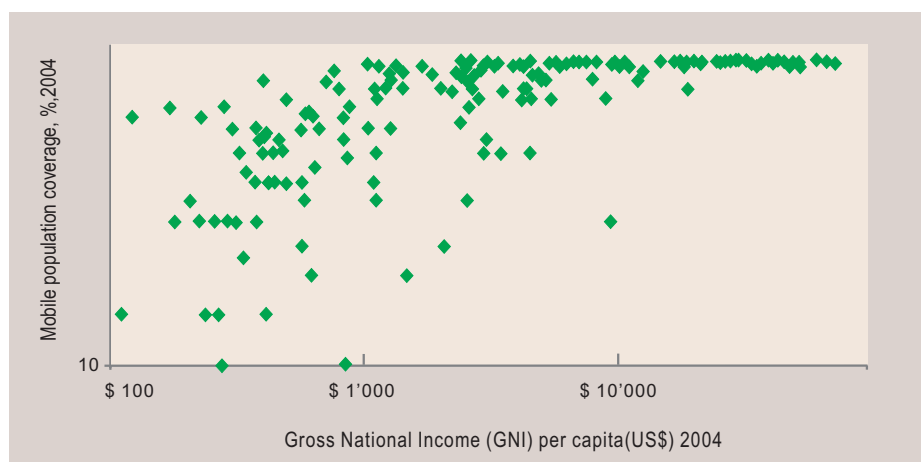
2.2.1 Mobile phones, income and poverty indicators

In general, studies of ICTs show a positive relationship between income and access to ICTs. The most recent United Nations report on the expansion of ICTs (UNCTAD 2006) shows that the higher a country's income level, the greater the degree of adoption of ICTs, on average. Access to mobile telephony is no exception. The report on the information society published by the International Telecommunication Union (ITU) in 2006 also illustrates this point (ITU 2006b).

Figure 4 shows the strong positive correlation between income level and mobile telephony access for more than 100 countries. It is important to note, as the graph shows, that as of a certain level of per capita GDP (about US\$7,000), mobile telephone coverage begins to concentrate consistently at the higher level.

⁹ The set of services analyzed is low volume, with 25 outgoing calls and 30 short messages (SMS) a month. Countries in which the set of mobile phone services is less expensive than fixed telephony are Mexico and Chile. The remaining countries (Argentina, Brazil, Colombia and Peru) report that landlines are more accessible and less expensive than mobile service. See Barrantes et al. (2007).

Figure 4
Mobile telephones vs. per-capita GDP, 2004. International perspective

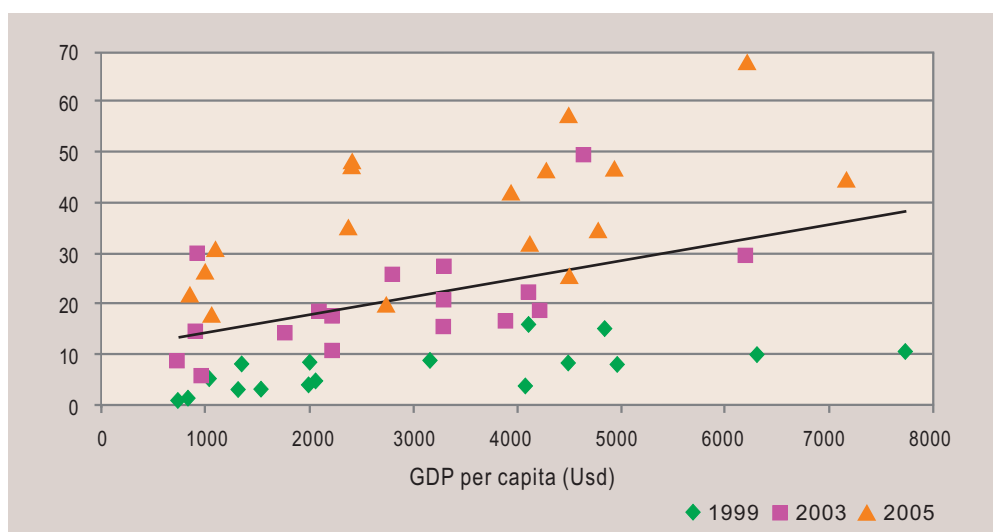


Source: ITU (2006b: 25)

In Latin America, the relationship between these variables follows the same pattern. Figure 5 shows the relationship between access to mobile telephone service and income levels for a group of 17 countries.

The trend here is also clearly positive. In looking at the relationship between income and degree of adoption broken down by year, we see that given the same income level, mobile penetration increases, moving toward the upper part of the graph. The results therefore show that not only does a higher income level increase mobile telephony penetration, but even if income holds steady at a certain level, the values for mobile telephony penetration increase.

Figure 5
Mobile telephones vs. GDP per capita (Usd) (1999, 2003, 2005). Selected countries in Latin America



Prepared by authors based on data from ITU and International Monetary Fund (IMF).

Table 2 shows the levels of penetration reached in a group of countries, along with their respective income levels, in descending order. Chile, the country with the highest mobile telephony penetration, ranks second among countries with highest per capita income. Mexico, the country ranks highest in income in the region, is in seventh place in access to mobile telephone service. Peru lags behind, as one of the three countries with the lowest level of access to mobile telephony, while its income level puts it in 10th place. Meanwhile, although Argentina and Colombia rank 6th and 11th on the income scale, they are second and third, respectively, in access to mobile telephone service. Ecuador shows the same pattern.

Uruguay and Costa Rica are interesting, because they are two cases in which telephone service is still provided by state-run companies. In both countries, the ranking for mobile telephone service is substantially lower than income levels. We will return to this point in Chapter 4.

Table 2
Ranking of mobile telephony penetration and per-capita income, 2005

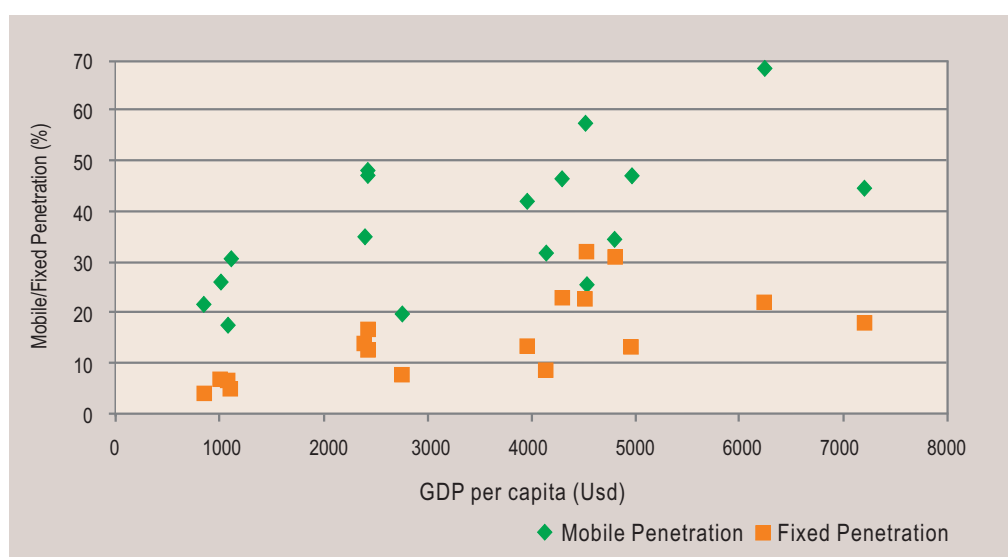
<i>Ranking</i>		Mobile penetration (%)	<i>Ranking</i>		GDP per capita (US\$)
1	Chile	67.79	1	Mexico	7,183.0
2	Argentina	57.27	2	Chile	6,223.6
3	Colombia	47.92	3	Venezuela	4,956.5
4	Ecuador	47.22	4	Uruguay	4,800.3
5	Venezuela	46.71	5	Costa Rica	4,526.2
6	Brazil	46.25	6	Argentina	4,512.3
7	Mexico	44.34	7	Brazil	4,297.4
8	Panama	41.88	8	Guatemala	4,135.5
9	El Salvador	35.05	9	Panama	3,959.5
10	Uruguay	34.38	10	Peru	2,762.8
11	Guatemala	31.38	11	Colombia	2,436.5
12	Paraguay	30.64	12	Ecuador	2,429.0
13	Bolivia	26.37	13	El Salvador	2,398.7
14	Costa Rica	25.45	14	Paraguay	1,120.1
15	Nicaragua	21.77	15	Honduras	1,085.7
16	Peru	19.96	16	Bolivia	1,024.6
17	Honduras	17.79	17	Nicaragua	871.2

Prepared by authors based on data from ITU, GSM and IMF.

In short, even when income level is clearly a determining factor in the adoption of ICTs, the results of Figure 5 and Table 3 raise a question about the degree of that determination. Once again, more detailed analysis is needed of preferences and other factors at play in determining levels of adoption of cellular telephones in LAC.

Another interesting result appears when we compare levels reached by mobile phones and landlines, again taking income level as a base. The results show that, given the same income level, mobile telephony subscribers have greater access than landline subscribers (Figure 6).

Figure 6
Mobile telephones and fixed lines vs. GDP per capita (2005). Selected countries in Latin America



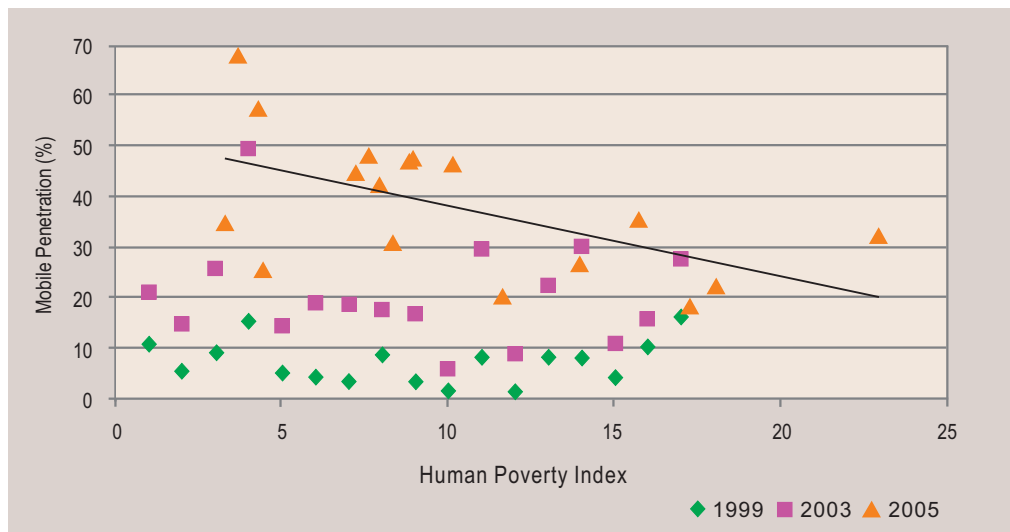
Prepared by authors based on data from ITU, GSM and IMF.

Figure 7 shows the relationship between levels of mobile access and the Human Poverty Index (HPI) created by the United Nations Development Program (UNDP). The HPI is a social indicator that measures needs or shortfalls in three areas — (i) long and healthy life, (ii) education and (iii) a decent standard of living — and its value is presented as a percentage.¹⁰ The higher the value the poorer the country.

When the relationship between the poverty indicator and levels of access to mobile telephony is established, a negative association is expected: on average, the higher the level of poverty, the lower the level of access to mobile telephony; and the lower the level of cellular telephone access in a country, the higher the level of poverty.

¹⁰ The HPI is based on calculation of the UNDP's Human Development Index. The three aspects considered are determined as follows: (i) Long and healthy life is measured by the probability at birth of not living to age 40; (ii) Education is measured by the adult illiteracy rate; (iii) Decent standard of living is measured by the percentage of the population that lacks sustainable access to an improved water source and the percentage of children who are underweight for their age.

Figure 7
Mobile telephones vs. Human Poverty Index (1999-2003-2005). Selected countries in Latin America



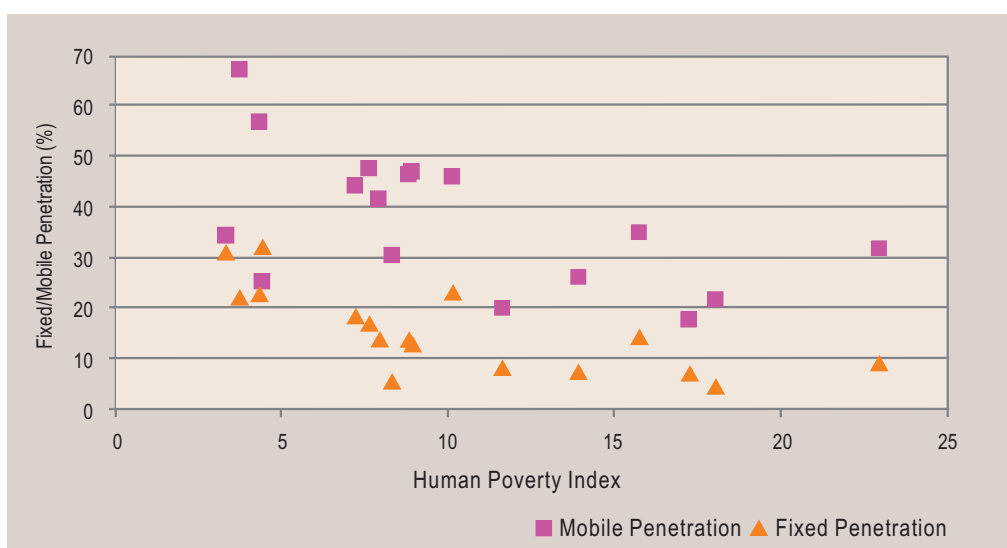
Prepared by authors based on data from ITU, GSM and IMF.

As Figure 7 indicates, the relationship is negative for the years analyzed. The change in this relationship over the years should also be noted. For any given poverty level (approximated by the HPI value), the level of access to mobile telephony increases (from 1999 to 2003). This conclusion is similar to the results for income and adoption of mobile telephony: Even when income and poverty level do not vary, percentages of access to mobile telephone service increase over the years.

One preliminary conclusion that can be drawn from these data, therefore, is that as time goes by, mobile telephony penetration is increasing, even among the poorest sectors of the population.

When levels of mobile telephony and landline access are compared with HPI levels, the findings again reveal what was seen in Figure 6: given the same poverty level, mobile telephony penetration is notably greater than that of landlines. Figure 8 shows this for 2005.

Figure 8
Fixed lines and mobile telephony vs. Human Poverty Index (2005). Selected countries in Latin America



Prepared by authors based on data from ITU, GSM and IMF.

Although the data presented do not allow the conclusion that mobile telephones have an impact on poverty reduction, it is possible to see again that they constitute a tool for access to telecommunications for poor sectors, with a degree of penetration much higher than that achieved by fixed telephony even after several decades.

2.2.2 Mobile phones and inequality: Lorenz curves

Among the methodologies used by the United Nations Conference on Trade and Development (UNCTAD) to analyze the digital divide, one interesting approach involves the relative measurements that involve studying inequality by calculating Gini indices and Lorenz curves (UNCTAD 2003, 2006). Based on this, we have constructed Lorenz curves and Gini indices for mobile and fixed telephony in Latin American countries.

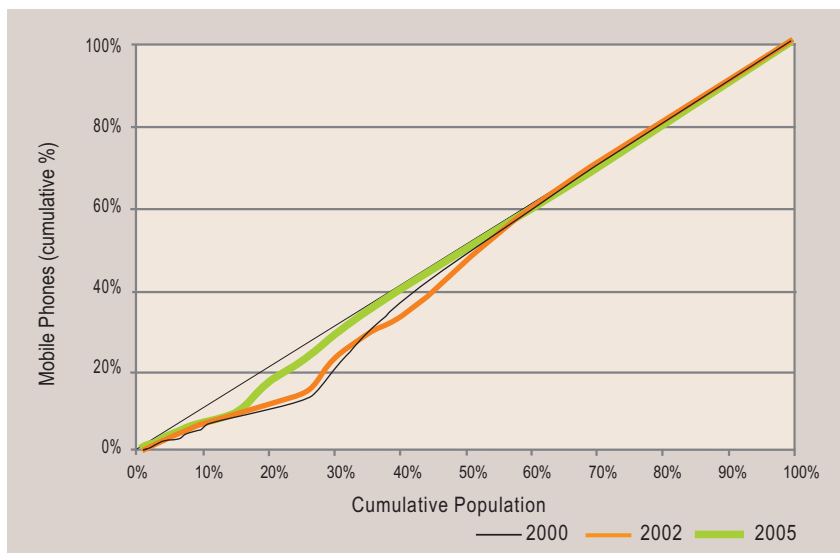
Both the Lorenz curve and the Gini coefficient are measurements commonly associated with studies of income inequality.¹¹ Nevertheless, both can be used with other variables (in this case, telephony). The Lorenz curve is a graphic measure commonly used to represent the distributive equality of resources in a population. If one Lorenz curve is always above another, it can be stated without question that the first shows less inequality than the second. If two Lorenz curves cross, however, the distributions of the variable that generate them are not comparable (Núñez Velázquez 2006). Figure 9 shows the Lorenz curves for mobile telephony in Latin America for 2000, 2002 and 2005..¹²

¹¹ Lorenz was a pioneer in contributing to studies of economic inequality. His work dates from 1905 and remains relevant (Núñez Velázquez 2006).

¹² To construct these indicators, 15 countries in the region were taken as units of analysis: Argentina, Brazil, Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. To construct the curves, total population and levels of adoption of telephony in each country were used.

A comparison of the results for 2000 and 2002 does not allow definitive conclusions, because the two curves cross. It is clear, however, that for 2005 the distribution of mobile telephones in the region is more equitable, because the curve remains constantly above those of earlier years.

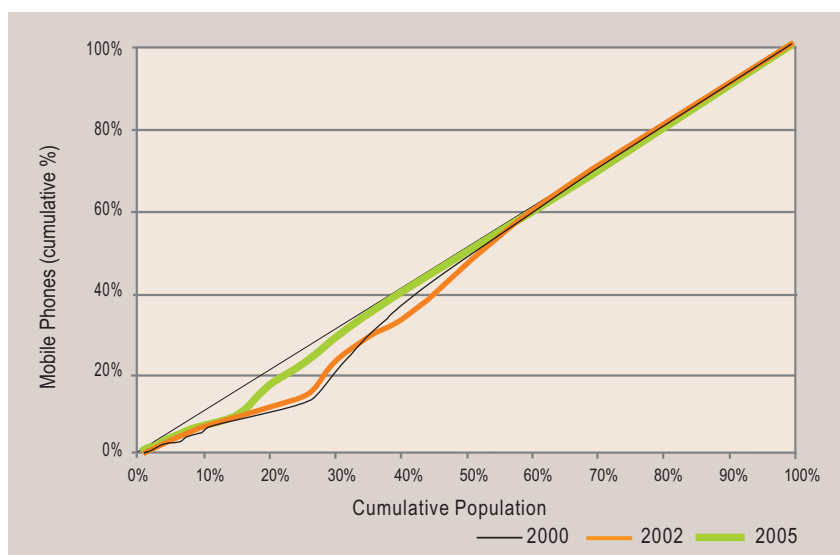
Figure 9
Lorenz curves for mobile telephony in Latin America. 2000, 2002 and 2005



Prepared by authors based on data from GSM.

When the distribution of access to mobile telephony compared to landlines in the region is analyzed, the results also coincide with those described in the preceding section. While for a given income or human poverty index level, mobile telephones achieved a higher degree of penetration than landlines, in the case of the Lorenz curve it is clear that mobile telephones are also distributed more equitably than landlines.

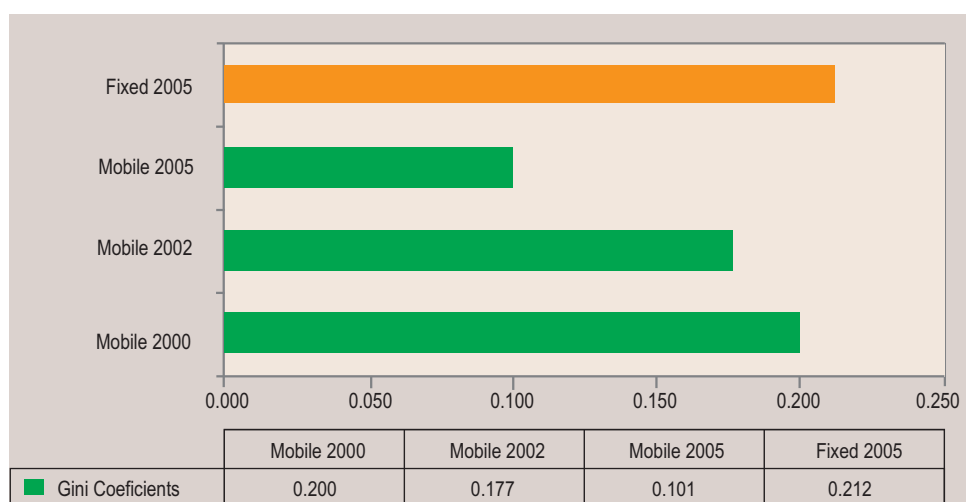
Figure 10
Lorenz curves in mobile and fixed telephony, 2005



Prepared by authors based on data from GSM.

The results of calculation of the Gini coefficients for these cases point to conclusions along the same lines. The Gini index or coefficient sums up the graphic results of the Lorenz curve in a value between 0 and 1. At the extremes, a Gini index with a value equal to 0 indicates the existence of perfect equality, while a value of 1 indicates perfect inequality. Thus, the closer to 0 the more equitable the distribution. Figure 11 shows the results for both mobile and fixed telephony for the years analyzed.

Figure 11
Índices de Gini



Prepared by authors based on data from GSM.

The results raise a series of interesting questions. Access to fixed telephony in 2005 was less equitable than access to mobile telephony in any of the years analyzed. Meanwhile, the Gini index decreased every year for mobile telephony, as the information above shows. These results are also consistent with the recent UNCTAD report on the digital divide. The report indicates that the index of mobile telephony was the lowest in 2004.(UNCTAD 2006: 10).

In short, mobile telephones are becoming more widespread, not only in absolute terms, but also in terms of distribution in the region. But while there has been a boom in mobile telephone use in the region, in contrast to the high technology that accompanies its distribution in developed countries, in LAC there is still a preponderance of equipment that is slow and unable to support data transmission and Internet use. This is a limitation to more complex and integrated use, a factor that has often been noted in debates over the digital divide. This also poses a challenge when it comes to thinking about which equipment, applications and services are most appropriate for the region's lowest-income sectors (Mallalieu 2006).

3. Mobile telephony and poverty in Uruguay

3.1 Overall socio-economic profile of Uruguay

With an area of 176,000 square kilometers, Uruguay is one of the smallest countries in Latin America and has a highly urbanized population of slightly more than 3 million people. Traditionally, the country has had some of the region's more favorable social indicators, along with notable political stability and trust in the democratic government, comparable only to Costa Rica in LAC. It has high levels of human development, like Chile and Argentina, but lower levels of inequality, along with indicators of education, life expectancy and access to potable water similar to those of developed countries (Table 3).

Table 3
Principal socio-economic indicators, 2006

Population (millions)	3,324
Percentage of rural population *	15.8%
GDP (US\$ millions)	19,319
Per capita GDP PPP **	9,421
Inequality (Gini coefficient)	44.9
GDP growth (compared to 2005)	6.6%
HDI ranking (value)	43 (0.851)
Literacy	97%
Life expectancy (years)	75.6
Population below poverty line (INE)***	27.4%
Population below extreme poverty line (INE)***	2.9%
Unemployment	10.0%

Sources: INE 2006 <www.ine.gub.uy>, BCU <www.bcu.gub.uy> y UNDP, Rivero Illa (2007).

Notes:

* Population in rural areas and cities of up to 5,000 inhabitants; the strictly rural population represents 8.1 percent.

**Adjusted for purchasing power parity (PPP), 2004 (UNDP 2006a: 283).

***Figures based on information from the National Institute of Statistics (*Instituto Nacional de Estadística*, INE). According to ECLAC, the population below the poverty line represents 19.05 percent and extreme poverty 3.9 percent.

With the severe economic crisis that affected the country in 2002, however, GDP dropped nearly 50 percent from its 1998 levels and poverty rates increased significantly, affecting 30 percent of the population (Table 3). Slightly more than 50 percent of children are now born in poor households, which is a clear indicator of the levels of reproduction of poverty.

3.2 State of ICTs

Uruguay has traditionally had relatively favorable ICT indicators, such as the number of computers per person, Internet access, number of Internet hosts and number of landlines per capita. As in the other countries in the region, however, there are very significant levels of inequality in access between urban and rural areas (Table 4).

Table 4
Principal ICT indicators in Uruguay, 2006

1. Fixed telephony density	78%
2. Mobile telephony penetration	51.8%
3. Mobile telephony penetration (rural)	31.5%
4. Fixed telephony per 100 inhabitants	31
5. Internet penetration (national average)	27.4%
6. Internet penetration (rural areas)	4.4%
7. Households with broadband connection	10.5%
8. Households with television	92.8%
9. Households with radio	97%
10. Households with computer in Montevideo (capital)	32.8%
11. Households with computer in rural areas	10.7%

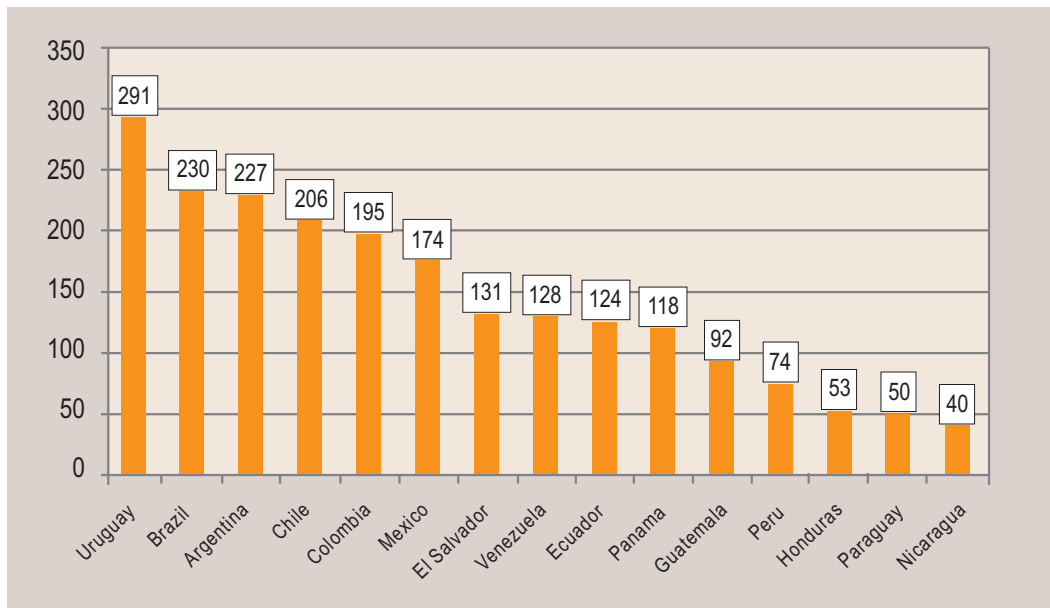
Note: Indicators 3, 4, 6, 8 and 9 are from 2005.

Sources: Indicators 1 and 4, ANTEL; 2 and 7, calculations by authors based on data from telecommunications companies and INE; 3, 5, 6, 10 and 11, INE (2006: 4); 8 and 9, UNDP (2005).

With regard to landline penetration (Figure 4), it is important to note that the state-run company ANTEL still has a monopoly on fixed telephony. Existing infrastructure, therefore, has been implemented and managed by a public company, which means that many initiatives include social — rather than exclusively profit-based — distribution criteria, such as free connectivity for public schools and Internet access centers or free public telephones in low-income neighborhoods.¹³

¹³ As with the rest of the countries in the region, the structural adjustment programs sought to privatize the state-run telecommunications company. In 1992, a petition drive resulted in a referendum on the law that would have privatized ANTEL, which was defeated by 72 percent. This left fixed telephony under public monopoly, but opened up competition in mobile telephony, international telephone service and data transmission.

Figure 12
Number of fixed lines per 1,000 people in Latin America, 2006



Prepared by authors based on data from ITU.

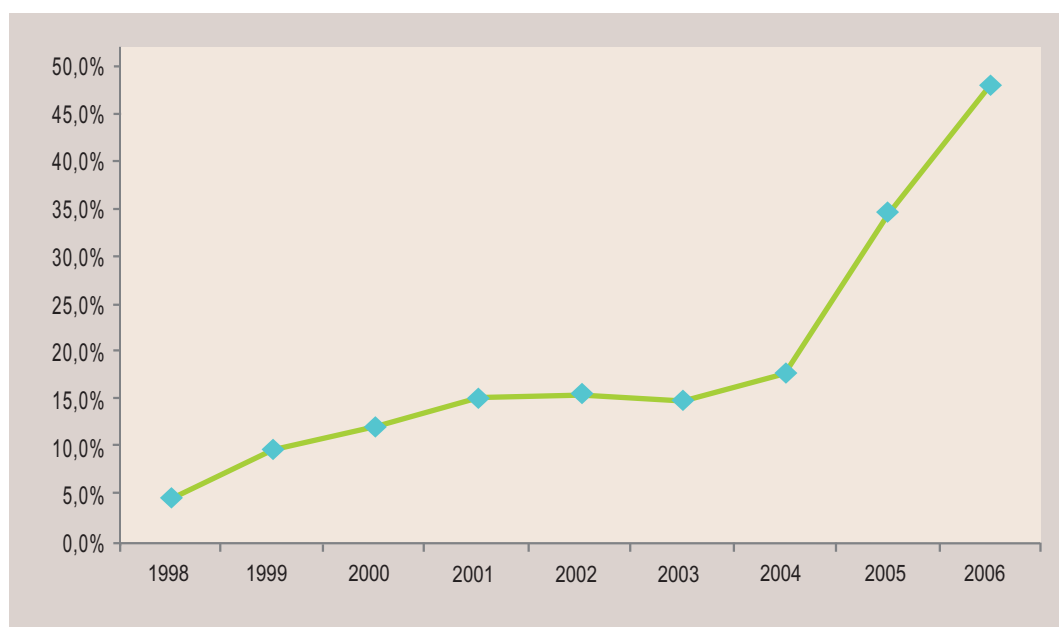
As Figure 12 shows, and comparing it with the countries' mobile telephone ranking in the preceding chapter (Table 4), we see that while countries such as Argentina and Chile hold the top spots on both lists, there are significant differences among the rest. These three countries are generally close in many socio-economic indicators. It is not difficult to guess which countries are at the bottom: Honduras, Paraguay and Nicaragua, which have a relative degree of development — measured in human development, for example — that is consistently low.

There is a much stronger positive correlation between landline penetration and human development levels than is seen with mobile telephony. While that is not the specific focus of this study, it is interesting to note how certain correlations between having a telephone and the relative degree of development that we assumed for landlines change significantly for cellular telephones. This issue, at the micro level in Uruguay, will be examined in the next section (5).

3.3 Mobile telephony and poverty in Uruguay

Despite these ICT indicators, which are relatively favorable overall, development of mobile telephony in Uruguay has lagged behind the rest of the region, and even today it has not reached the levels of penetration seen in other countries with similar levels of socio-economic development, such as Argentina and Chile. Complementing the data in Chapter 3, which placed Uruguay in an intermediate spot in the region, Figure 13 shows that the mobile telephony boom in Uruguay began in 2004. This is relevant for at least two reasons. First is that the magnitude of this growth tripled penetration in only three years (Figure 13). Second is that this expansion and growth is very strong among the poorest segments of society (Table 5).

Figure 13
Evolution of cellular telephony penetration in Uruguay, 1998-2006
(% of total population; includes the three service providers)



Prepared by the authors based on data from the three mobile telephone service providers in Uruguay —ANCEL (public), and CTI and Movistar (private) — and population data from the National Institute of Statistics (*Instituto Nacional de Estadística*, INE).

Given this significant growth in ICTs in general and cellular telephony in particular among the poorest sectors of society, the National Institute of Statistics (*Instituto Nacional de Estadística*, INE) of Uruguay used data from the rolling census to specifically assess the existence of ICT goods in households in general and poor households in particular. By processing the available information we can analyze certain indicators of inequality in access to these ICT goods (Table 5).

Table 5
Access to ICT goods, by household type
Uruguay, 2006

% of households with access to technology	Households in low-income neighborhoods*		Other households	
	Has	Does not have	Has	Does not have
Computer	6.3	93.7	24.1	75.9
Internet connection	1.9	98.1	13.4	86.6
DVD player	12.7	87.3	19.4	80.6
Cable television connection	18.4	81.6	41.0	59.0
Mobile telephone	32.4	67.6	44.1	55.9

* Areas known as *asentamientos* in Uruguay and by other terms — *villa miseria*, *chabolas*, *favelas*, etc. — in other countries in Latin America. Based on INE (2006), *Flash temático sobre TIC* and Ongoing Household Survey, First Quarter 2006.

In analyzing Table 5, several figures clearly stand out. Having a computer at home is a privilege that only one of every 16 poor households can allow itself. This gap is even greater for Internet connections. The nationwide average of households connected to the Internet is eight times the figure for low-income neighborhoods. If we consider not the national average but the average of urban households with moderate to high levels of education, the proportion with Internet connections exceeds 55 percent, compared to 1.9 percent in low-income neighborhoods. This is clearly a huge digital divide, a degree of inequality in access to ICTs that is more than significant and particularly serious in a country with a relatively low level of inequality, as measured by the Gini index.

Nevertheless, ownership of at least one mobile telephone in poor households is slightly below the national average for other households: 32.4 percent compared to 44.1 percent. This indicator must be viewed with caution, because the average number of cellular telephones per household is much higher in higher-income families than in low-income households, and this is not reflected in the figures from the household survey. If we considered individuals instead of households, these inequality levels would be higher. Even taking into account this methodological clarification, this indicator of relatively low inequality among households demonstrates that mobile telephony penetration is very high even in the poorest sectors.

This ICT — cellular telephony — in particular is therefore transforming society in terms of inclusion and access to telecommunications and related services, and is leveraging the tools people can use to change their economic situation, in terms of finding work, getting a better job or engaging in economic activities that involve the use of a mobile phone. This high degree of penetration also calls for a rethinking of the principles and instruments involved in social policies in general and those for ICTs in particular that target these sectors of the population.

This new context also calls into question earlier criteria for targeting and identifying unsatisfied basic needs. In the past, certain degrees of comfort in households could be inferred, with statistical reliability, from the existence of a landline in the home. Having a fixed telephone implied certain levels of income and/or job stability in the household, a certain degree of solidity in the construction of the home and access to potable water, certain educational parameters, etc. The mere existence of a telephone made it possible to predict other indicators of domestic comfort, satisfied basic needs and human development. But the positive correlations that apply to landlines change completely when we analyze mobile telephony, which is basically individual and has much greater penetration among poor sectors, making these associations much weaker.

As explained throughout this document, in both Latin America in general and Uruguay in particular, the cellular telephony boom is undoubtedly the recent ICT transformation that has been most significant for development. This transformation is especially intense among the poorest sectors of society, and its specific characteristics should therefore be taken into account in the design and implementation of projects for promotion and inclusion of these sectors in ICTs.

4. Conclusions

Mobile telephone service is becoming more and more widespread in the countries of Latin America and the Caribbean. Throughout this document, we have noted the economic and social contributions that mobile telephones can catalyze as promoters of development and factors in a higher standard of living for rural and low-income populations. These results, however, are the product of a still-small number of studies carried out in other regions of the world.

Efforts like those of LirneAsia and the Commonwealth Telecommunications Organisation (CTO) shed light on some myths and realities about how poor people and those in rural areas take advantage of mobile telephony, not only to communicate with family and friends, but also to find employment and get help in cases of emergency. The data show that, contrary to popular belief, the poor demonstrate an unsatisfied demand for telephone services for which they are willing to pay.

The data analyzed for LAC show that mobile telephony is making giant strides in the region. Indeed, it has far outstripped landline figures. It could be thought that landlines are shared by several people — a family, for example — while a mobile telephone is mainly an individual tool, which could lead to an overestimate of mobile telephony penetration. Several of the studies cited here, however, argue that mobile telephony also becomes a communal tool, especially in rural areas.

Similarly, the adoption of mobile telephony is greater than that of landlines, even when mobile telephones are comparatively more expensive for low-consumption users. Both CPP and prepaid cards, which were introduced some years ago in the region, have favored the mobile phone boom. The purpose of this study was not to document the regulatory or market incentives or barriers to greater adoption of mobile telephony in the region. Nevertheless, a better understanding of those issues could be useful for explaining the degree of preference for mobile phones, beyond a country's income or poverty levels. As the third section noted, income levels apparently are not sufficient to explain the levels of mobile telephony use in LAC countries. The same is true of poverty indicators.

The analysis using Lorenz curves and Gini coefficients produces another interesting result: while the aggregate data do not allow a detailed understanding of how mobile phones are used or how they are reaching the lowest-income sectors in each country, they show that mobile telephony distribution in the region was considerably more equitable in 2005 than in 2000. The distribution of mobile telephony is also significantly more equitable than that of landlines. These elements — significant growth and more equitable distribution — are confirmed by a specific analysis of the case of Uruguay.

This makes having mobile telephone service a notably weaker predictor than fixed telephony for estimating levels of poverty or human development for individuals or communities. Other ICTs, particularly landlines and Internet access, require more investment in public infrastructure (connectivity, electricity, education and infrastructure) than cellular telephony. The degree of universal penetration of these ICTs therefore has a more positive correlation with human development than the degree of mobile telephony penetration.

In short, the results and analysis presented in this study show effective indications of greater and growing use of mobile telephones in the region in general, and in poor sectors in particular. These results also confirm the need for more detailed studies, both of current uses of mobile telephony by rural and poor sectors in the region and of needs and uses that are not being met.

References

ASOCIACIÓN LATINOAMERICANA DE INTEGRACIÓN (ALADI)

2003 *La brecha digital y sus repercusiones en los miembros de la ALADI*. Montevideo: General Secretary of the ALADI.

BARJA, G. and B. S. GIGLER

2005 "The Concept of Information Poverty and How to Measure it in the Latin American Context". In H. Galperin y J. Mariscal (eds.). *Digital Poverty: Latin American and Caribbean Perspectives*. Ottawa : DIRSI-IDRC, cap. 1, pp. 1-28.

BARRANTES, R.

2005 "Analysis of ICT Demand: What is Digital Poverty and How to Measure It?". In H. Galperin y J. Mariscal (eds.). *Digital Poverty: Latin American and Caribbean Perspectives*. Ottawa: DIRSI-IDRC, cap. 2, pp. 29-53.

BARRANTES, R., H. GALPERIN, A. AGÜERO and A. MOLINARI

2007 *Asequibilidad de los servicios de telefonía móvil en América Latina*. DIRSI working paper. Available at <www.dirsi.net>.

DYMOND, Andrew and Sonja OESTMAN

2004 "The Role of Sector Reform in Achieving Universal Access". In *Trends in Telecommunication Reform 2003*. Geneva: ITU, ch. 3.

ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN (ECLAC)

2006 *Panorama social de América Latina 2006*. LC/G.2326-P/E. Santiago de Chile: ECLAC. Available at: <<http://www.eclac.org/cgi-bin/getProd.asp?xml=/publicaciones/xml/0/27480/P27480.xml&xsl=/dds/tpl/p9f.xsl&base=/tpl/top-bottom.xsl>>. Retrieved 27 February 2007.

2000a *América Latina y el Caribe en la transición hacia una sociedad del conocimiento: una agenda de políticas públicas*. Presentation at the Regional Meeting on Information Technology for Development, Florianópolis, Brazil (20-21 June).

2000b "Telecomunicaciones: inversiones y estrategias empresariales en América Latina y el Caribe". In *La inversión extranjera en América Latina y el Caribe. Informe 2000*. Santiago de Chile: United Nations and ECLAC, ch. 4, pp. 185-241.

HEEKS, R.

2005 *ICTs and the MDGs: On the Wrong Track?* Information for Development. Development Informatics Group. Manchester: Institute for Development Policy and Management, University of Manchester.

INDJIKIAN, R. and D. S. SIEGEL

2005 "The Impact of Investment in IT on Economic Performance: Implications for Developing Countries". *World Development* 33(5), pp. 681-700.

INSTITUTO NACIONAL DE ESTADÍSTICA (INE)

2006 *Encuesta Nacional de Hogares Ampliada 2006: Acceso a TIC* Montevideo: INE.

INTERNATIONAL TELECOMMUNICATION UNION (ITU)

- 2005 *World Telecommunication Indicators*. Geneva.
2006a *World Telecommunication Indicators*. Geneva.
2006b *World Information Society Report 2006*. Geneva.

KIRBY, P.

- 2004 *Globalisation, Development and the Role of the State: Lessons from the Irish Case*. Presentation at the Institute of Social Studies (ISS), The Hague.
2003 *Macroeconomic Success and Social Vulnerability: Lessons for Latin America from the Celtic Tiger*. Financing for Development Series 129. ECLAC.

MALLALIEU, Kim I.

- 2006 *Pro Poor Mobile Capabilities: Service Offering in Latin America and the Caribbean*. A Background Paper. DIRSI. Available at <www.dirsi.net>.

MANSELL, R. y U. WHEN

- 1998 *Knowledge Societies: Information Technology for Sustainable Development*. Oxford: Oxford University Press.

MARISCAL, J., C. BONINA and J. LUNA

- 2006 "New Market Scenarios in Latin America". In J. Mariscal y H. Galperin (eds.). *Digital Poverty: Latin American and Caribbean Perspectives*. Montevideo: IDRC.

MAY, C.

- 2002 *The Information Society: A Sceptical View*. Cambridge, UK: Polity Press.

MOONESINGHE, A., H. DE SILVA, N. SILVA and A. ABEYSURIYA

- 2006 *Telecom Use on a Shoestring: Expenditure and Perceptions of Costs Amongst the Financially Constrained*. The World Dialogue on Regulation for Network Economies (WDR) and LirneAsia. Discussion paper WDR 0610, versión 2.2 (prepublication).

NETWORK ECONOMICS CONSULTING GROUP (NECG)

- 2004 *The Diffusion of Mobile Telephony in Latin America, Successes and Regulatory Challenges*. Canberra:NECG.

NÚÑEZ VELÁZQUEZ, J.

- 2006 "La desigualdad económica medida a través de las curvas de Lorenz". *Revista de Métodos Cuantitativos para la Economía y la Empresa* (2), pp. 67-108.

OESTMAN, Sonja

- 2003 *Mobile Operators: Their Contribution to Universal Service and Public Access*. INTELECON Research.

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT-OECD

- 2003 "The Contribution of ICT to Growth". In OCDE (eds.). *ICT and Economic Growth: Evidence from OECD Countries, Industries and Firms*, cap. 2, pp. 35-53.

OXFORD ANALYTICA

- 2007 "South/South-East Asia: Region Set for Telcoms Growth". *Global Strategic Analysis, Oxford Analytica*, Oxford.

POHJOLA, M.

2001a *Information Technology, Productivity, and Economic Growth: International Evidence and Implications for Economic Development*. Oxford-New York: WIDER-Oxford University Press.

2001b "Information Technology and Economic Growth: Introduction and Conclusion". En M. Pohjola (ed.). *Information Technology, Productivity and Economic Growth: International Evidence and Implications for Economic Growth*. Oxford-New York: WIDER-Oxford University Press: pp. 1-32.

PRABHAKAR, A. C.

2003 "A Critical Reflection on Globalisation and Inequality: A New Approach to the Development of the South". *African & Asian Studies* 2 (3), pp. 307-345.

PRIMO BRAGA, C., J. A. DALY, R. ESKINAZI and C. FINK

2002 "You Can't Put the Genie Back in the Bottle Again". Presentation at the «Globalization» Conference organized by UN-ECLAC-World Bank, Santiago, Chile (6-8 March).

PROENZA, F. J., R. BASTIDAS-BUCH and G. MONTERO

2001 *Telecentros para el desarrollo socioeconómico y rural en América Latina y el Caribe*. Available at <<http://www.iadb.org/sds/itdev/telecentros/Telecentros.pdf>>. Retrieved 22 February 2005.

RAVALLION, M.

2003 "The Debate on Globalization, Poverty and Inequality: Why Measurement Matters". *International Affairs* 79 (4), pp. 739-753.

RIVERO ILLA, M.

2007 *Enhancing the Livelihoods of the Rural Poor: The Role of Information and Communication Technologies. Country Report: Uruguay*. Prepared for the Overseas Development Institute. In press.

ROELLER, L. H. and L. WAVERMAN

2001 "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach". *American Economic Review* 91 (4), pp. 909-923.

RUGGERI LADERCHI, C., R. SAITH and F. STEWART

2003 "Does It Matter That We Do Not Agree on the Definition of Poverty? A Comparison of Four Approaches". *Oxford Development Studies* 31(3), pp. 243-274.

SAITH, A.

2003 "ICT and Poverty Alleviation: Some Issues". Mimeo.

SCHECH, S.

2002 "Wired for Change: The Links Between ICTs and Development Discourse". *Journal of International Development* 14 (1), pp. 13-23.

SOUTER, D., N. SCOTT, C. GARFORTH, R. JAIN, O. MASCARENHAS and K. MCKEMEY

2005 *The Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction: A Study of Rural Communities in India (Gujarat), Mozambique and Tanzania*. Commonwealth Telecommunications Organisation for UK Department for International Development. Available at <www.cto.int/index.php?dir=08&sd=40>. Retrieved 11 November 2006.

-
- STEPHENS, Robert, Jeremy BOYD and Juan GALARZA
2005 "Telefonía celular: nuevo instrumento para el acceso universal en Latinoamérica". *Latin.tel*, Regulatel, Year 1, No. 1, March.
- STIGLITZ, Joseph
2004 "Capital-Market Liberalization, Globalization, and the IMF". *Oxford Review of Economic Policy* 20(1), pp. 57-71.
- SVEDBERG, P.
2004 "World Income Distribution: Which Way?". *Journal of Development Studies* 40 (5), pp. 1-32.
- SZÉKELY, M., N. LUSTIG, M. CUMPA and J. A. MEJÍA
2004 "Do We Know How Much Poverty There Is?". *Oxford Development Studies* 32 (4), pp. 523-558.
- TELECOM CIDE
2006 *Contribuciones sociales y económicas de la telefonía móvil en México*. Study by Telefónica Movistar of Mexico, Mexico City. Available at <www.telecom.cide.edu>. Retrieved 10 November 2006.
- TORERO, M. and J. VON BRAUN
2005 *Information and Communication Technologies for Development and Poverty Reduction*. International Food Policy Research Institute Brief 40.
- UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT-UNCTAD
2006 *The Digital Divide Report: ICT Diffusion Index 2005*. United Nations, Geneva and New York.
2003 *Information and Communication Technology (ICT) Development Indices*. Working paper UNCTAD/ITE/TEB/MISC.2. World Summit on Information Society, Geneva.
- UNITED NATIONS DEVELOPMENT PROGRAM (UNDP)
2006a *Human Development Indicators*. Human Development Report 2006. New York.
2006b *Desarrollo Humano en Chile 2006. Las nuevas tecnologías: ¿Un salto al futuro?* Santiago: UNDP Chile.
2005 *Desarrollo humano en Uruguay 2005. El Uruguay hacia una estrategia de desarrollo basada en el conocimiento*. Montevideo: UNDP.
- VALENTI, P.
2002 *La sociedad de la información en América Latina y el Caribe: TICs y un nuevo marco institucional*. Washington: Information Technology for Development Division (SDS/ICT), Inter-American Development Bank.
- VODAFONE
2005 *Africa: The Impact of Mobile Phones*. The Vodafone Policy Papers, Serie 2.
- VOS, R., L. TAYLOR and R. P. D. BARROS
2002 *Economic Liberalization, Distribution, and Poverty: Latin America in the 1990s*. Cheltenham-Northampton: Edward Elgar Pub.
- WADE, R. H.
2004 "Is Globalization Reducing Poverty and Inequality?". *World Development* 32 (4), pp. 567-589.

WAVERMAN, L., M. MESCHI and M. FUSS

2005 *The Impact of Telecoms on Economic Growth in Developing Countries*. The Vodaphone Policy Paper Series 2.

WENT, R.

2003 "Less Growth, More Inequality: What's Wrong with Globalisation". *Indian Journal of Labour Economics* 46 (3), pp. 397-408.

WOODWARD, D. and A. SIMMS

2006 *Growth Isn't Working. The Unbalanced Distribution of Benefits and Costs from Economic Growth*. London: New Economics Foundation.

WORLD BANK

2000 "Growth, Inequality and Poverty". In World Bank (ed.). *World Development Report 2000: Attacking Poverty*. New York: World Bank-Oxford University Press, pp. 45-59.

ZAINUDEEN, A., R. SAMARAJIVA and A. ABEYSURIYA

2006 *Telecom use on a Shoestring: Strategic use of Telecom Services by the Financially Constrained in South Asia*. The World Dialogue on Regulation for Network Economies (WDR) y LirneAsia. Discussion paper WDR 0604. Available at <<http://www.lirneasia.net/projects/completed-projects/strategies-of-the-poortelephone-usage/>>. Retrieved 22 February 2007.



www.dirsi.net