Tariffs and the affordability gap in mobile telephone services in Latin America and the Caribbean

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Executive Summary

Since 2007, the Regional Dialogue on the Information Society (DIRSI) has periodically compiled information about mobile telephony tariffs in the main markets in Latin America and the Caribbean, using the basket of mobile services methodology developed by the Organization for Economic Cooperation and Development (OECD). The purpose is to monitor tariff trends as markets mature and estimate the affordability of the service for lower-income users. This estimation is crucial for the design of universal access strategies, because the level of affordability determines the boundary of market efficiency. Without empirical analysis of the affordability of services, it is impossible to determine which markets are commercially viable without the need for subsidies. The goal, therefore, is to support the design of public policies that expand the market boundary while minimizing the public subsidy needed.

In light of this objective, this study focuses on the affordability of the OECD's low-usage basket of mobile telephony services, which includes 360 calls and 396 text messages (SMS) a year, segmented by duration, time of day and destination. In other words, the study compares the monthly cost of prepaid service for a user who makes approximately one call and sends one text message per day. Because our main interest lies in estimating the affordability of this basket of services for users at the bottom of the income pyramid, two indicators are used:

1. The proportion of income that the cost of this basket represents for users in the third income decile, which acts as a proxy for income at the bottom of the pyramid;

2. The affordability gap, which corresponds to the difference between the cost of the basket and 5 percent of the income of the potential users in each income decile.

The data presented are from the second quarter of 2009. The main findings can be summarized as follows:

- There is significant dispersion of mobile telephony tariffs in the region, with costs of the low-usage basket ranging from US$45 in Brazil to US$2.20 in Jamaica (in current dollars). The average for the region is US$15.

- For users who consume a minimum basket of mobile services, prepaid service is less expensive than post-paid service in 13 of the 20 markets in the sample. In other

words, there appears to be no poverty penalty in the consumption of mobile telephone service, because prepaid service not only allows low-income users to constantly adjust the amount they consume, but also is generally more economical than postpaid service.

- Overall, mobile telephony tariffs in Latin America are significantly higher than those of OECD countries and other emerging markets. In the expanded sample of 62 countries, eight of the 10 markets with the highest tariffs (in PPP dollars) are in Latin America (six of the 10 in current dollars). The average cost of the basket in the region (US$24 in PPP dollars) is practically twice the average cost in the OECD (USD13) and more than three times the average cost in South Asian markets (USD7). This means that mobile telephone users in Latin America, on average, must make three times the effort of their peers in South Asia to acquire the same basket of mobile telephone services.

- The high tariff level results in a low level of affordability of services for users at the bottom of the pyramid. The only country in the region in which mobile telephone services can be considered affordable for low-income users is Costa Rica. In the others, the cost of the basket greatly exceeds the threshold of 5 percent of income, which is usually considered the threshold that potential users of telecommunications services are able to pay.

- In a general scenario of low affordability in the region, analysis of the affordability gap identifies three groups of countries: a) countries with adequate affordability, because of low tariffs and low levels of inequality in income distribution (Costa Rica); b) countries with a moderate affordability gap because of low tariffs (Ecuador, Jamaica and Paraguay) and/or lower levels of inequality in income distribution (Venezuela y Uruguay); c) countries with a large or very large affordability gap due to a combination of high tariffs (especially in Brazil) and high levels of inequality in income distribution (particularly Nicaragua, Honduras and Peru). In this group of countries, 90 percent of the population must spend more than 5 percent of its income to acquire a minimum basket of mobile telephony services.

- Because of low levels of service affordability, mobile telephony's high penetration in the region contrasts with the low level of use of the service and the persistent gaps in universal access in low-income sectors. On average, mobile telephony users in Latin

America and the Caribbean use the service less than users in any other region (116 minutes per month), even less than the average in Africa (129 minutes) and far below the average in the Asia-Pacific region (290 minutes).

- In some countries, the entry of new players in the regional market has resulted in significant reductions in tariff levels and, therefore, greater affordability, even in a low-income environment. Examples include countries such as Paraguay, Bolivia and Guatemala, where the operator Tigo (*Millicom International Cellular*) has gained significant market share by using a low-cost business model similar to that of operators in South Asia. The other countries show persistent tariff structures that limit consumption of services, which in turn limits the expansion of the market toward value-added services targeting users at the bottom of the pyramid.

- There are various reasons for this phenomenon. The main ones include: 1) the high degree of concentration in mobile telephony markets in Latin America, especially at the regional level; 2) the lack of clear policies for interconnection among operators; and 3) the heavy tax burden on this service in most countries in the region.

- Despite advances in the adoption of the service, the results of this report highlight a significant affordability gap that limits consumption of mobile telephony services for most people in the region, and point to a need for continued efforts and initiatives to reinforce competition in the market. Recommendations for reinforcing competition include implementation of number portability, greater availability of the radio spectrum, reserving frequencies for operators entering the market, encouraging sharing of infrastructure, and establishing interconnection policies that encourage tariff reductions in the medium term.

- It is also important to review the heavy tax burden that affects mobile telephony service in the region, because it not only distorts consumers' decisions, but is also regressive, because it taxes a service on which lower-income sectors have relatively greater dependence.

Introduction

There is extensive literature about the factors that determine penetration and use of mobile telephony services in developing countries, particularly the surprising degree of penetration in low-income sectors (Rouvinen, 2006; Kalba, 2008). Few works, however, consider prices or tariffs for the service as an explanatory factor, and fewer still examine the relationship between tariffs and people's income or, in other words, the affordability of mobile telephony services.

The main obstacle is the difficulty of obtaining comparable data about mobile telephony tariffs among operators in different countries. The wide variety of plans and packages offered by operators (and, in some cases, the lack of transparency in the offerings) requires the use of standardization tools as well as rigorous data gathering. Since 2007, the Regional Dialogue on the Information Society (DIRSI) has periodically gathered data about mobile telephony tariffs in the major markets in Latin America and the Caribbean, using the OECD methodology based on a basket of mobile services. This allows comparison of the affordability of mobile telephony services in the various countries and monitoring of trends in tariffs as the region's markets mature.

Estimation of affordability of services is crucial for the design of public policies for universal access, because the degree of affordability determines the boundary of market efficiency (Navas-Sabater, Dymond & Juntunen, 2002). Lack of data about the affordability of services makes it impossible to determine which markets are commercially viable without the need for subsidies. DIRSI's effort to gather tariff data and estimate affordability is aimed at supporting the design of public policies that expand market boundaries while minimizing the level of public subsidies needed to reach the goal of universal access.

The first study of mobile telephony tariffs in 2007 showed significant variation in tariffs among the region's countries, gradual convergence between prepaid and postpaid tariffs for low usage levels, and, generally, low levels of affordability of the service for low-income sectors (Barrantes & Galperin, 2008). This study updates and expands on the results of the earlier survey, increasing the sample size from eight to 20 countries, which allows analysis of markets that are small, but still very significant in terms of impact of mobile service (especially markets in Central America). This study uses new tools that allow more precise estimation of affordability and its impact on access to service at the bottom of the income pyramid. It also includes an international comparison of tariffs with those of emerging

markets in South Asia and developing OECD countries, placing mobile telephony tariff trends in the region in a broader context.

This paper is organized as follows: The first section describes the basket of services methodology used to estimate mobile telephony prices in the markets analyzed. The second section describes empirical results, analyzing the results from the sample of 20 countries in Latin America and the Caribbean and providing an international comparison. The third section presents estimations of the affordability of mobile telephony services, comparing the tariff levels with different indicators of user income and standard of living. The fourth section presents conclusions drawn from the study's analyses.

1. The basket of services methodology

One of the greatest difficulties in comparing mobile telephony tariffs among operators in different countries is the wide variety of service plans and packages offered, which makes it difficult to establish a standardized metric for comparison (such as the cost of a three-minute local call, which is typically used for fixed telephony). To overcome this obstacle, we used the OECD's methodology for a low-usage basket of mobile telephony services. This methodology distinguishes among three typical user profiles: low-volume, medium-volume and high-volume users. Each user profile is assigned a volume of calls (differentiated by duration, destination, time of day and termination network) and text messages (SMS).

Because our main goal was to determine barriers to affordability and use of services by low-income sectors, data gathering targeted low-usage consumers. This profile includes a minimum basket of services, including 360 calls per year and 396 text messages per year, segmented by duration, time of day and destination, as described in detail in Annex A. In other words, these users make an average of one outgoing call and send one text message per day. The data are from the second quarter of 2009 and were taken from operators' Web sites and information obtained by calling customer assistance centers.

To calculate the cost of the baskets, we used the final prices (including tax) per minute and per text message for the main operators in each country (those whose market share exceeded 10 percent). Because we were interested in estimating affordability of services at the bottom of the income pyramid, we took as a price reference the cost per minute and per text message for the lowest prepaid recharge rate. There were two reasons for this: first, most mobile telephony users in the region (approximately 80 percent in 2009) use prepaid

services; and second, an extensive bibliography about business models at the bottom of the pyramid shows that these users tend to purchase in small quantities (Prahalad, 2004). For post-paid plans, we used as a reference the monthly price of the lowest-cost plan offered by each operator, adding the lowest recharge unit if necessary to reach the level of use in the low-usage basket.

It is important to recognize the limitations of this methodology. First, the OECD's basket of services is, by definition, arbitrary, although various estimates of the demand for mobile telephony in low-income sectors (especially user surveys carried out as part of DIRSI's Mobile Opportunities project) suggest that this basket does reflect the real behavior of low-income users in Latin America.[1] Second, baskets are calculated using published prices and do not include special prices or promotions. Third, calculating the per-minute price of the lowest-cost recharge tends to result in an overestimate of basket prices. The baskets therefore represent higher tariff levels, especially because of the constant (and ever-changing) specials offered by operators.

The cost of the baskets has been calculated both in current dollars and purchasing power parity (PPP) dollars. There is extensive debate about the relevance of making short-term comparisons using the PPP exchange rate, as well as its relevance to non-tradable services (Taylor & Taylor, 2004). Because of this debate, we have chosen to make the comparisons using both exchange rates. To calculate affordability, the comparison uses proportions expressed in local currency, which generally avoids this discussion.

2. *Comparison of mobile tariffs: key results*

This section presents the results of the evaluation of mobile telephony tariffs from the second quarter of 2009. The results are presented in two sections: the first compares tariffs in Latin America and the Caribbean (20 countries), while the second adds a comparison with markets in other regions (OECD and Asia).

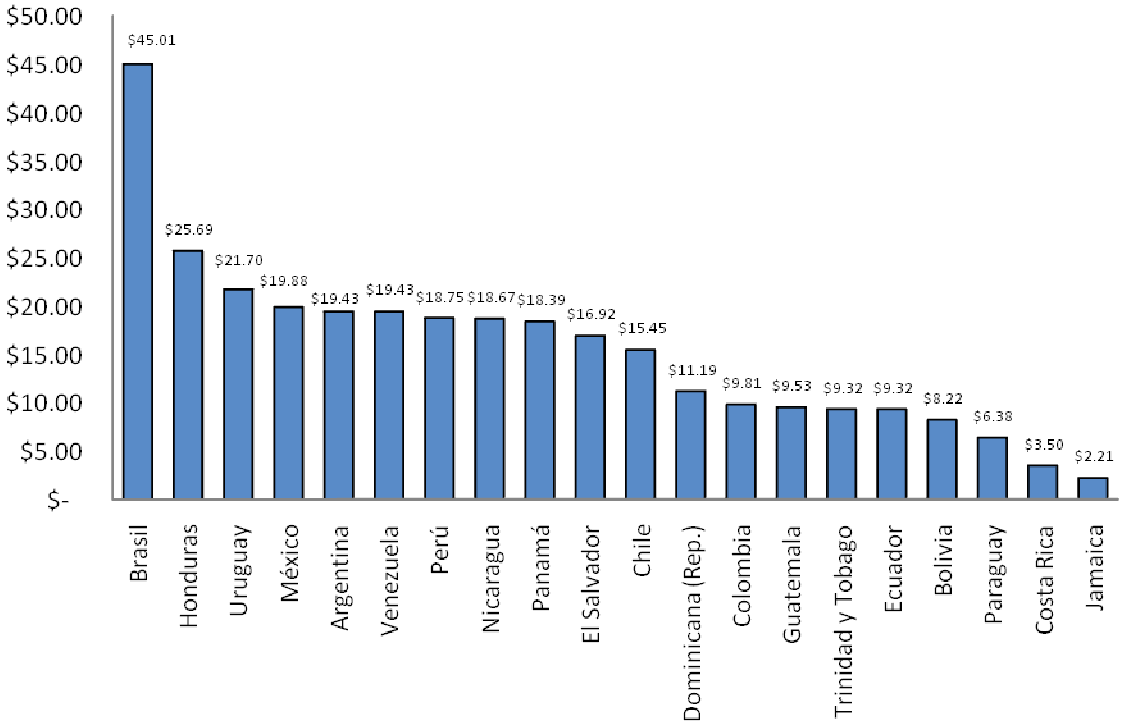
2.1. *Regional comparison: Latin America and the Caribbean*

Figure 1 shows the cost of the prepaid low-usage basket in current dollars (average exchange rate for the third quarter of 2009). The first thing that stands out is the significant

[1] See Galperin & Mariscal, 2007.

dispersion of tariffs among countries, ranging from US$45 in Brazil to US$2.20 in Jamaica. The average for the region is around US$15.

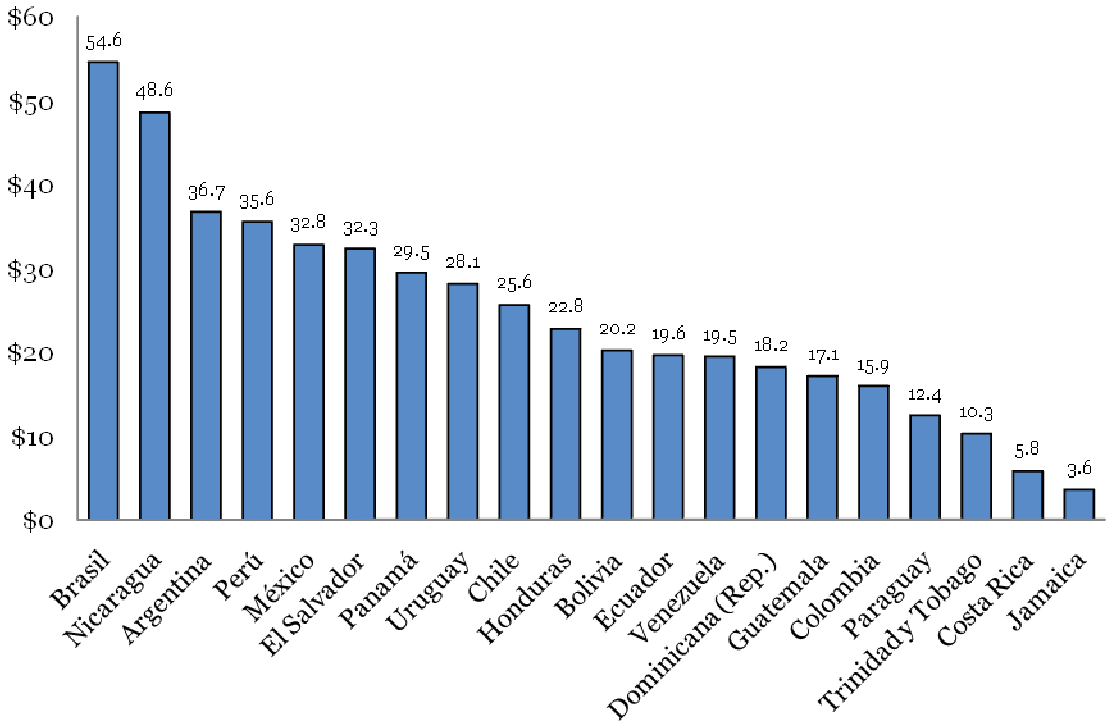
Figure 1: Cost of the prepaid low-usage basket in current dollars (2009)



Source: Compiled by author

Figure 2 shows the cost of the same basket in PPP dollars. Brazil remains the market with the highest tariffs, although the difference between it and other markets, such as Nicaragua, decreases, while Jamaica and Costa Rica continue to have the lowest tariffs. In this case, the average for the region is US$24 PPP.

Table 2: Cost of the prepaid low-usage basket in PPP dollars (2009)

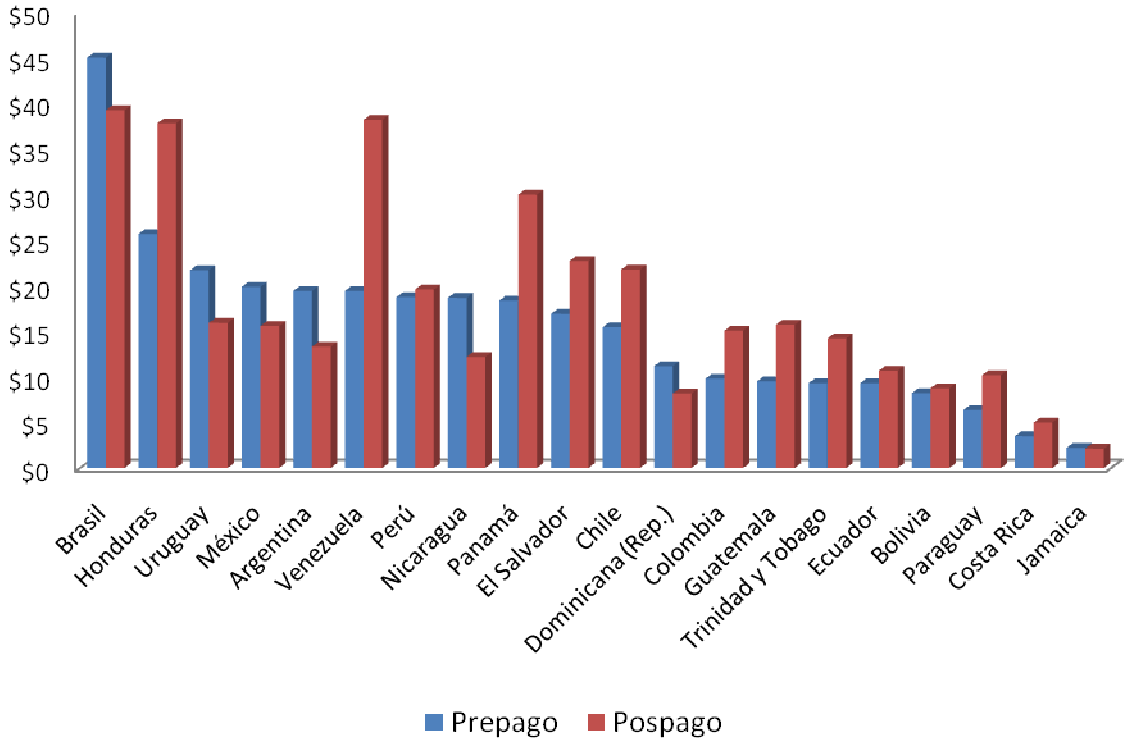


Source: Compiled by author

Figure 3 compares prepaid and post-paid tariffs for the same low-usage basket. This comparison was made to analyze whether low-income users are penalized for using prepaid services. As the figure shows, the data confirm the inverse hypothesis: for a minimum basket of mobile services, prepaid service is more economical than post-paid in 13 of the 20 markets studied, although post-paid service has a significant advantage in markets such as Nicaragua. In other words, prepaid service not only allows low-income users to constantly adjust the quantity used, but it is also more economical than post-paid service.

This is noteworthy, because per-minute or SMS tariffs tend to be lower for post-paid service. The explanation can be found in the minimum quantities offered by operators for post-paid service plans, which in most cases greatly exceed the number of minutes and SMS that low-income users can afford at current prices.

Figure 3: Cost of prepaid vs. post-paid low-usage basket in current dollars (2009)



Source: Compiled by author

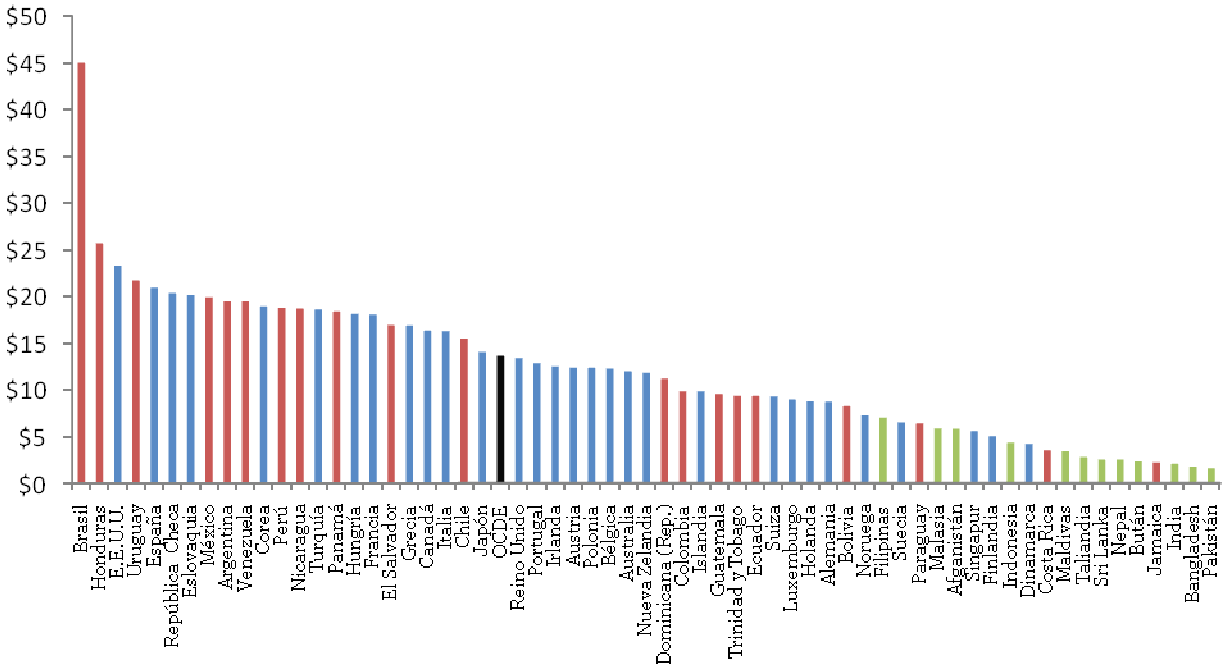
2.2. International comparison

To place prices in the region in an international context, Figure 4 compares tariffs for the prepaid low-usage basket for Latin America and the Caribbean to those in moderate- and high-income countries (those belonging to the OECD) and in another emerging region (South Asia). As the figure shows, in general, mobile telephony tariffs in Latin America are significantly higher than those in both higher-income countries and other emerging markets. The only exceptions are Jamaica and Costa Rica, although in the latter, development of the mobile telephony market is still incipient because of the later opening of the market to private operators.

Figure 4 shows that six of the 10 markets with the highest tariffs are in Latin America, while the average for the region (US$15) is approximately four times the average for South

Asian markets (US$3.60).[2] In current dollars, the average level of tariffs in the region is also slightly higher than the average for higher-income OECD countries (US$13.50). Taking into account the significant differences in income levels between Latin America and the OECD, this translates into low affordability in the region's countries, as we will see in the next section.[3]

Figure 4: Cost of the prepaid low-usage basket in current dollars (2009)

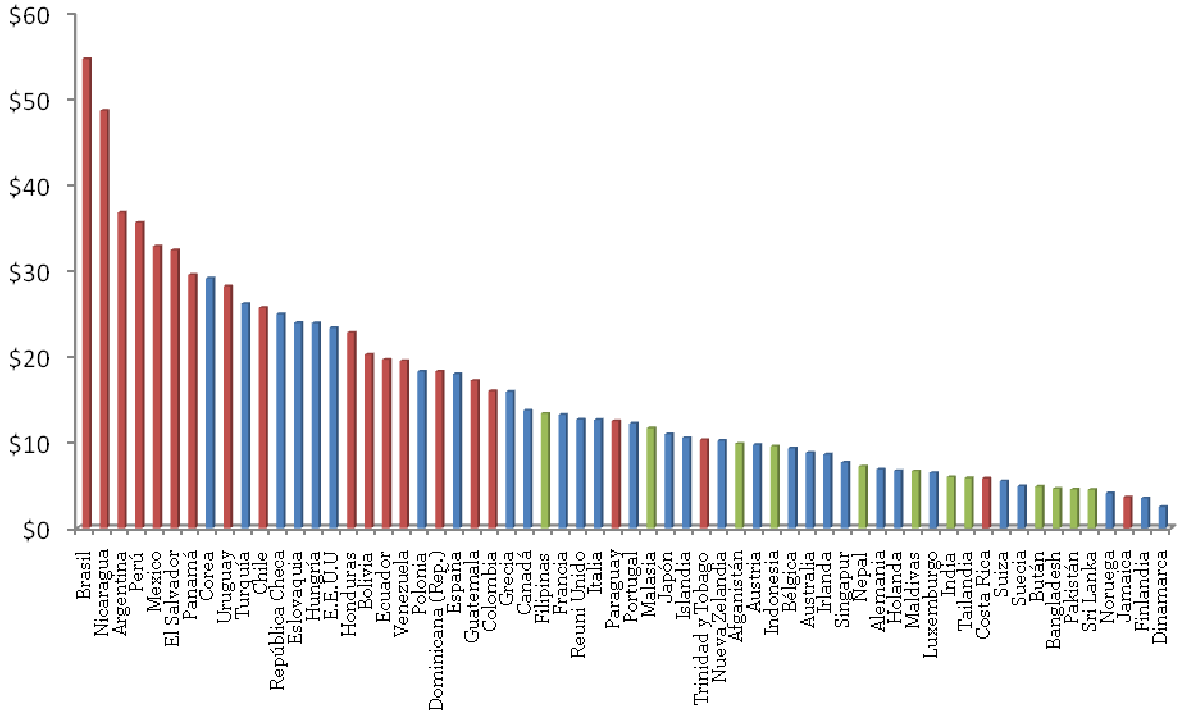


Source: Compiled by author, with data from OECD and Lirneasia

As could be expected, the contrast with tariffs in high-income markets is greater in the comparison using PPP dollars, as Figure 5 shows. In that case, eight of the 10 countries with the highest tariffs are in Latin America, where the average tariff (US$24) is practically twice the OECD average (US$13). In the comparison with South Asian markets, calculating in PPP dollars slightly reduces the difference, although the average tariff in Latin America is still three times the average for that region's markets (US$24 vs. US$7).

[2] To facilitate reading, in the international comparison graphs, the Latin American and Caribbean countries are shown in red, OECD countries in blue and South Asian countries in green.
[3] In comparisons with Latin America, Mexico is excluded from the OECD countries.

Figure 5: Cost of the prepaid low-usage basket in PPP dollars (2009)



Source: Compiled by author with data from OECD and Lirneasia

It should be noted that the few countries in the region that have tariffs comparable to those of South Asian markets are those in which new operators, which have entered the market with business models based on low tariffs and high traffic volumes, have gained significant market share. These include Digicel in the Caribbean markets and the growing share of Tigo (*Millicom International Cellular*) in countries such as Bolivia, Paraguay and Guatemala. In the rest of the region's markets, unlike other emerging markets, the development of low-cost mobile telephony business models is still incipient.

3. Affordability of mobile telephony services

This section discusses the affordability of mobile telephony services in Latin America and the Caribbean. Affordability refers to the ability of people at different income levels to pay for services and is therefore a key factor in calculating demand and the market efficiency boundary. The design of efficient universal access policies therefore depends on a correct estimation of affordability of mobile telephony services.

In an earlier work (Barrantes & Galperin, 2008), we estimated the affordability of mobile telephony services by comparing tariffs and aggregate standard of living indicators, particularly per-capita GDP, formal sector wages and the official poverty line. The problems with these indicators are well known: per-capita GDP, extensively used in the literature, is an average of limited value, especially for countries with high levels of inequality in income distribution, such as those in Latin America; formal sector wages, by definition, ignore the significant number of informal workers in the region's countries (which is often higher than the number employed in the formal sector); and the poverty line is subject to variations in the makeup of the basket of goods and services in different countries, as well as political events.

We therefore chose to estimate the affordability of mobile telephony services by using income data for deciles as reported by household surveys in each Latin American country. These data, current as of the second half of 2009, allow us to more precisely determine the cost of the basket of mobile telephony services for people at each income level.[4] We are especially interested in the affordability of the low-usage basket for people at the bottom of the income pyramid. We therefore used two indicators:

1. The first indicator of affordability is based on the cost of the prepaid low-usage basket as a proportion of income in the third income decile. This income threshold is used for two reasons: first, it approximates the low-income (but not marginal) sectors in the region's countries; and second, regressions show that affordability in this income decile is the standard of living indicator that best explains the degree of penetration attained by the service in the region's countries, which suggests that it is relevant to our analysis.

2. The second indicator of affordability, which we call the affordability curve, is based on the difference between the cost of the prepaid low-usage basket and 5 percent of the income of potential users in each income decile. This threshold of spending on telecommunications services is widely used in the literature (e.g., Milne, 2006) and by regulators and multilateral bodies for designing universal service funds. Although some specific studies suggest that lower-income users are willing to spend 8 percent or more of their monthly income on mobile telephony

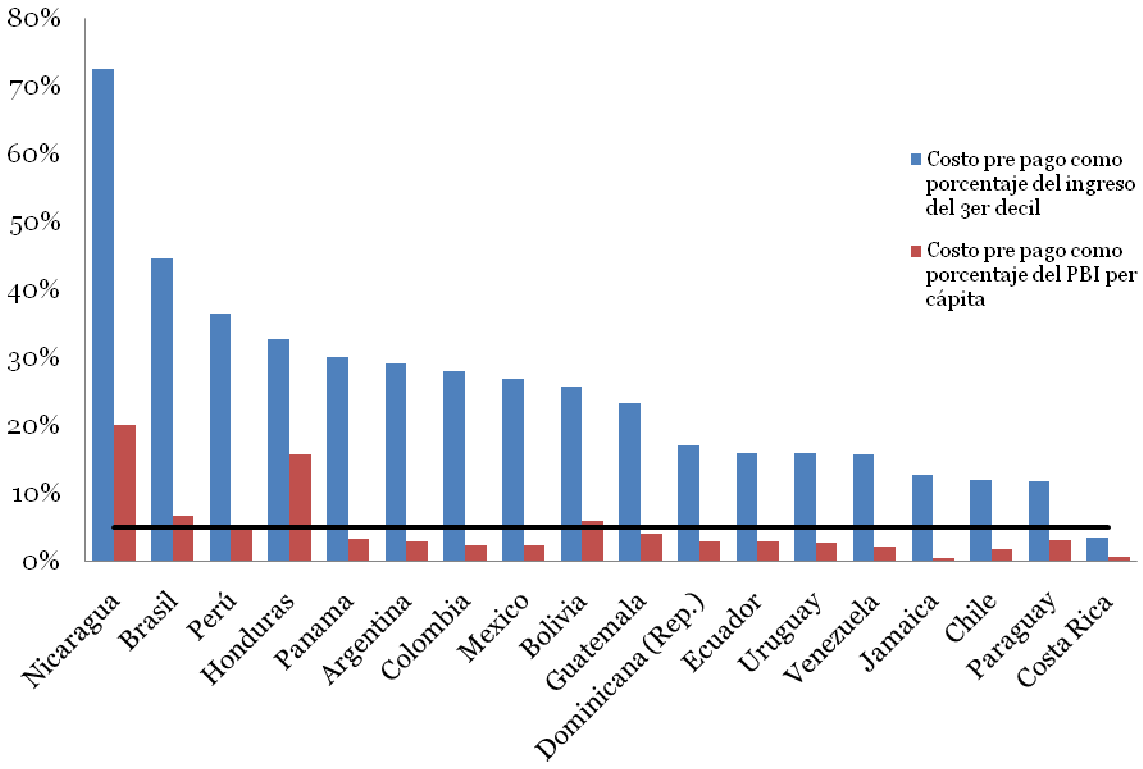
[4] Income data for deciles were taken from the Socio-Economic Database for Latin America and the Caribbean (SEDLAC, http://www.depeco.econo.unlp.edu.ar/sedlac/esp/index.php) and adjusted for inflation as of the second half of 2009.

services (Souter, 2005; Gillwald, 2005; Mooneshige et al., 2006), the most representative data for the region, which come from national surveys on spending, suggest that when the cost of the service exceeds the 5 percent income threshold, adoption is significantly reduced.

Figure 6 shows the results of the first indicator of affordability (the cost of the prepaid low-volume basket as a proportion of income in the third income decile) and the results for the same basket calculated as a percentage of aggregate per-capita income. This comparison shows the differences between traditional indicators of affordability (which use aggregate income measurements) and the indicator breakdown proposed in this paper.[5]

[5] To analyze affordability, El Salvador and Trinidad and Tobago are excluded from the sample, because there are no comparable income data for those countries.

Figure 6: Cost of the prepaid low-usage basket as a percentage of income (2009)



Source: compiled by author.

The first notable result is the low affordability of mobile telephony service for low-income sectors in Latin America. As Figure 6 shows, the only country in the sample in which mobile telephony services can be considered affordable for low-income sectors is Costa Rica. In the others, the tariffs far exceed the potential users' ability to pay. It is interesting to note that, if we considered the indicator of affordability that is traditionally used (which calculates the cost of the basket in relation to per-capita income), the tariffs in the region show acceptable affordability levels. Except in Nicaragua and Honduras, the amount the average person must spend to purchase the basket is around or below the 5 percent threshold (the horizontal line in the figure). By definition, however, that indicator does not take into account income distribution in each country. If the mobile services basket under consideration appears affordable in relation to the population's average income, it is no longer affordable when compared to the average income of the most vulnerable sectors.

In this overall scenario of low affordability, the analysis differentiates among three groups of countries:

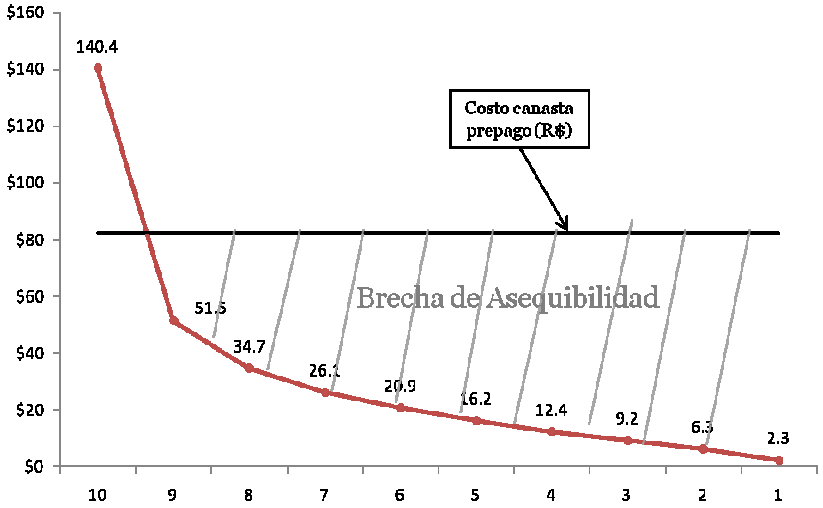
- Countries with adequate affordability, because of low tariffs and low levels of inequality in income distribution (Costa Rica).

- Countries with moderate affordability, because of low tariffs (Ecuador, Jamaica and Paraguay), relatively lower levels of inequality in income distribution (Venezuela and Uruguay), or high income levels (Chile).

- Countries with low or very low affordability, because of a combination of high tariffs (particularly in Brazil) and high levels of inequality in income distribution (particularly Nicaragua, Honduras and Peru).

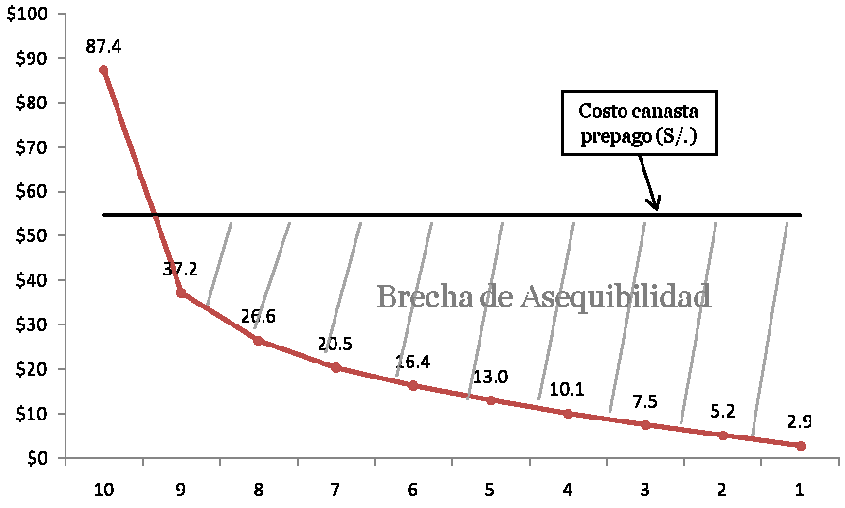
The results of the second indicator of affordability allow us to visualize these differences and quantify what we call the affordability gap, or the difference between the cost of the prepaid low-usage basket and the 5 percent threshold for spending on telecommunications services in each income decile. Figures 7, 8 and 9 show the results of this calculation for three countries with low or very low affordability. In Brazil (Figure 7), high tariffs result in a wide gap between the basket under consideration and the potential users' ability to pay. In this case, 90 percent of the population must spend more than 5 percent of its income to acquire the basket of mobile telephony services (the horizontal line represents the cost of the basket). The same is true in Peru (Figure 8) and Mexico (Figure 9), although in the latter the gap is slightly smaller.

Figure 7: Brazil: Available spending (in R$) for telecommunications (5% of income), by income decile (2009)



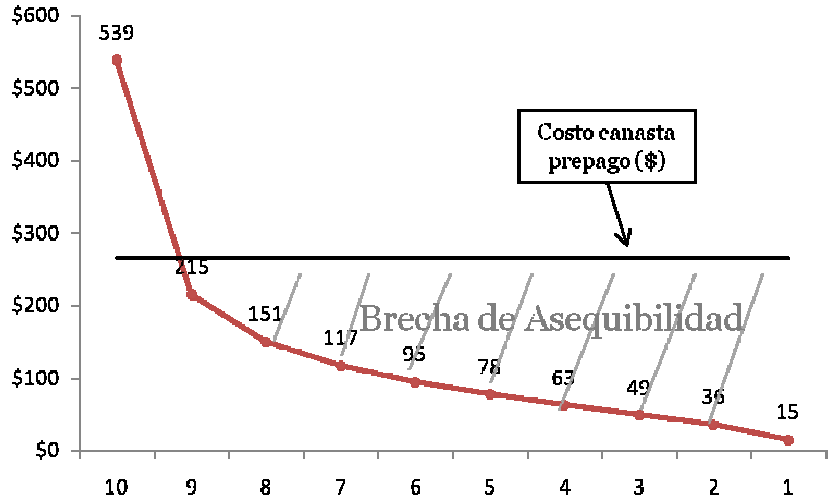
Source: Compiled by author

Figure 8: Peru: Available spending (en S/.) for telecommunications (5% of income), by income decile (2009)



Source: Compiled by author

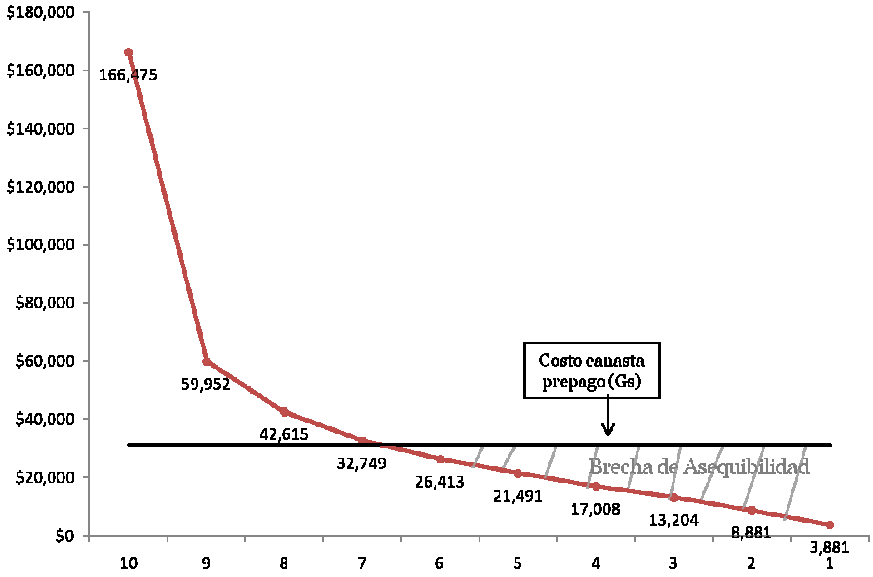
Figure 9: Mexico: Available spending (en $) for telecommunications (5% of income), by income decile (2009)



Source: Compiled by author

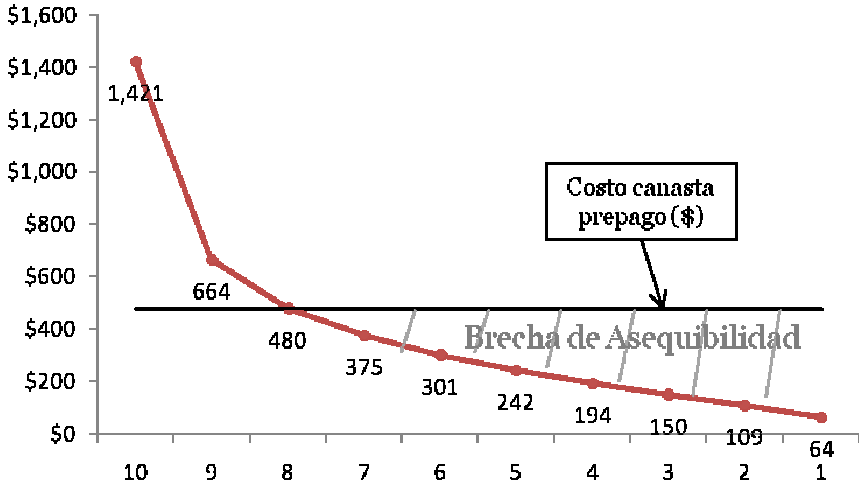
In Paraguay (Figure 10), where per-capita income is 50 percent lower than in Brazil, low tariffs result in a significantly smaller affordability gap, since nearly 50 percent of the population can acquire the basket for less than the threshold of 5 percent of income. In Uruguay (Figure 11), although tariffs are high (see previous section), higher income levels and better income distribution result in a smaller affordability gap than in other countries analyzed. In this case, nearly one-third of the inhabitants who have an income spend less than 5 percent of it to acquire the basket of mobile telephony services.

Table 10: Paraguay: Available spending (in Gs) for telecommunications (5% of income), by income decile (2009)



Source: Compiled by author

Figure 11: Uruguay: Available spending (in $) for telecommunications (5% of income), by income decile (2009)



Source: Compiled by author

Conclusion

Mobile telephony penetration has reached surprising levels in Latin America and the Caribbean. Although it is difficult to calculate aggregate penetration statistics for various reason (including the increase in individual subscriptions with more than one operator), mobile telephony is nearing levels of universal access attained only by mass media such as radio and television. The high level of penetration, however, contrasts with the low level of use of the service and persistent gaps in universal access among low-income sectors. On average, mobile telephony users in Latin America and the Caribbean use the service least (116 minutes per month in the second quarter of 2009), with lower usage even than the average in Africa (129 minutes) and far below the average in the Asia-Pacific region (290 minutes).

The results of this study show that the main explanation lies in the tariff structure in the region. Although the steady decrease in the cost of terminals and operators' subsidy strategies have significantly lowered barriers to entry into the market for lower-income sectors, the high recurring costs of the service are a barrier to market expansion, not only in terms of subscribers, but also in intensity and diversity of mobile services used.

An international comparison of tariffs reveals this problem. In a sample of 62 countries, eight of 10 of the markets with the highest tariffs (in PPP dollars) are in Latin America (six of 10 in current dollars). The average cost of the low-usage basket in the region (US$24 in PPP dollars) is practically twice the OECD average (US$13), and more than three times the average in South Asian markets (US$7). High recurring costs hit low-income sectors especially hard, because low fixed telephony penetration in poor households makes them more dependent on access to mobile telephony, and because poor sectors make a greater effort to acquire a minimum basket of services or, as various studies show, resort to various strategies to reduce costs (Galperin & Mariscal, 2007).

Within this discouraging overall scenario for the region, some cases stand out in which new firms operating in the regional market have resulted in significant tariff reductions and, as a result, greater affordability for low-income users. These countries include Paraguay, Bolivia and Guatemala, where Tigo has gained significant market share with a low-cost business model similar to that of operators in South Asian countries.

In other countries, especially those with higher incomes, such as Argentina, Brazil, Colombia and Mexico, tariff structures persist that inhibit purchase of services and limit

expansion of the market toward services with higher value added targeting users at the bottom of the pyramid. There are various reasons for this; the main ones include: 1) the high concentration of mobile telephony markets in Latin America, especially at the regional level (Mariscal & Rivera, 2007); and 2) in most countries, the heavy tax burden on this universal-access service (on which poor people are more dependent because of the low level of fixed telephony in those households).[6]

The results of this report highlight the significant affordability gap that limits purchase of mobile telephony services for most of the region's inhabitants. Despite progress in adoption of the service, these results show a need for continued efforts and initiatives to reinforce competition in the market, for example by implementing number portability, making more of the radio spectrum available, reserving frequencies for new operators entering the market, encouraging sharing of infrastructure, and establishing clear policies for interconnection among operators to encourage tariff reductions in the medium term. It is also important to review the heavy tax burden that affects mobile telephony in the region, as it not only distorts consumers' decisions, but is also regressive, because it taxes a service on which lower-income people are more dependent.

[6] In fact, the tax burden on mobile telephony in Latin America has been increasing in recent years. See Galperin & Katz (2009) and Flores Roux, Mariscal & Aldama (2009).

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Annex A: Methodology

To measure affordability of mobile telephony services among the poorest sectors in various countries in Latin America, we used a methodology based on baskets of services that allows standardization of the various plans and tariffs and comparison at the international level. The main purpose of the baskets is to set a standardized benchmark among countries.

The basket used was based on the basket of mobile services developed by the OECD, with small adjustments reflecting the models for selling services that are currently used in Latin America. Using this benchmark, the first step was to record the tariffs for the main markets in Latin America and the Caribbean (20 in all), including: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay and Venezuela. The following section describes the characteristics of the different baskets and the methodology used to collect tariff information (which was carried out in May 2009), as well as the other indicators included in the analysis.

1. Characteristics of the baskets of mobile services

Currency: The tariffs were converted to US dollars for comparison, using the current exchange rate. Because of the difference between price levels in each country, the tariffs are also presented in purchasing power parity (PPP) dollars, using the IMF conversion factor.

Tax treatment*:* Tariffs reflect final prices, and therefore include value added tax (VAT) or any other special tax applied to the service.

Makeup of the basket: In this step, the price of the equipment and possible related subsidies and connection charges were not included. The basket reflects only the recurring (monthly) cost of the service. A distinction is made between the costs of the baskets for prepaid and post-paid plans. The baskets include monthly rental charges and any other charge applicable to the corresponding tariff plan.

Because the "calling party pays" (CPP) system predominates in the region, only the cost of outgoing calls is calculated. The baskets correspond to the following volume of calls and text messages (SMS) per month:

Table A.1: **Baskets by user profile**

Basket	**Outgoing calls**	**SMS**
Low usage	30	33
Moderate usage	65	50
High usage	140	55

Destination of calls. We differentiate among four types of destinations:

a. Local calls to fixed telephones

b. Long-distance calls to fixed and mobile telephones: if there are tariff differences according to distance, weighting was done using criteria for the OECD telecommunications basket:

Table A.2: **Weighting used for distance, according to the OECD**

Km	3	7	12	17	22	27	40	75	110	135	175	250	350	490
Wt.	62%	14.5%	5.2%	3.1%	1.6%	2.1%	2.1%	2.1%	1.2%	1%	0.8%	0.8%	0.6%	2.9%

If the distances specified by the OECD did not coincide with those in the operator's tariff plan, the OECD weights coinciding with each of the ranges defined by the operator were used. It is also possible that the operator charges as a local call a call the OECD would consider a long-distance call. In that case, we add the amount corresponding to that/those distance(s) to the per-minute cost of local calls.

c. Calls to mobile telephones in the same network (*on-net*).

d. Calls to mobile telephones on another network (*off-net*).

Distribution by destination for *each* basket (in percentages of total calls) is:

Table A.3: **Distribution of each basket, by destination**

Basket	Local calls to fixed phones	Long-distance calls	On-net mobile	Off-net mobile	Voice mail
Low usage	15%	7%	48%	22%	8%
Moderate usage	14%	7%	48%	24%	7%
High usage	13%	7%	47%	26%	7%

In cases in which there were differences between the tariffs charged for local and long-distance mobile calls, the study used as a basis the cost of a local or long-distance call to a fixed telephone. For example, in Argentina, tariffs for calls to mobile telephones do not depend on the operator, but on the place where the telephone was purchased. In those cases, we used the following weighting system:

Table A.4: **Weighting used in cases of differences in tariffs charged for local and long-distance mobile calls**

Canasta	Llamadas locales a fijos	Llamadas nacionales	Llamadas Móvil local	Llamadas Móvil
Bajo volumen	15%	7%	39%	19%
Medio volumen	14%	7%	43%	21%
Alto volumen	13%	7%	33%	27%

Basket	Local calls to fixed phones	Long-distance calls	Local mobile calls	Long-distance mobile calls
Low usage	15%	7%	39%	19%
Moderate usage	14%	7%	43%	21%
High usage	13%	7%	33%	27%

Time bands: We distinguished among three bands with regard to the time of day when calls were made:

a. Calls at peak hours: if there were several tariffs, the study used the tariffs from the most expensive weekdays.

b. Calls at off-peak hours: if there were several tariffs, the study used the tariffs from the least expensive weekdays.

c. Weekend calls: if there were several tariffs, the study used the lowest Sunday tariffs.

The following table shows the distributions for time and day for each basket (as percentages of total calls):

Table A.5: **Distribution by time and day for each basket**

Basket	**Peak hours**	**Off-peak hours**	**Weekend**
Low usage	48%	25%	27%
Moderate usage	50%	24%	26%
High usage	60%	19%	21%

Length of calls: Three different call durations were considered, in the following categories:

a. Local and long-distance calls to fixed lines

b. Calls to the same network (*on-net*)

c. Calls to other networks (*off-net*)

d. Voicemail

The following table shows the durations defined for each basket (in minutes per call):

Table A.6: **Durations defined for each basket (minutes per call)**

Basket	Local and long-distance	On-net mobile	Off-net mobile	Voicemail
Low usage	1.5	1.6	1.4	0.8
Moderate usage	1.8	1.9	1.7	0.8
High usage	1.7	1.9	1.8	0.8

In countries in which calls are broken down by minute (and not by second), the duration was rounded up to the nearest unit.

Calls allowed: The value of calls included in post-paid contracts was deducted from the usage value after calculating the basket. This could not exceed the cost of actual usage (because negative usage is not allowed); transfers of minutes to the next month were not considered.

Included minutes and SMS: When the tariff plan under consideration included minutes, these were deducted from the basket before calculating the cost of usage. When the plan under consideration included SMS, these were deducted from the basket before calculating the cost of text messages, taking as a maximum the number of messages included in each basket.

Choice of package and operator: If the operator offered more than one prepaid package, the study used the least expensive package, taking as a reference the low-usage basket. The study included only operators with at least a 10 percent market share, based on the following table:

Table A.7: **Market share of operators in countries studied**

(Leg: country-name-share)

País	Nombre	Participación
Argentina	Claro (America Movil)	34.94 %
	Movistar (Telefonica)	34.02 %
	Personal (Telecom Argentina)	28.82 %
Bolivia	Entel	48.17 %
	Tigo (Millicom)	33.29 %
	Nuevatel	18.54 %
Brasil	Vivo (Portugal Telecom-Telefonica)	29.48 %
	Claro (America Movil)	25.41 %
	TIM	23.88 %
	Oi (Telemar)	16.00 %
Chile	Movistar (Telefonica)	43.23 %
	Entel	37.73 %
	Claro (America Movil)	18.88 %
Colombia	Comcel (America Movil)	67.35 %
	Movistar (Telefonica)	24.50 %
Costa Rica	ICE	100.00 %
Dominicana (Rep.)	Claro (America Movil)	52.81 %
	Orange	32.15 %
Ecuador	Porta (America Movil)	70.79 %
	Movistar (Telefonica)	26.62 %
El Salvador	Tigo (Millicom)	40.28 %
	Claro (America Movil)	31.28 %
	Movistar (Telefonica)	21.14 %
Guatemala	Tigo (Millicom)	38.01%
	Claro (America Movil)	36.21 %
	Movistar (Telefonica)	25.79 %
Honduras	Tigo (Millicom)	71.52 %
	Claro (America Movil)	24.77 %
Jamaica	Digicel	60.59 %
	LIME (Cable & Wireless)	28.31 %
	Claro (America Movil)	11.10 %
Mexico	Telcel (America Movil)	71.44 %
	Movistar (Telefonica)	19.43 %
Nicaragua	Claro (America Movil)	68.24 %
	Movistar (Telefonica)	31.76 %
Panama	Mas Movil (Cable & Wireless)	63.72 %
	Movistar (Telefonica)	33.54 %
Paraguay	Tigo (Millicom)	48.39 %
	Personal (Nucleo)	32.16 %
Perú	Movistar (Telefonica)	57.49 %
	Claro (America Movil)	38.89 %
Trinidad y Tobago	bmobile (TSTT)	58.97 %
	Digicel	41.03 %
Uruguay	Ancel (Antel)	43.07 %
	Movistar (Telefonica)	38.08 %
	Claro (America Movil)	18.85 %
Venezuela	Movilnet	39.89 %
	Movistar (Telefonica)	36.38 %
	Digitel	23.73 %

Source: Compiled by author based on data from Wireless Intelligence (https://www.wirelessintelligence.com/). All data are from December 2008.

Each operator has a wide variety of plans and options. The study considered all prices to calculate the lowest price for the low-usage basket. We assume that micro-recharge is possible, so the prepaid basket costs are exactly the same as those of the OECD baskets at the price of each operator in each country. For post-paid plans, the study used the plans with the lowest monthly charge. If the OECD basket was higher than the lowest plan, the study calculated the lowest-cost plan, then added the number of recharge units (cards) needed to equal the basket amount. If the post-paid plan was more expensive than the basket, the post-paid plan price was used. In both cases, the information presented reflects the plan that resulted in the least expensive low-usage basket.

Currency and exchange rate: There are theoretical arguments for and against considering mobile calls as tradable goods. We decided to report results both in US dollars (at the exchange rate in effect when the data were gathered) and in US dollars adjusted for PPP.[7]

Per-decile income: Income for each decile was calculated using the "Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank)" http://www.depeco.econo.unlp.edu.ar/sedlac/eng/index.php. Because we did not have the data from 2009, figures were adjusted for inflation using inflation data from CEPALSTAT.

[7] Source: For exchange rate: http://www.bloomberg.org/invest/calculators/currency.html. For PPP conversion factors: International Monetary Fund, World Economic Outlook Database.