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How to Connect the Other Half: Evidence and Policy Insights from Household Surveys in Latin America

Hernán Galperin

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67 Erb Street West
Waterloo, Ontario N2L 6C2
Canada
tel +1 519 885 2444 fax +1 519 885 5450
www.cigionline.org

10 St James's Square
London, England SW1Y 4LE
United Kingdom
tel +44 (0)20 7957 5700 fax +44 (0)20 7957 5710
www.chathamhouse.org

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ABOUT THE GLOBAL COMMISSION ON INTERNET GOVERNANCE

The Global Commission on Internet Governance was established in January 2014 to articulate and advance a strategic vision for the future of Internet governance. The two-year project conducts and supports independent research on Internet-related dimensions of global public policy, culminating in an official commission report that will articulate concrete policy recommendations for the future of Internet governance. These recommendations will address concerns about the stability, interoperability, security and resilience of the Internet ecosystem.

Launched by two independent global think tanks, the Centre for International Governance Innovation (CIGI) and Chatham House, the Global Commission on Internet Governance will help educate the wider public on the most effective ways to promote Internet access, while simultaneously championing the principles of freedom of expression and the free flow of ideas over the Internet.

The Global Commission on Internet Governance will focus on four key themes:

- enhancing governance legitimacy — including regulatory approaches and standards;
- stimulating economic innovation and growth — including critical Internet resources, infrastructure and competition policy;
- ensuring human rights online — including establishing the principle of technological neutrality for human rights, privacy and free expression; and
- avoiding systemic risk — including establishing norms regarding state conduct, cybercrime cooperation and non-proliferation, confidence-building measures and disarmament issues.

The goal of the Global Commission on Internet Governance is two-fold. First, it will encourage globally inclusive public discussions on the future of Internet governance. Second, through its comprehensive policy-oriented report, and the subsequent promotion of this final report, the Global Commission on Internet Governance will communicate its findings with senior stakeholders at key Internet governance events.

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ABOUT THE AUTHOR

Hernán Galperin is a research associate professor at the Annenberg School for Communication at the University of Southern California. Previously, he was associate professor and director of the Center for Technology and Society at the Universidad de San Andrés (Argentina). He is also a steering committee member for Diálogo Regional sobre Sociedad de la Information, an information and communications technology policy research consortium in Latin America.

An expert on telecommunications policy and development, Hernán leads a number of research projects related to the regulation and impact of new information and communication technologies in Latin America, funded by a variety of foundations and international donors such as International Development Research Centre, Economic Commission for Latin America and the Caribbean, United States Agency for International Development and Inter-American Development Bank. He has published extensively in major journals such as *Telecommunications Policy*, *Development Policy Review* and *Information Technologies & International Development*. His most recent book is *Information technologies for development: Opening the Internet black box* (co-authored with Judith Mariscal).

EXECUTIVE SUMMARY

This paper seeks to advance the debate on how to connect the next billion Internet users in two fundamental ways. First, it analyzes Internet diffusion patterns in Latin America based on the most recently available household surveys. The use of large-scale household surveys (over 875,000 cases in total) has many advantages over the more commonly used industry data, the main one being the ability to analyze how socio-demographic characteristics affect Internet adoption. Second, the paper examines the unconnected population through different lenses. It presents estimates on the demand gap — a concept that captures differences between Internet infrastructure coverage, subscriptions and individual use. Further, the paper examines the reasons for non-use, distinguishing between four types of barriers: affordability, skills, relevance and availability. By modelling the probability that non-users cite each of these factors, the paper provides a unique characterization of the non-user population that helps in the design of appropriate commercial and policy responses to connectivity challenges in the region.

The findings offer many important lessons for policy makers. First, demand-side factors are found to be as important as supply-side factors in explaining non-adoption. While many rural areas still lack adequate connectivity infrastructure, the large majority of non-users in Latin America simply find Internet access either too expensive or irrelevant. Second, there is a large unmet demand for low-cost access services, particularly among households with school-age children. Third, gender gaps in Internet access remain significant, with men between five and nine percent (depending on the country) more likely to be online than women. Fourth, language skills are an important obstacle for adoption, after controlling for other factors correlated with Internet adoption. Households where the primary language is not Spanish are between 12 and 22 percent less likely to be connected, while individuals whose first language is not Spanish are between eight percent and 31 percent less likely to be online. Last, the presence of school-age children in the household has a strong spillover effect on Internet use by adults, though the effect on residential access is much weaker due to cost factors.

Overall, the results suggest an opportunity to complement infrastructure-deployment initiatives and regulatory reforms with targeted programs aimed at addressing connectivity barriers related to demand factors. Among the proposed programs are incentives for the creation of online content and services in indigenous languages, kindergarten to grade 12 (K–12) school connectivity initiatives, and a residential access subsidy for low-income families tied to complementary investment in human capital by recipients. Such programs can be expected to lower access barriers, promote the acquisition of information and communications technology (ICT) skills and have important spillover effects among the 250 million Latin Americans who remain off-line.

INTRODUCTION

It is widely agreed that Internet access is a prerequisite for human development in the twenty-first century. Without connectivity, individuals and businesses face significant barriers for participating in the economic and social networks that permeate modern societies (World Bank 2016). Universalizing access has therefore become a policy priority in many countries, and is a core pillar of the new UN sustainable development agenda. Several of the proposed sustainable development goal targets address inequalities in access to the Internet, most significantly target 5.b ("enhance the use of enabling technologies, in particular ICT, to promote women's empowerment") and target 9.c ("significantly increase access to ICT and strive to provide universal and affordable access to Internet in less developed countries [LDCs] by 2020").

Internet access became a full-fledged market around 1995. From then, it took fewer than 10 years for half of the population in developed countries to come online. Today, average penetration in rich countries exceeds 80 percent. By contrast, only about one in three people in the developing world uses the Internet on a regular basis (International Telecommunication Union [ITU] 2015). In Latin America, there are approximately 250 million people aged 15 and older who are not regular Internet users. The challenges are manifold, including deficits in the legacy telecommunications infrastructure, low population density, lack of human capital, endemic poverty and an inadequate regulatory environment.

Further, the unconnected are fundamentally different than the online population: they are older, poorer, less educated and more likely to live outside the main urban centres. As a result, they represent a much less attractive market for network operators and content/application providers. Bringing the next billion users online therefore represents a far greater challenge, one that will require not only technological and commercial innovations but also a new compact between governments and the private sector.

This study seeks to advance the debate on how to connect the next billion Internet users in two fundamental ways. First, it analyzes Internet diffusion patterns in Latin America based on the most recently available household surveys. The use of large-scale household surveys (over 875,000 cases in total) has many advantages over the more commonly used industry data, the main one being the ability to analyze how socio-demographic characteristics affect Internet adoption. Second, the paper examines the unconnected population through different lenses. It presents estimates on the demand gap, a concept that captures differences among Internet infrastructure coverage, subscriptions and individual use. As Raúl Katz and Hernán Galperin (2013) argue, identifying the determinants and magnitude of the demand gap across different populations is critical for the design of cost-effective connectivity policies. Further, the paper examines the reasons for non-use, distinguishing between four types of barriers for adoption: affordability, skills, relevance and availability. By modelling the probability that non-users cite each of these factors, the paper provides a unique characterization of the non-user population that helps design appropriate commercial and policy responses.

The findings offer many important lessons for policy makers. First, demand-side factors are as important as supply-side factors in explaining non-adoption. While many rural areas still lack adequate connectivity infrastructure, the large majority of non-users in Latin America simply find Internet access either too expensive or irrelevant. Second, there is a large unmet demand for low-cost access services, particularly among households with school-age children. Third, gender gaps in Internet access remain significant (particularly in the Andean region), with men between five and nine percent (depending on the country) more likely to be online than women. Fourth, language skills are found to be an important obstacle for adoption, suggesting the need to promote linguistic diversity in online content and services. Last, the presence of school-age children in the household has a strong spillover effect on Internet use by adults, although the effect on residential access is much weaker due to cost factors. Overall, the results suggest an opportunity to complement infrastructure-deployment initiatives and regulatory reforms with targeted programs aimed at addressing connectivity barriers related to demand factors.

LONG-TERM TRENDS IN INTERNET ADOPTION AND THE DEMAND GAP

There are different ways to measure Internet connectivity levels across countries or regions. The most common involves adding up the number of subscriptions to different access services (for example, mobile and fixed broadband) as reported by service operators, from which subscriptions per 100 inhabitants are calculated. Figure 1 presents subscription indicators for various ICT services in Latin America for the 1980–2014 period. This long-term perspective reveals a number of stylized facts. The first is the extraordinary growth in the adoption of mobile telephony, which presents a textbook case of a logistic (or S-shaped) diffusion curve. By contrast, fixed telephony presents a slow-growing trend that peaked in 2008 at 18.7 lines per 100 inhabitants surveyed and has been declining ever since.

Perhaps not surprisingly, the adoption curves for mobile and fixed broadband closely follow the pattern for mobile and fixed telephony respectively. The number of mobile broadband subscriptions has been growing exponentially in recent years, following the pattern of mobile telephony in the early 2000s. By contrast, the rate of growth in fixed broadband is small and appears to be decelerating. Currently at slightly more than 10 subscriptions per 100 inhabitants, residential broadband in Latin America has struggled to grow beyond a niche market for wealthy urban households. Even considering that fixed broadband is best interpreted as a household asset, the scale of the market remains limited, with current penetration at just over half of fixed telephony.

A key fact from Figure 1 is the deceleration in the pace of growth of the Internet population in Latin America. This deceleration represents a major policy challenge for the region. However, penetration indicators based on industry data present a number of well-known problems, particularly in countries where most users do not subscribe to monthly services (as is the case in most developing regions). Further, these indicators are national averages that say little about the distribution of access within the population. The use of household-level survey data offers a more detailed representation of the existing access divides and the policy challenges for bridging these deficits in the region.

Figures 2 and 3 present demand gap estimates for eight countries for which recent household-level survey data is available. In the case of mobile broadband (Figure 2), the demand gap is measured as one minus the ratio of mobile broadband users to population coverage.[1] In other words, it estimates the fraction of potential users who do not utilize mobile broadband services. Results are presented by income decile, measured in total family income per capita.[2]

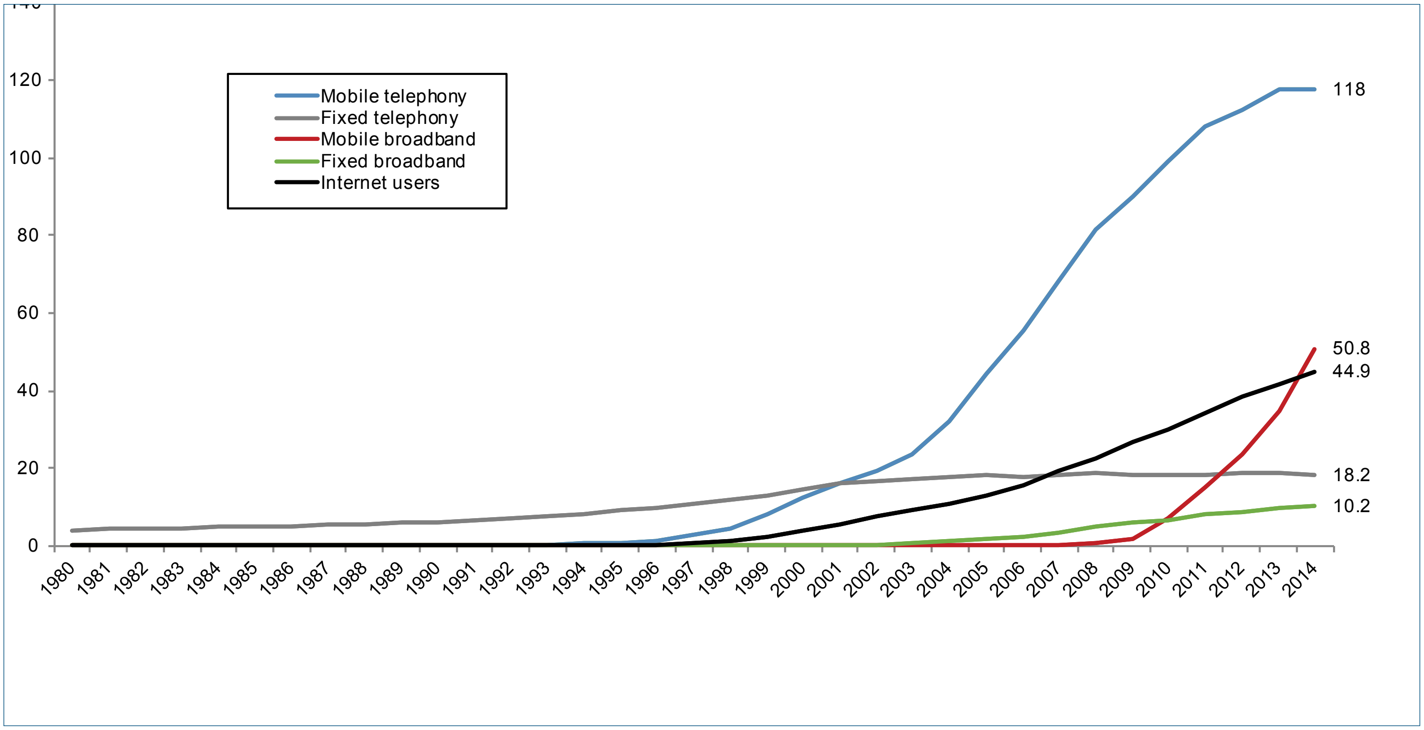
The analysis reveals that the magnitude of the demand gap in mobile broadband varies considerably by country and income group. In general terms, large infrastructure investments over the past decade have significantly expanded coverage, making mobile Internet available to more than 80 percent of the population in the countries analyzed. With the possible exception of Bolivia, where geography and low population density create significant challenges for network deployment, most Latin Americans can choose from a growing menu of mobile connectivity services.

The key determinant of the observed gaps is therefore weak demand for mobile broadband. Take the case of Peru:

1 Mobile broadband demand gap = $1 - \left(\frac{users}{population\ coverage}\right)$

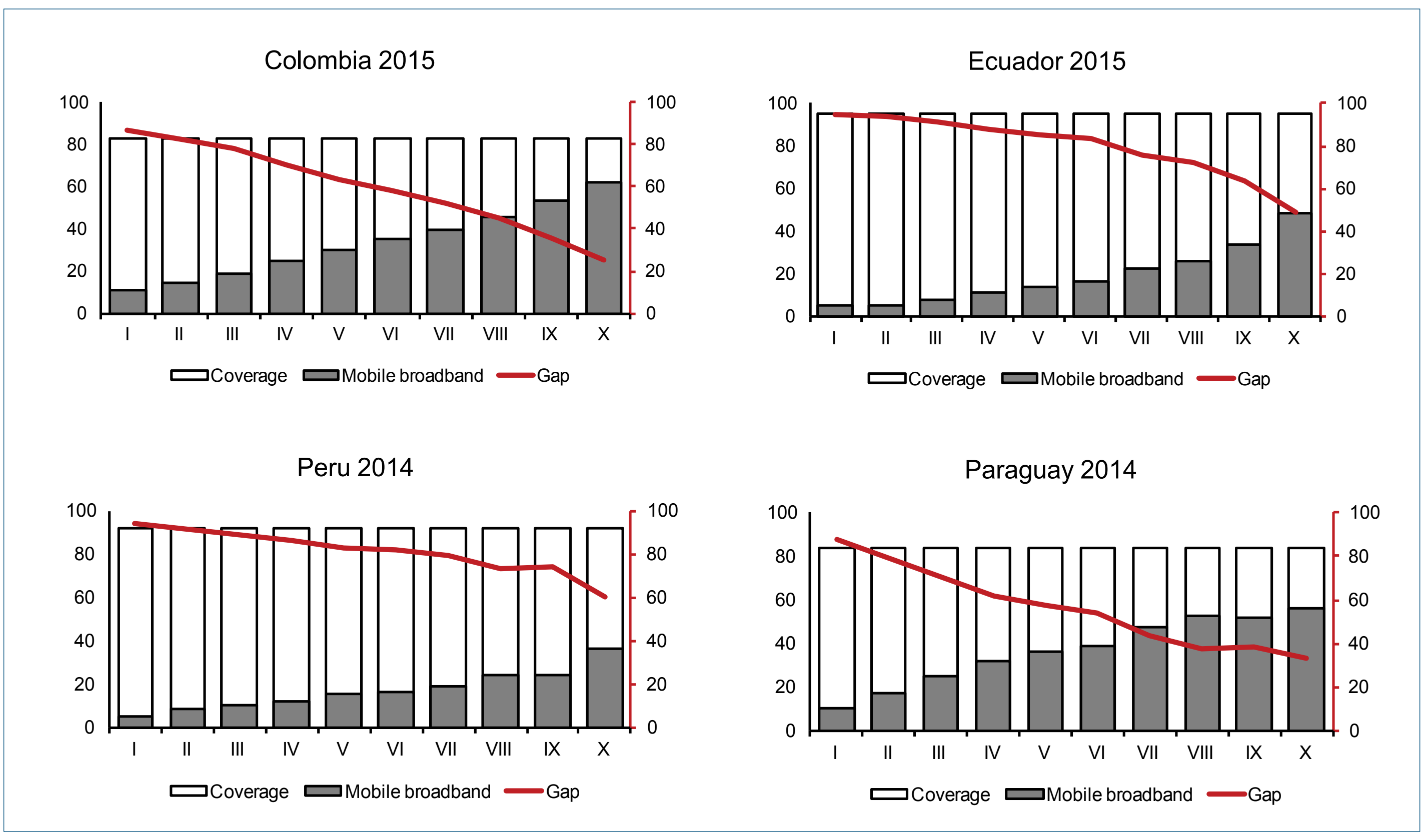
2 Total family income per capita is deflated using the Consumer Price Index for each country and adjusted by 2005 Purchasing Power Parity.

Figure 1: ICT Subscriptions per 100 Inhabitants and Internet Users in Latin America, 1980–2014



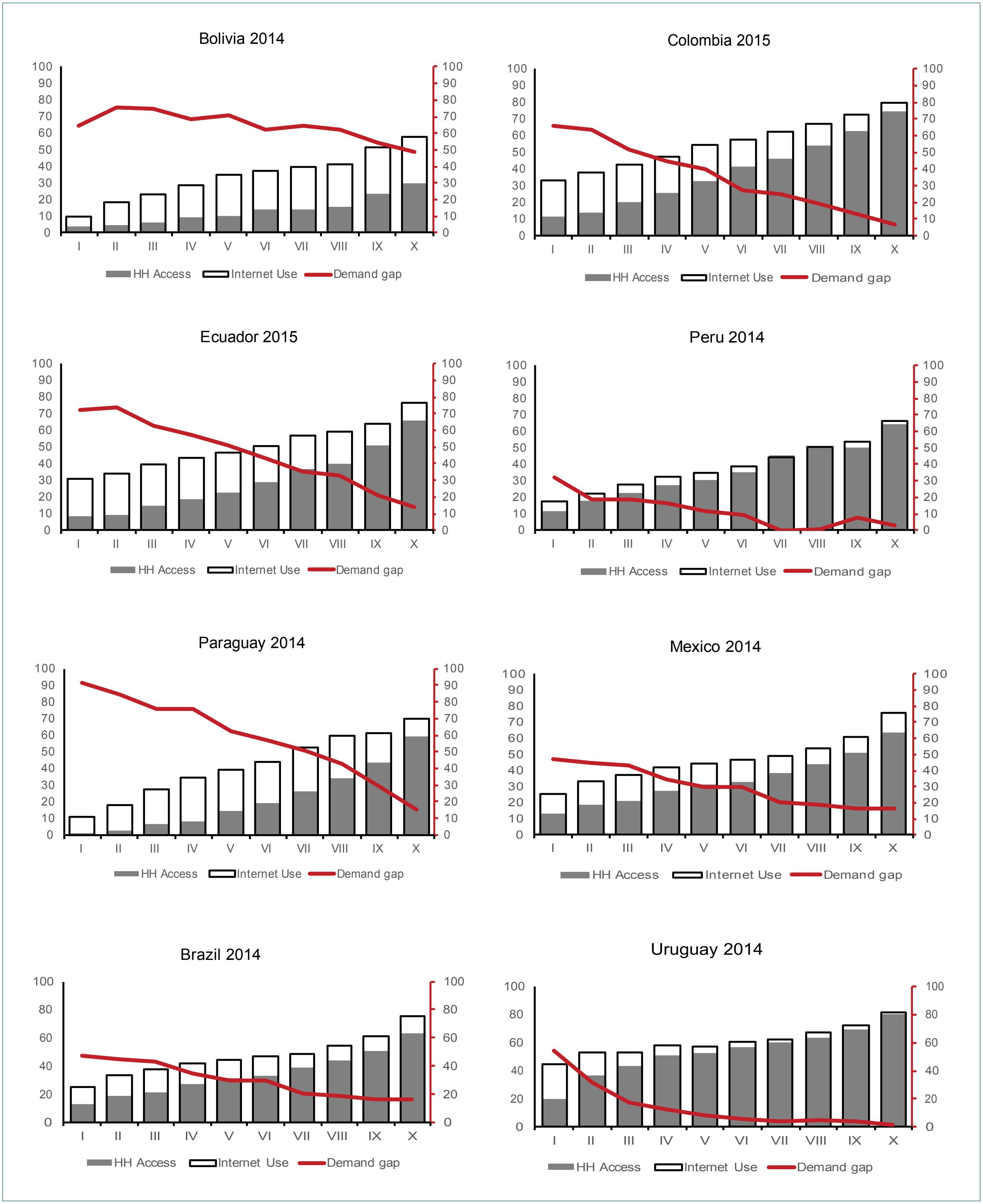
Source: ITU Indicators Database 2015 (http://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx).
Note: Latin America includes Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. Unweighted averages reported.

Figure 2: Demand Gap in Mobile Broadband by Income Decile



Source: National statistics offices (see Appendix A) and GSM Intelligence (www.gsmaintelligence.com/).

Figure 3: Demand Gap in Fixed Broadband by Income Decile



Source: National statistics offices (see Appendix A). *Note:* HH = Household.

while mobile broadband reaches about 90 percent of the population, fewer than one in 10 Peruvians in the bottom third of the income distribution report using mobile Internet services. The gap is similar in Ecuador and only slightly lower in Colombia and Paraguay. Interestingly, even at the top of the income distribution a sizable demand gap is observed. In Ecuador, less than half of the individuals in the top 20 percent of the income distribution report using mobile broadband (demand is somewhat stronger in Colombia and Paraguay). These results raise questions about the affordability and relevance of existing mobile broadband services for the poorest.

Unlike in developed countries, most Internet users in Latin America (and in other emerging regions) do not subscribe to residential services. Yet the very fact that these individuals are online (at work, in schools, at a cyber café, on a mobile device and so on) suggests there is a latent demand for access within the household. Therefore, given the lack of reliable coverage estimates for fixed services, the demand gap for residential broadband is measured one minus the ratio of residential subscriptions (per 100) to Internet users (per 100).[3] In other words, it estimates the fraction of Internet users who do not subscribe to residential access services. Results are presented by income decile, measured in total family income per capita (Figure 3).

The results reveal a reasonably consistent pattern in which the demand gap for residential broadband peaks in the bottom income quintile and declines (in some cases rapidly) thereafter. In other words, at the top end of the income distribution, the market for fixed broadband is approaching saturation. As shown in the next sections, lack of interest is the main factor that explains why a small share of the wealthiest households remains unconnected. The exceptions are countries with overall low penetration such as Bolivia, where lack of a legacy wired infrastructure limits residential broadband coverage even in relatively wealthy areas (Galperin, Alvarez-Hamelin and Viecens 2014).

By contrast, a combination of subsistence-level incomes and limited human capital explains weak Internet demand at the bottom of the distribution. Not only is connectivity unaffordable as a household asset, but individual household members have very limited Internet use experience. In Bolivia and Paraguay, only one in t10individuals living in households in the lowest income decile is a regular Internet user. In wealthier countries such as Mexico, the fraction is closer to one in four. After the first income quintile, higher incomes result in more residential access, but the effect is smaller on use, thus reducing the demand gap.

3 Demand gap = $1 - \left(\frac{\textit{subscriptions per 100}}{\textit{users per 100}} \right)$

THE DISTRIBUTION OF INTERNET ACCESS

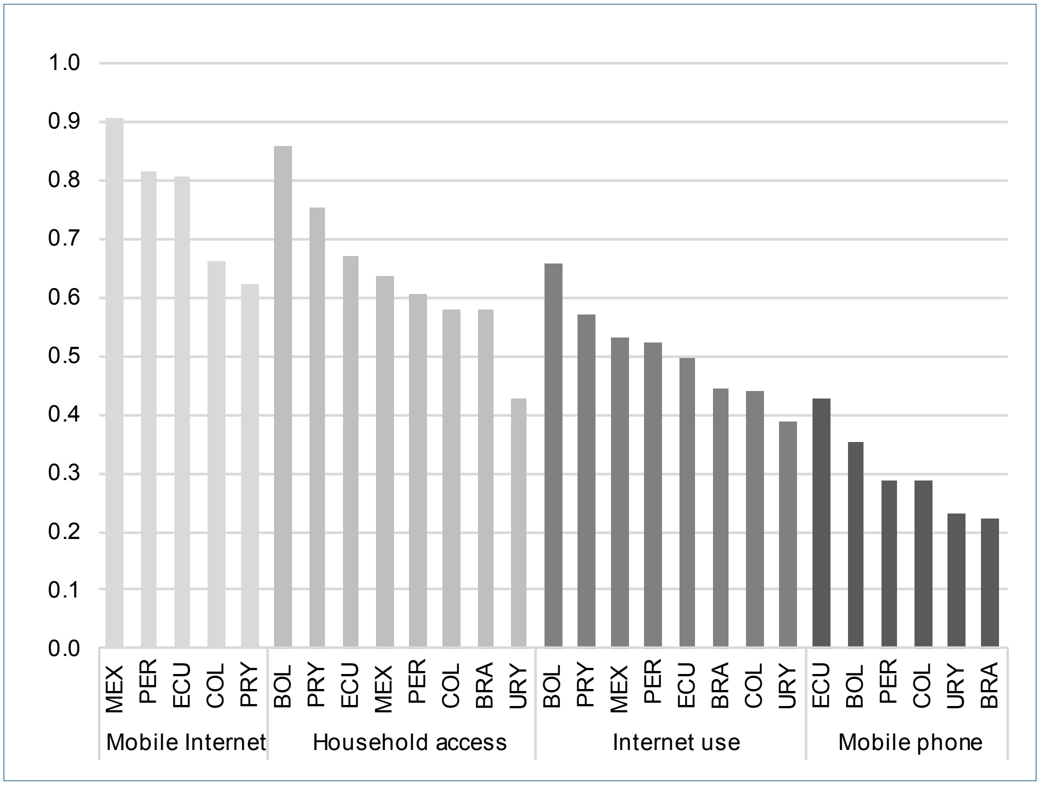
There are multiple ways to measure differences in access to ICT resources within a population, which are sometimes conflated in the term “digital divide.” One approach is to examine absolute levels of access to different technologies across different subpopulations. This approach emphasizes Internet access as an individual right, and calls for government policies that guarantee a minimum level of access opportunities to all regardless of income, location or other demographic factors. This is the principle that has guided universal service policies in telecommunications for many decades and, more recently, national broadband plans to extend Internet services to low-income households and remote populations.

Another approach is to examine relative levels of access to ICT within a population. In this approach, the emphasis is on between-group differences rather than absolute levels of access. The underlying principle is that disparities in access to ICT resources are likely to perpetuate or even exacerbate other social inequalities, further widening existing economic and social gaps (see, for example, Di Maggio et al. 2001). Among the most commonly used measures of inequality is the Gini coefficient (and the associated Lorenz curve), which measures the extent to which the distribution of a resource (typically income) deviates from perfect equality. In Figures 4 and 5, the same principle is used to measure inequality in access to ICT resources.

Figure 4 presents Gini coefficients for fixed and mobile Internet-access, mobile telephony use, and Internet use in selected Latin American countries for which recent data is available. The associated Lorenz curves are presented in Figure 5. As usual, the x axis represents the cumulative number of individuals or households from lowest to highest income, whereas the y axis represents the cumulative share of different ICT resources in the population.

The results reveal a number of interesting facts about inequalities in ICT adoption in the region. The largest disparities are consistently found in mobile broadband followed closely by residential access (see Figure 5a and Figure 5b), with Gini coefficients in the 0.58 to 0.9 range (with the exception of Uruguay, discussed below). Inequality in residential access appears to be inversely related to country wealth, rising in poorer countries such as Bolivia and Paraguay while decreasing in richer countries such as Brazil and Uruguay. By contrast, the distribution of individual Internet use is significantly less skewed, with Gini coefficients in the 0.38 to 0.65 range. Further, overall country wealth seems to have little effect on the distribution of Internet use, with Lorenz curves for different countries tightly clustered (see Figure 5d).

Figure 4: Gini Coefficient for Selected ICTs in Latin America (Selected Countries and Years)



Source: National statistics offices (see Appendix A).

At the other end of the spectrum is mobile telephony, with Gini coefficients in the 0.22 to 0.42 range. Further, Lorenz curves for different countries are also tightly clustered (see Figure 5c), suggesting that overall country wealth is unrelated to the distribution of mobile telephony access within these populations. This finding validates the strong equalizing effect that mobile telephony has had on ICT adoption in the region, as in much of the developing world (ITU 2015). By contrast, broadband (both fixed and mobile) remains highly skewed toward wealthier households and individuals, much like fixed telephony has been for the past century.

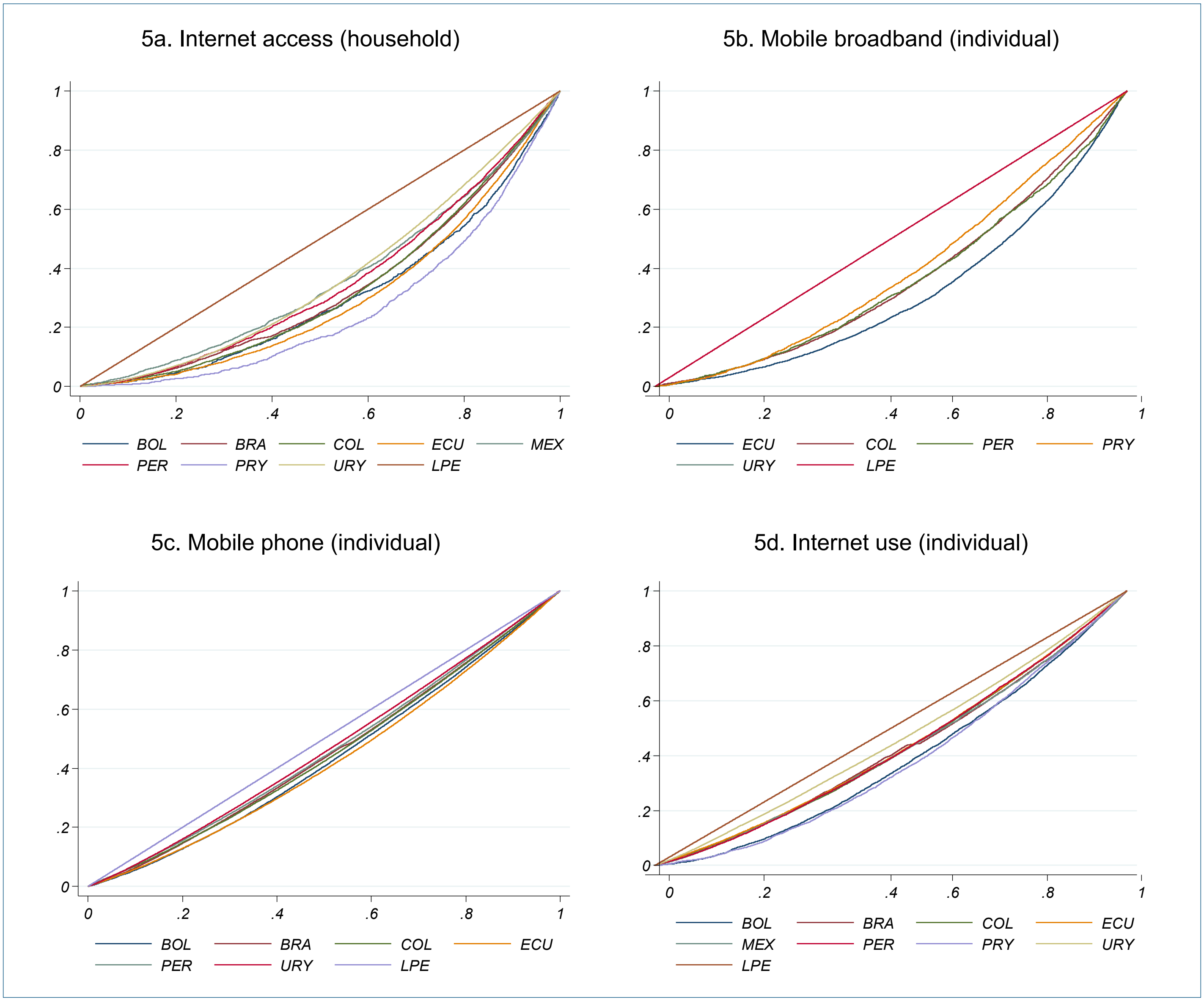
The case of Uruguay deserves special attention. Uruguay is among the better connected countries in the region. It also reveals the least inequality in access to ICT resources, as shown in Figures 4 and 5 above. There are several explanations for this finding. The simplest are that Uruguay is the second-wealthiest country in the region (after Chile), and that it is a small country with low income inequality. Beyond that, the state-owned operator, Antel (which holds a near monopoly in residential services), has aggressively marketed entry-level Internet services to low-income households. As a result, the Gini coefficient for fixed broadband in Uruguay is about a third lower of that in Mexico, a country of comparable wealth on a per capita basis. Another relevant factor is Plan Ceibal, a large-scale ICT-in-education program that distributes low-cost laptops to all students in public schools across the country, and also provides Internet connectivity to these schools through Antel. While the long-term impact of the program on educational achievement is yet to be seen, its effect on lowering barriers to ICT access and promoting ICT literacy has been extensively documented. (See Rivoir and Lamschtein 2012; de Melo et al. 2013.)

The political and demographic conditions that allowed Uruguay to significantly reduce inequality in access to ICT resources, in particular to residential broadband, are difficult to replicate in other countries. However, the experience points to a combination of affordable Internet service packages targeted at low-income residents with extensive investments in human capital that promote demand for connectivity in the long term. This successful policy formula also highlights the need for coordination across policy actors, as well as for public-private partnerships in countries where, unlike Uruguay, private operators are the most relevant players in the Internet access market.

WHO IS NOT ONLINE?

Numerous studies suggest that household demand for Internet services and individual adoption depend on a number of demographic factors (Chaudhuria and Flamm 2007; Cardona et al. 2009; Chinn and Fairlie 2010). Among the most relevant are income, education,

Figure 5: Lorenz Curve for Selected ICTs in Latin America (Selected Countries and Years)



Source: National statistics offices (see Appendix A).
Note: LPE = line of perfect equality.

gender, geographical location (urban versus rural) and the presence of school-age children in the household. In order to corroborate these findings and determine how each of these factors affects Internet adoption in Latin America, various linear probability models (Ordinary Least Squares) are presented for the countries for which recent household-level data is available. The models estimate the likelihood that, conditional on a set of demographic characteristics, an individual:

- has Internet access at home;[4]
- is a regular Internet user (regardless of access location or device);[5]
- has an active mobile telephony line; and
- uses the mobile phone to access the Internet.

The most recent national household surveys have been homogenized to maximize the comparability of results, following the methodology described in Centro de

4 Because the decision to adopt residential broadband is typically with the head of household, residential access models use a reduced sample of heads of households.

5 Unfortunately, the wording of questions and time frame used to define an Internet user varies across surveys in the different countries. Most countries define users as individuals who have used the Internet in the past 12 months. Bolivia, Paraguay and Uruguay use a more restrictive definition based on use within the past three months.

Estudios Distributivos, Laborales y Sociales (2009). Full results are presented in Appendix B (Tables 1 to 4). All marginal effects reported are calculated at the dependent variable's mean.

Income

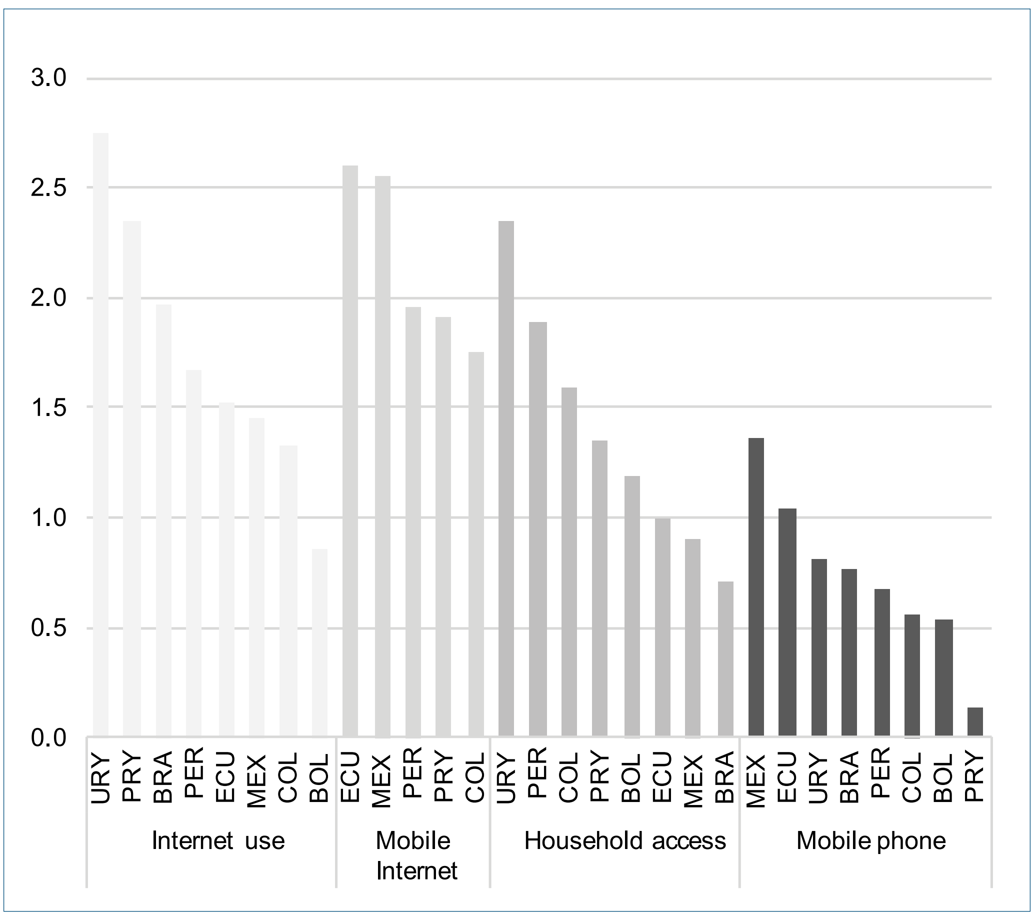
As expected, income is a strong predictor of ICT adoption in all models. The results show a consistent pattern whereby the effect of income is significantly stronger for Internet access than for mobile telephony. For example, in the case of Peru a 10 percent increase in household income per capita results in a 1.9 percent increase in the likelihood of having residential access, but only a 0.7 percent increase in the likelihood of cellphone use. In other words, income elasticity is almost three times as large for residential access as for mobile phone. Interestingly, the effect is equally strong for residential and mobile access as for Internet use. While the results vary somewhat across countries, this general pattern holds across the region, as shown in Figure 6.

Age of User

The results suggest that the effect of a person's age on ICT adoption varies depending on the technology examined. In most countries, as age rises so does the likelihood of residential connectivity. This small but significant effect is somewhat counterintuitive, though it needs to be interpreted in the context of a sample limited to heads of households. By contrast, age is — as expected — inversely related to Internet use, and the effect is particularly strong. For example, in the case of Mexico, every additional year reduces the likelihood of using the Internet by about 2.2 percent. The results vary slightly across countries but the pattern generally holds. Age is also inversely related to mobile phone adoption, but the effect is much weaker. Again, in Mexico, an additional year reduces the likelihood of using a cellphone by only 0.23 percent, an effect approximately 10 times weaker than for Internet use.

The effect of age is also found to be strong in the case of mobile broadband, with every additional year reducing the likelihood of adoption, from 1.2 percent in Ecuador to 3.1 percent in Peru. Part of the explanation may be a novelty effect, given that the young are more likely to be

Figure 6: Conditional Effect of a 10 Percent Increase in Household Income per Capita on ICT Adoption (in Percent Change at Dependent Variable Mean)



Source: National statistics offices (see Appendix A).

early technology adopters. This is, however, a pattern that deserves close monitoring, for it may indicate a widening generational gap in access to new digital services associated with mobile broadband.

Education

The data indicates that education is a strong determinant of Internet adoption in Latin America, and that the magnitude of the effect increases with education level. Compared to the base-case scenario of an individual who has not completed primary school, an individual with secondary schooling is between nine and 24 percent more likely (depending on the country) to have Internet access at home (controlling for other characteristics including income). As Figure 7a shows, the effect increases steadily with education level. Education is also a strong predictor of individual Internet use, and the magnitude of the effect is generally larger, in particular as education rises (Figure 7d). In most countries, a college graduate is at least twice as likely to use the Internet compared to the base-case scenario of an individual who has not completed primary school.

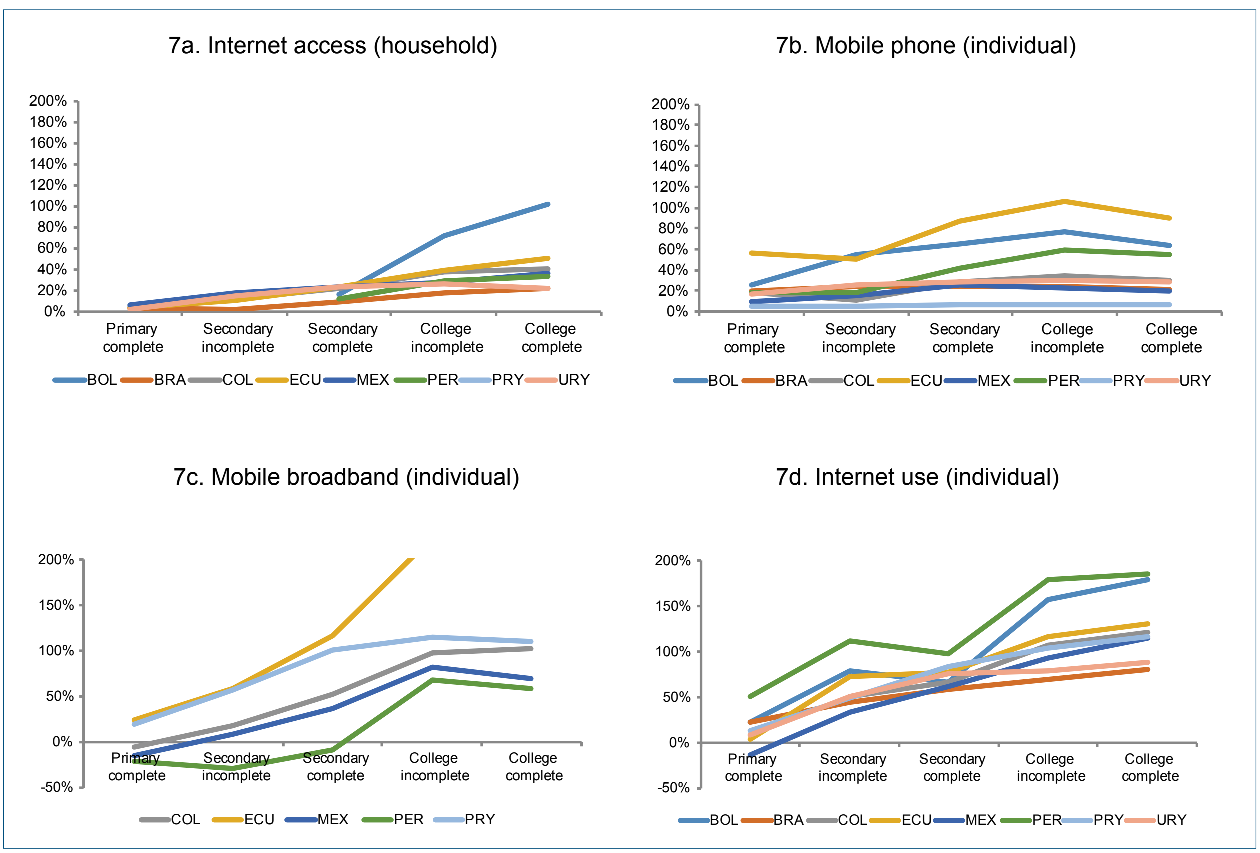
Interestingly, the effect of education on mobile telephony adoption does not rise monotonically with level of education (Figure 7b). Rather, the results suggest an inverted-U pattern in which the effect is largest in the middle of the education distribution. Furthermore, in some countries (such as Peru and Mexico) the likelihood of mobile broadband adoption decreases with education in the bottom half of the distribution, although the trend reverts at higher education levels (Figure 7.c). This surprising finding suggests that, in some countries, mobile broadband may be substituting for fixed access among those with more limited ICT skills.

Gender

Gender gaps in ICT access in Latin America persist, although the evidence indicates that the situation varies by country and technology (see Table 1). The most significant finding is that Internet use generally skews male. Holding all other characteristics constant, men are between five and nine percent more likely than women to be regular Internet users. However, in the two countries with the highest level of adoption (Brazil and Uruguay) the opposite result obtains, with women slightly more likely to be online than men. This suggests that women may be slowly catching up with men as adoption propagates in the population.

By contrast, mobile telephony skews female, with men between one and eight percent less likely to own a mobile

Figure 7: Conditional Effect of Education on ICT Adoption (Base Case = Primary School Incomplete)



Source: National statistics offices (see Appendix A).
Note: Only significant effects reported.

Table 1: Change in Likelihood of Adoption if Respondent is Male

	BOL	BRA	COL	ECU	MEX	PER	PRY	URY
Internet use	9.38%	-1.07%	6.11%	5.36%	9.25%	6.35%	0.0%	-2.80%
Mobile phone use	-3.26%	-4.83%	-7.98%	-1.09%	-6.59%	-2.58%	0.0%	-5.43%

Source: National statistics offices (see Appendix A).

phone. This surprising finding contrasts with the situation in other developing regions, where large gender gaps in mobile telephony adoption have been reported (see GSMA 2015). Overall, while the magnitude of the gender gap in Internet adoption in Latin America may be smaller than in other developing regions (see UN Broadband Commission 2015), it remains significant and should be considered in the design of connectivity initiatives across the region.

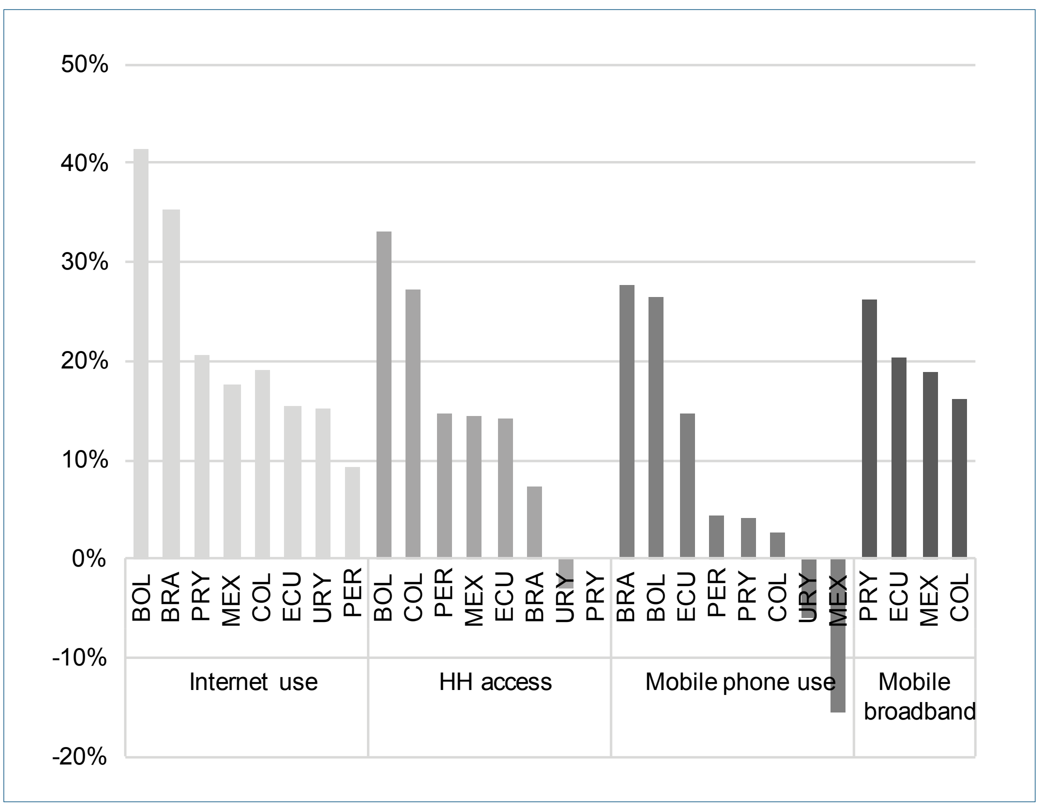
Geographical Location

Connecting residents of low-density, isolated areas remains one of the most significant challenges for Latin America. As Figure 8 indicates, rural residents are at a very significant disadvantage for ICT access. Surprisingly, the largest effects are found for Internet use, with urban residents between 15 and 41 percent more likely to be online than rural dwellers.[6] Effects are also strong for residential access, which is less surprising given the limited coverage of fixed broadband services outside urban areas and the challenges in deploying fixed infrastructure in certain parts of the continent (which may explain why effects are particularly large in Andean countries). On average, urban households are between seven and 33 percent (depending on the country) more likely to have residential connectivity, after controlling for income and other household characteristics.

These findings point to the varied impact of rural connectivity programs across the region. The most successful case appears to be Peru, where the government has been investing in rural connectivity projects since the early 1990s through a dedicated fund (FITEL, or Fondo de Inversión en Telecomunicaciones). While the urban-rural

6 Results from Uruguay are reported but excluded from the analysis due to the country's size and favourable geographical characteristics.

Figure 8: Conditional Effect of Urban Location on ICT Adoption (Base Case = Rural)



Source: National statistics offices (see Appendix A).
Note: Only significant effects reported.

Table 2: Change in Likelihood of Internet Adoption When School-age Children Are Present in Household

	BOL	BRA	COL	ECU	MEX	PER	PRY	URY
Household access	0.0%	2.93%	0.0%	8.28%	0.0%	0.0%	0.0%	-14.74%
Internet use (only >18)	-8.61%	10.85%	6.17%	5.18%	2.32%	0.0%	6.62%	11.01%

Source: National statistics offices (see Appendix A).
Note: Internet use calculated on a subsample of adults (18 years and over). See Table 2b in Appendix B.

gap in Peru remains significant (at about 15 percent), it is less than half of that in other countries such as Brazil, Bolivia and Colombia.

Figure 8 also shows the impact of geographical location on mobile phone ownership. As shown, a rural gap persists, though the magnitude is somewhat smaller: on average, urban residents are between three percent (in Colombia) and 27 percent (in Brazil) more likely to own a cellphone than comparable rural residents. It is also interesting to note that in the case of Mexico the opposite result obtains, possibly suggesting a substitution effect between fixed and mobile adoption that deserves further research.

Finally, Figure 8 reveals a large gap in mobile broadband adoption, which varies between 16 and 26 percent depending on the country. In other words, the magnitude of the urban-rural gap in mobile broadband is comparable to that in fixed broadband. This result is somewhat surprising given the cost advantages in expanding into low-density areas for mobile network operators, and suggests the need for governments to further facilitate investments in mobile broadband in rural communities.

School-age Children

Qualitative studies suggest that parents, even those with limited financial or educational resources of their own, understand the value of ICT access in determining social mobility opportunities for their children (for example, Ortiz and Green 2011). This is particularly true in the case of children of school age, for it is apparent how Internet connectivity vastly amplifies educational opportunities. As such, the presence of school-age children in the household is expected to have a positive impact on the likelihood of having residential access, shifting upward the demand for connectivity.

However, the results presented in Table 2 only partly corroborate this hypothesis. In five of the eight countries analyzed, the presence of children of school age had no discernable effect on the likelihood of residential access, after controlling for other household characteristics. The impact was found to be positive in two countries: in Brazil, where a small but significant effect (about three percent) was detected, and in Ecuador, which reports a much larger effect of about eight percent.

In contrast, a large negative effect was found in Uruguay, where the presence of children of school age reduces the likelihood of residential access by approximately 15 percent. This counterintuitive finding is significant, given the investments Uruguay has made on Plan Ceibal, which provides both equipment and connectivity to the majority of the K–12 population in the country. The magnitude of this undesired effect, whereby households appear to substitute residential access for the connectivity provided to students within schools, warrants a closer evaluation of the impact of Plan Ceibal on household demand for Internet access.

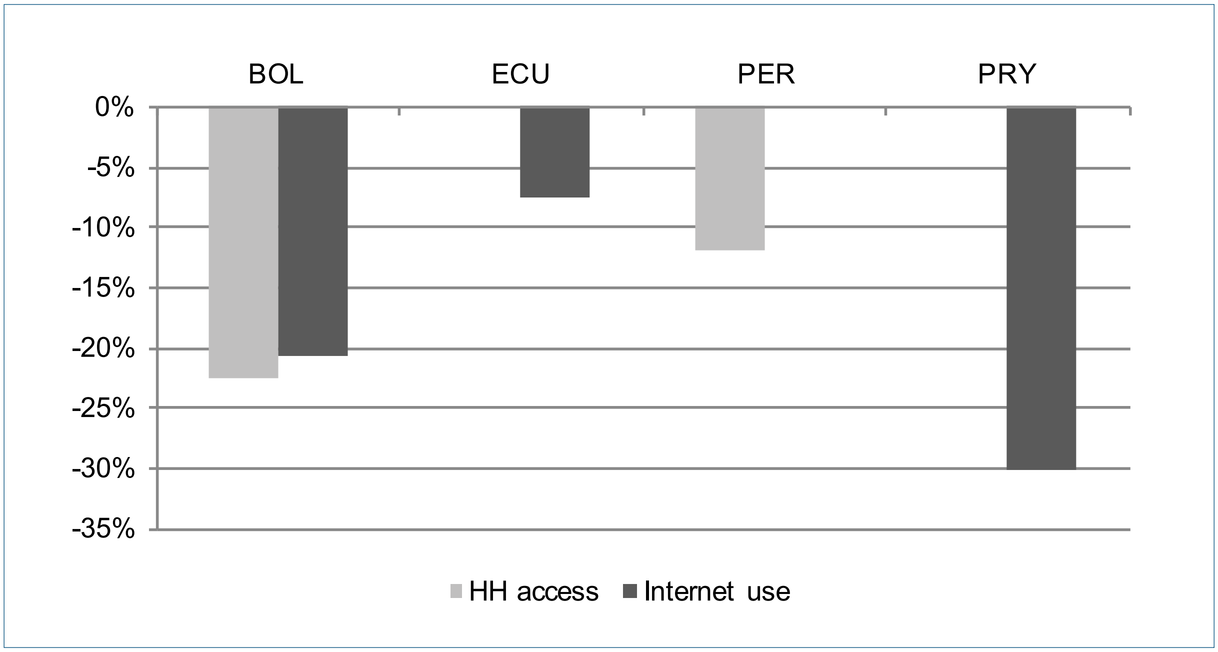
Some studies also suggest the existence of a spillover effect, whereby other household members gradually become Internet users as they acquire both motivation and ICT skills from younger relatives (Correa et al. 2015; Belo, Ferreira and Telang forthcoming). As such, individual Internet use is expected to be higher — *ceteris paribus* — among adults living in households with school-age children. The results in Table 2 largely corroborate this hypothesis. In six of the eight countries analyzed, positive spillover effects were found, ranging from a modest 2.3 percent increase in Mexico to a larger 11 percent increase in Brazil and Uruguay. Only Bolivia reports a negative impact, while in Peru no significant effects were found.

Language

Latin America is a multilingual region with hundreds of indigenous languages still spoken today, particularly in Mexico, Guatemala, Paraguay and the Andean region. An estimated 40 million people in the region speak an indigenous language, and for many this is their first language (López 2009). However, these languages are severely underrepresented online. Although precise estimates are lacking, experts agree that only a handful of major languages — among them Spanish — dominate online content, thus reducing adoption incentives for native speakers of indigenous languages across the region (Vannini and Le Crosnier 2012).

The data in Figure 9 corroborates this hypothesis. After controlling for other factors correlated with Internet adoption, households where the primary language is not Spanish are between 12 percent (Peru) and 22 percent (Bolivia) less likely to have residential Internet access. The magnitude of the effect is even larger for Internet

Figure 9: Conditional Effect of Indigenous Language on ICT Adoption (Base Case = Spanish)



Source: National statistics offices (see Appendix A).
Note: Only significant effects reported.

use: individuals whose first language is not Spanish are between eight percent (Ecuador) and 31 percent (Paraguay) less likely to be online. These results suggest that the lack of relevant content in indigenous languages shifts Internet demand downward, reducing incentives for adoption. Perhaps not surprisingly, the observed effects are largest in Paraguay, a bilingual country where an indigenous language (Guaraní) is spoken by the majority of the population.

WHY ARE PEOPLE NOT ONLINE?

Household surveys contain valuable information about Internet non-adopters. In most questionnaires, heads of households are asked about the reasons for not contracting residential services. In addition, some surveys query individual non-users about the reasons for not being online. Unfortunately, different surveys use slightly different questions and response options. However, it is possible to combine responses into four broad reasons for non-adoption, as follows: affordability (for example, "service is too expensive"); interest ("not interested" or "don't need it"); skills ("don't know how to use"); and availability ("services not available where I live"). The analysis that follows is based on the main reason for non-adoption cited by respondents (although some surveys allow for multiple responses).

Using this categorization, two types of analyses are presented in this section. In the first, descriptive results are sorted by income level, highlighting both differences and commonalities in adoption barriers across income groups. In the second, a series of linear probability models are presented, shedding light on the relationship between a wider set of demographic characteristics and connectivity barriers. Samples in this section are restricted to non-adopters, at either the household or the individual level.

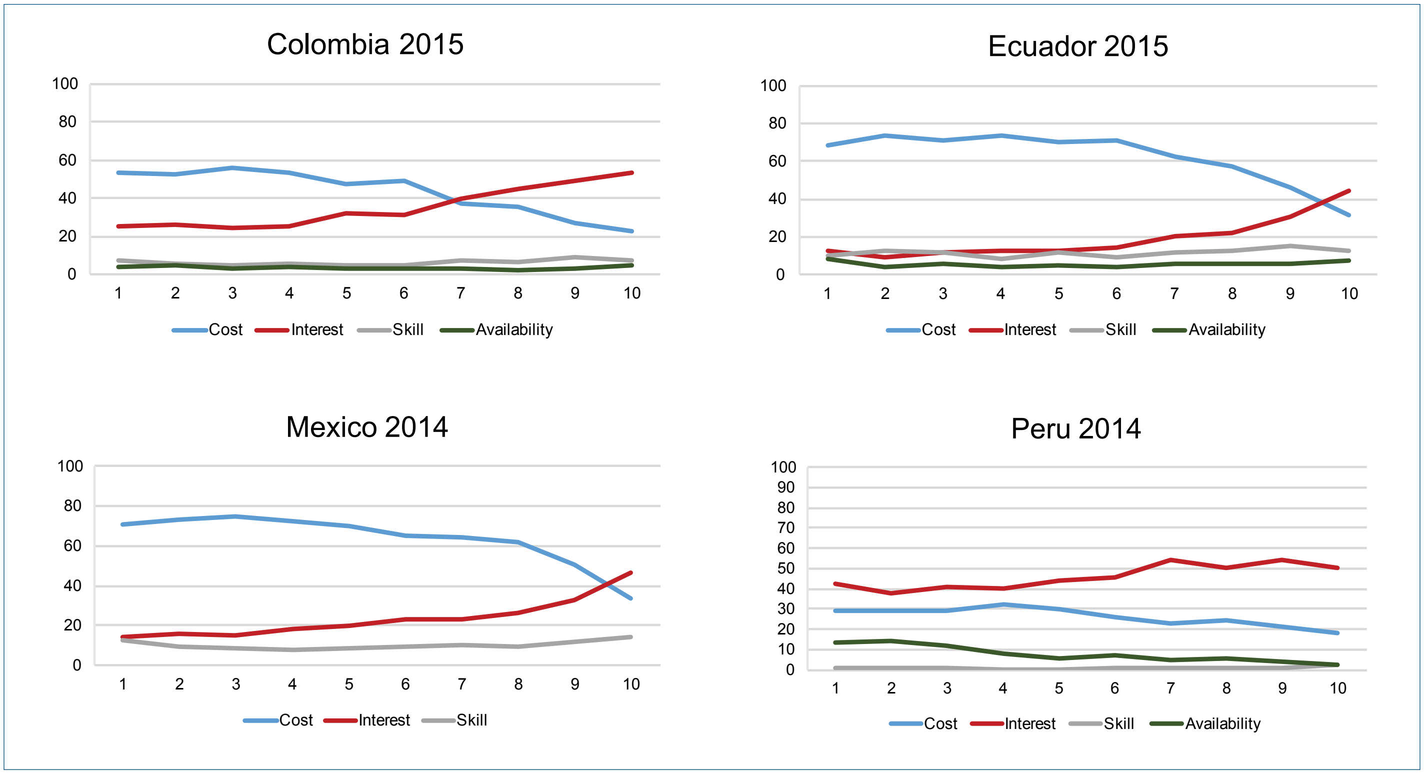
Descriptive Results

Figure 10 presents the main reasons cited by heads of households for not subscribing to residential access, sorted by income decile. The results generally corroborate that affordability remains the most relevant connectivity barrier. This is consistent with research that shows access prices in Latin America several times above comparable prices in other regions (for example, Galperin and Ruzzier, 2013). However, cross-country variations in results are noteworthy.

In Colombia, subsidized Internet access to low-income households (through a targeted government program) results in lower cost barriers at the bottom of the income distribution, with affordability peaking at 56 percent in the third income decile and falling consistently thereafter. By contrast, in Ecuador and Mexico, affordability peaks at around 73 percent in the second income decile and falls gradually, dipping below 50 percent only in the top income quintile. In Peru, somewhat surprisingly, affordability starts off below interest, peaking at around 33 percent in the fourth income decile and falling gradually thereafter.

As expected, affordability and interest move in opposite directions, the first falling and the second rising with

Figure 10: Main Reason for Not Having Internet Access at Home, by Income Decile (%)

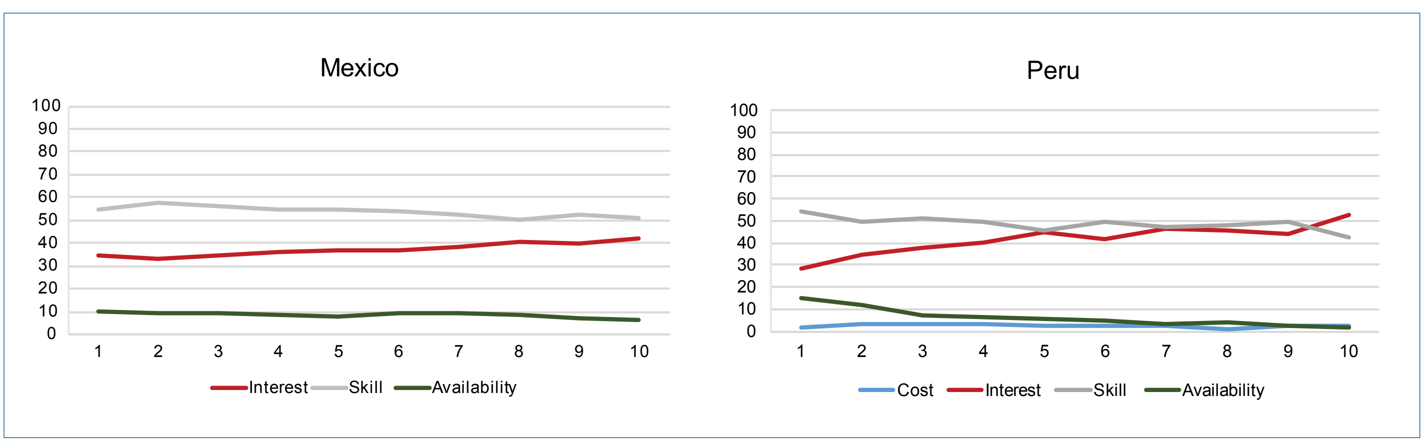


Source: National statistics offices (see Appendix A).
Note: Sample restricted to non-adopter heads of households.

income. The point at which these trends intersect is indicative of whether prices in the residential access market reflect disposable household incomes. In Colombia, the curves intersect somewhere between the sixth and the seventh income decile; in Ecuador and Mexico, it is only at the very top of the income distribution that interest overtakes cost as the main reason for not being connected at home. This suggests a large latent demand for lower-cost services in both countries. In Peru, by contrast, weak residential demand is largely explained by motivational factors across income levels.

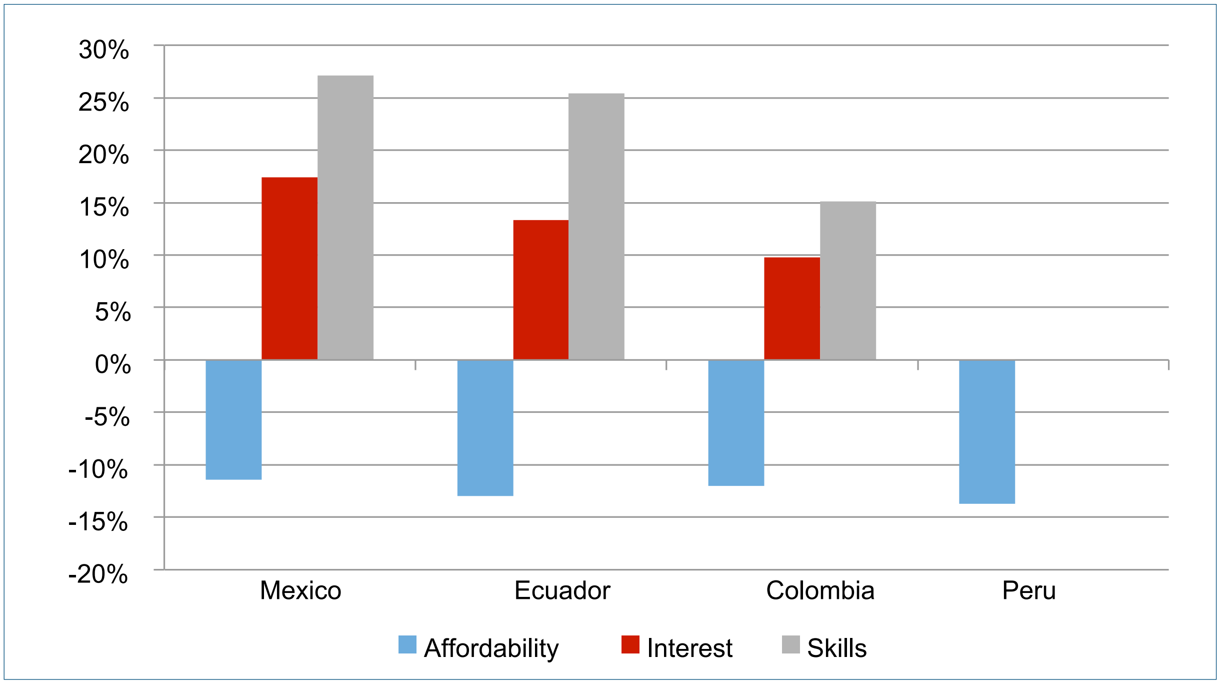
Results with respect to reasons for individual non-use are available only for Mexico and Peru (Figure 11). They indicate that, unlike in the case of residential access, affordability is of little relevance for explaining non-use. This finding is consistent with research that points to the ubiquitous presence of affordable (or in some cases, no-cost) public access locations across the region (Sey et al.

Figure 11: Main Reason for Not Using Internet, by Income Decile (%)



Source: National statistics offices (see Appendix A).
Note: Sample restricted to non-adopters.

Figure 12: Change in Likelihood of Citing Barrier for Residential Access When Respondent Is Male



Source: National statistics offices (see Appendix A).
Note: Sample restricted to non-adopter heads of households.

2013). Further, hourly prices in public access locations are rapidly dropping as operators struggle to compete with mobile broadband services, in particular with daily prepaid packages that emulate the pay-as-you-go cyber café model.

The results also suggest that lack of interest and lack of skills are about equally important as explanatory factors for non-use. There is surprising consistency in this pattern across income groups, particularly in the Mexico case, though this may reflect underreporting of human capital deficits, which is common in household surveys. In Peru, a more expected pattern is observed, whereby lack of interest rises with income, while lack of skill falls, from a peak of 54 percent in the first income decile to 42 percent in the top income group. In other words, while lower-income non-users are predominantly held back by skill-related factors, wealthier non-users perceive little value in being online.

Probability Models

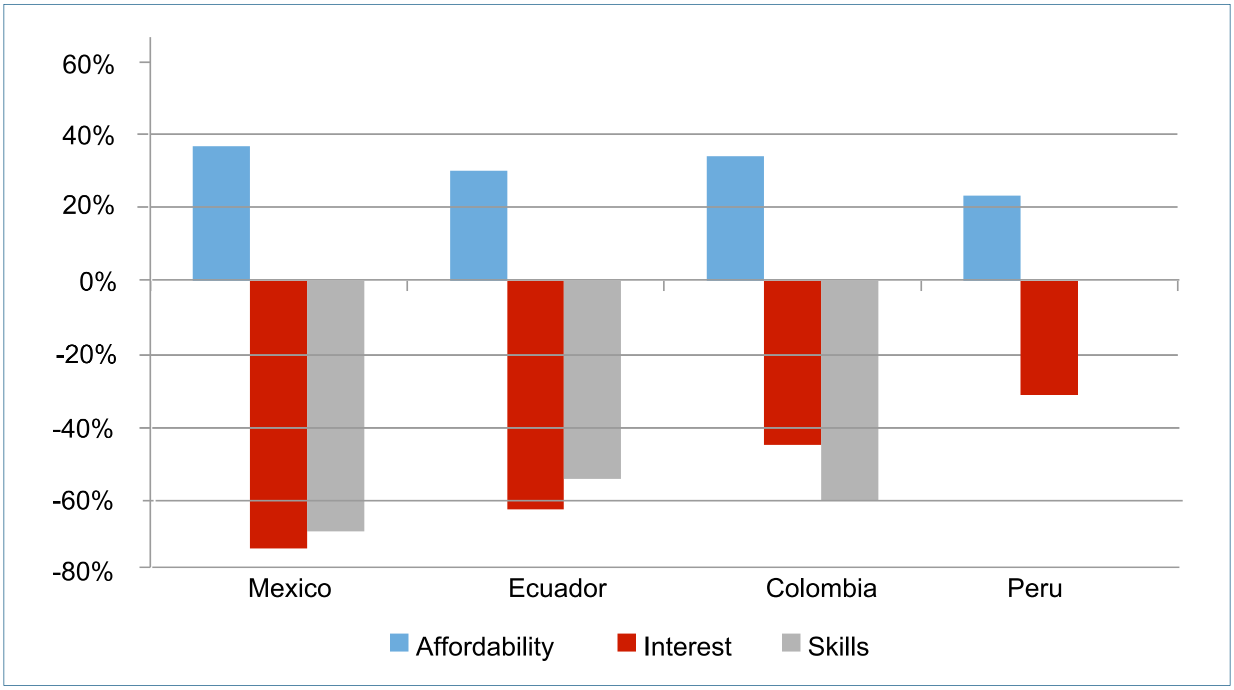
In order to corroborate the descriptive results and examine the simultaneous effect of different demographic factors on Internet adoption, this section presents various linear probability models based on samples restricted to non-adopters. The models estimate the likelihood that non-adopters cite either of the four response categories as the main barrier for connectivity (affordability, lack of interest, lack of skills, and availability), conditional on a set of demographic characteristics. Full results are presented in Appendix B (see Tables 5 to 10). All marginal effects reported are calculated at the dependent variable's mean.

As expected, income, age and education are associated with different connectivity barriers, talhough the fit of the models is generally low, suggesting that factors other than basic socio-economic characteristics are also at play.[7] Among younger heads of household, cost is a critical barrier for residential connectivity; as age rises, affordability becomes less significant, while lack of interest and skills grow in importance. Age is also an important factor for explaining non-use. Every additional year increases the probability of citing lack of skills by between 0.74 percent (Mexico) and 1.76 percent (Peru). This is a remarkably strong effect that indicates the need to attend ICT literacy deficits among the elderly population.

The opposite is true for education: controlling for other factors, the more educated respondents are less likely to cite skills and more likely to cite interest as the main reason for not having access at home. As expected, income is negatively correlated with cost and positively correlated with interest as a connectivity barrier. Despite small differences, these patterns generally hold across the countries examined.

7 For example, Ellen J. Helsper and Bianca C. Reisdorf (2013) show psychological characteristics associated with different reasons for Internet non-use.

Figure 13: Change in Likelihood of Citing Barrier for Residential Access if Children of School Age in Household



Source: National statistics offices (see Appendix A).
Note: Sample restricted to non-adopter heads of households.

Interestingly, the results indicate systematic differences in connectivity barriers between genders. Conditional on other demographic factors, male heads of households are between 11 percent (Mexico) and 14 percent (Peru) less likely to cite affordability as the primary reason for not subscribing to residential access (see Figure 12). Conversely, men are significantly more likely to cite lack of interest and, in particular, lack of skills as the primary barrier. These gender differences are reasonably consistent across countries, except in Peru where male and female heads of households are equally likely to cite interest and skills as main barriers.

Interestingly, a different gender pattern emerges when considering the reasons for individual non-use in the entire population (rather than among heads of households only). While data is only available for two countries (Mexico and Peru), the results suggest that skills deficits are disproportionately relevant for women, with female respondents between five percent (Mexico) and 16 percent (Peru) more likely to cite lack of skills as the main connectivity barrier. This finding corroborates the need to target ICT literacy efforts to ensure that women close the small but significant gender use gap identified in the previous section.

As noted, availability is cited by a small fraction of respondents as the main barrier for residential access. However, when households are sorted by geographical location, the evidence suggests that the urban/rural gap in service coverage remains significant, and is an important determinant of observed differences in residential adoption. Rural heads of households are between two and three times more likely to cite availability as the main reason for not subscribing to Internet services. This result illustrates the continued need for policies that promote Internet infrastructure expansion into low-density areas.

The findings also corroborate the role of linguistic barriers for Internet adoption. In Ecuador, households in which the primary language is not Spanish are 18 percent less likely to cite affordability, but 17 percent more likely to cite lack of skills and 27 percent more likely to cite lack of relevance as the main barrier for residential adoption. Likewise in Peru, individuals whose primary language is not Spanish are 16 percent more likely to cite lack of skills as the main reason for not being online. This suggests that, *ceteris paribus*, indigenous-language speakers not only are less attracted to the content available online but also find it more difficult to acquire the necessary skills for effective use.

Finally, the results show that the presence of school-age children in the household strongly affects the barriers for adoption. Overall, having children in school increases the likelihood of citing affordability as the main barrier for residential connectivity, by between 23 percent (Peru) and 37 percent (Mexico), while at the same time it significantly reduces the likelihood of citing either lack of interest or skills (Figure 13). This is a remarkably strong and consistent effect, which validates the finding that parents are aware of the value that residential access has for their children's education, but to a large extent find services unaffordable. This finding may also help explain the smaller than expected impact that the presence of children has on residential access, as reported above.

POLICY RECOMMENDATIONS FOR CONNECTING THE OTHER HALF

It is often argued that connecting the next billion users worldwide will require a novel set of policy and commercial strategies. The findings in this study clearly support this conclusion. The unconnected in Latin America are fundamentally different from the online population: as expected, they are poorer, older, less educated and more likely to live outside urban centres; perhaps less obvious is that they are disproportionately female and speak Spanish as a second language. Further, the large majority of non-users is within reach of existing networks, but considers Internet access either unaffordable or irrelevant.

In recent years, public policies have shifted away from the shared personal computer (PC) access model in favour of initiatives that build on the rapidly growing base of new personal devices (smartphones, tablets and so forth). The cornerstone of the new generation of initiatives is mobile broadband, which has many desirable characteristics matching the demographics of the unconnected. Compared to fixed broadband, infrastructure deployment costs for mobile are significantly lower (particularly in low-density areas); user interfaces typically require less in the way of ICT skills; and service operators have introduced commercial innovations, such as daily prepaid and zero-rating plans; that are well suited to the expenditure patterns of low-income groups. This shift also represents an attractive proposition for policy makers because public finances have become tighter since the 2008-2009 crisis. Rather than subsidizing the build-out of costly infrastructure for shared access, governments can simply incentivize network rollout by private actors.

There is much to be praised about this policy shift, especially in Latin America, where traditional universal service policies have had, at best, a limited impact (see Clarke and Wallsten 2002). Yet the focus on mobile connectivity may result in neglected policy opportunities in other areas. Further, there is increased evidence pointing at differentiated uses for mobile and fixed broadband (Napoli and Obar 2014; Hariggan and Duggan 2015), which suggests complementarity rather than substitution. This is corroborated by the results of this analysis, which shows that, controlling for other factors including income, having residential access has a strong effect on the probability that an individual uses mobile broadband (see Table 4 in Appendix B).

The policy recommendations below seek to promote residential Internet access in Latin America, regardless of the underlying technology. They are based on three key premises: First, that the observed gaps in demand for Internet require policy initiatives that address two critical access barriers: affordability and relevance. Second, that regulatory initiatives aimed at strengthening competition in access markets throughout the region — while urgently necessary in many cases — will not suffice to close the observed gaps. This is because, as the findings show, Internet adoption is strongly associated with basic socio-demographic variables (age, education, native language, family composition and so on) that evolve much slower than market structures evolve. Third, that neither service operators nor individual households are able to fully capture the spillover benefits of increased Internet connectivity. Thus there is need for government initiatives and investments that help align consumer choices with public welfare.

Recommendation One: Promote Online Content and Services in Indigenous Languages

Given its origins and evolution, it should come as no surprise that English quickly emerged as the de facto language of the Internet, with other major languages growing gradually as the online population diversified. The call for linguistic diversity in online content and services is almost as old as the Internet itself. These calls are often presented as necessary for preserving worldwide cultural diversity, given the migration of content to digital and the opportunities offered by online content archiving and delivery. However, the findings in this study point to a more fundamental result, which is that lack of online linguistic diversity reduces incentives for adoption and the acquisition of ICT skills among minority-language speakers, thus reinforcing social exclusion.

The results of this study suggest the need to promote online content and services in indigenous languages as part of digital inclusion policies. Government actors have an important part to play, given their role in the creation of content and the provision of online services associated with education, health and other basic public services. But incentives for private actors are also critical, particularly because of the enduring association between indigenous groups and poverty, which reduces market incentives to address this potential demand. At the same time, many countries in Latin America have a long-standing tradition of support for linguistic diversity in audiovisual content production. The lessons learned from these initiatives represent a natural springboard for designing policy instruments that promote a more linguistically diverse Internet in the region.

Recommendation Two: Connect Schools

In the past decade, there have been large investments in ICT-in-schools program in Latin America (UNESCO 2013). These programs, which combine the provision of equipment, connectivity and teacher training in various ways, are premised on two key assumptions: first, that schools have an important role to play in promoting ICT literacy, and second, that the introduction of ICTs in schools can positively affect student performance, promoting learning as well as other desirable outcomes such as motivation and retention. While program details differ across countries, investments have generally supported the purchase of ICT equipment for students, with comparatively fewer resources invested in complementary connectivity programs. As a result, many initiatives have fallen below expectations, with both schools and individual students unable to maximize the learning potential of government-subsidized devices (Cristia, Czerwonko and Garofolo 2014).

There is considerable controversy about the long-term impact of these initiatives. In general terms, the empirical evidence supports the first assumption about positive impacts on ICT literacy (for example, Bet, Cristia and Ibarrarán 2014) but provides mixed results when it comes to gains in learning. More specifically, several studies have found Internet use at school (whether measured as a binary or continuous variable) to be essentially uncorrelated with student performance (Goolsbee and Guryan 2006; Muñoz and Ortega 2015). However, more recent studies suggest that, by focusing on school-level effects, these evaluations are underestimating the impact of school connectivity programs. In particular, it has been shown that connecting schools has considerable spillover effects on residential broadband adoption and Internet use by adults in neighbouring areas, although the latter effect is somewhat weaker (Tengtrakul and Peha 2013; Belo, Ferreira and Telang forthcoming; Correa et al. 2015).

The findings presented in this study validate the need to renew these efforts. Several countries in the region have made significant progress in connecting schools in the past decade. Brazil alone has connected over 80,000 public schools since 2008 through a joint initiative with incumbent telecommunications operators, and similar initiatives exist in Chile and Uruguay. However, in much of the continent the situation is less promising. According to the most recent figures available (UNESCO 2013), fewer than 10 percent of the schools in Paraguay, Nicaragua and other lower-income countries are connected to the Internet; even in wealthier countries such as Mexico and Argentina only about one in three schools are connected.

Despite lack of evidence about short-term learning gains (as measured by standardized tests), returns to investments in human capital through school connectivity programs that promote ICT literacy are likely to be significant in the long term. For example, there is evidence (Dodel 2015) that Uruguay's Plan Ceibal has smoothed the education-to-work transition for high-school graduates, increasing the likelihood of landing a white-collar job regardless of socio-demographic characteristics as well as cognitive skills (as measured by Programme for International Student Assessment tests). While more research is needed, these results suggest that school connectivity may promote social mobility and help prepare children for the jobs of the future.

Recommendation Three: Subsidize Low-income Families with Children in School

One of the most significant innovations in social policy in Latin America in recent decades has been the implementation of large-scale conditional cash transfer (CCT) programs. These programs aim at breaking intergenerational poverty by increasing present consumption among low-income households and inducing family investments in the health and education of their children. Numerous impact evaluation studies indicate that the programs have been particularly successful in promoting school enrolment and retention, although the evidence on longer term learning outcomes is mixed. A review of these programs concludes that "to maximize their potential effects on the accumulation of human capital, CCTs should be combined with other programs to improve the quality of the supply of health and education services, and should provide other supporting services" (Fiszbein and Schady 2009, 3).

This study provides evidence that the presence of school-age children in the household increases demand for residential broadband and has spillover effects on use by adults; however, it also shows that most families find current services unaffordable. These findings are very significant, for they suggest an opportunity for governments to invest in human capital by providing targeted connectivity subsidies to low-income families as long as their children attend school, much like other government programs provide monetary support to families who meet educational requirements. While many initiatives in the region have focused on providing ICT devices for use within schools, these results suggest a latent demand for complementary programs that promote residential connectivity among low-income families with school-age children.

Residential connectivity subsidy programs for low-income families exist (in various forms) in several countries in the regions.[8] Yet several of these programs are neither targeted nor transparent, since there are no formal eligibility requirements and costs are often internalized by state-

8 Most notably in Brazil (Programa Nacional de Banda Larga), Uruguay (Antel's Universal Hogares) and Colombia (subsidy based on a household stratification system that determines eligibility for other utility subsidies).

owned telecom operators. Linking Internet subsidies to schooling would greatly improve cost-effectiveness while promoting spillovers that remain unrealized due to affordability barriers.

CONCLUSION

It is sometimes assumed that the diffusion of the Internet will resemble that of other technological innovations of the late nineteenth and early twentieth centuries such as electricity and broadcast radio. As coverage increased and prices dropped, these innovations became part of daily life for most Latin Americans. However, the findings in this paper suggest that the drivers for Internet adoption are far more complex. While cost remains a significant barrier for residential access, the results point to a combination of socio-economic and human capital factors that constrain Internet demand. Given that about half of the population remains unconnected, the current deceleration in the pace of growth of the online population represents a major policy challenge for the region.

At its most basic, the Internet is a general-purpose technology that allows individuals and firms to share information in a vastly more efficient manner. As such, adoption is contingent on the acquisition of new skills and the availability of complementary products and services that make the underlying technology valuable. To date, public policies in Latin America have favoured supply-side initiatives, seeking policy reforms that promote competition and extend infrastructure coverage. The findings presented in this study confirm that cost and availability continue to be important barriers for adoption; and yet they further suggest that targeted programs that also address motivational and skill-related factors will be necessary, and possibly more effective from a cost-benefit perspective.

Overall, the results suggest an opportunity to complement infrastructure-deployment initiatives and regulatory reforms with targeted programs aimed at addressing connectivity barriers related to demand factors. Among the proposed programs are incentives for the creation of online content and services in indigenous languages, K–12 school connectivity initiatives, and a residential connectivity subsidy for low-income families linked to investments in human capital by recipients. Such programs can be expected to promote the acquisition of ICT skills and have significant spillover effects to those who remain unconnected.

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Appendix A: Data Sources

Country	Survey	Source	Sample size	Year
Bolivia	Encuesta de Hogares (EH)	Instituto Nacional de Estadística (INE)	36,618	2014
Brazil	Pesquisa Nacional por Amostra de Domicílio (PNAD)	Instituto Brasileiro de Geografia e Estatística (IBGE)	362,623	2014
Colombia	Encuesta Nacional de Calidad de Vida (ENCV)	Departamento Administrativo Nacional de Estadística (DANE)	76,026	2015
Ecuador	Encuesta Nacional de Empleo, Desempleo y Subempleo (ENEMDU)	Instituto Nacional de Estadificas y Censos (INEC)	112,821	2015
Mexico	Modulo Tecnología de Información en Hogares (MODUTIH)	Instituto Nacional de Estadística y Geografía (INEGI)	82,477	2014
Paraguay	Encuesta Permanente de Hogares (EPH)	Dirección General de Estadística, Encuestas y Censos (DGEEC)	20,272	2014
Peru	Encuesta Residencial de Servicios de Telecomunicaciones (ERESTEL)	Organismo Supervisor de Inversión Privada en Telecomunicaciones (OSIPTEL)	53,203	2014
Uruguay	Encuesta Continua de Hogares (ECH)	Instituto Nacional de Estadística (INE)	131,857	2014

Appendix B: Probability Models
Table 1: Likelihood of Having Residential Access (Yes=1)

	BOL	BRA	COL	ECU	MEX	PER	PRY	URY
Age	0.001	0.000	-0.000	0.001	0.002	-0.001	0.000	0.001
	(0.000)**	(0.000)***	(0.000)	(0.000)***	(0.000)***	(0.000)***	(0.000)	(0.000)***
Gender (1=male)	-0.024	0.009	0.012	-0.000	-0.000	-0.034	-0.004	0.028
	(0.008)***	(0.001)***	(0.005)**	(0.004)	(0.005)	(0.008)***	(0.008)	(0.003)***
Primary complete	-0.004	0.012	0.014	0.010	0.024	0.009	0.008	0.009
	(0.007)	(0.003)***	(0.006)**	(0.004)***	(0.006)***	(0.009)	(0.010)	(0.005)*
Secondary incomplete	-0.003	0.007	0.038	0.032	0.067	-0.000	-0.009	0.084
	(0.010)	(0.004)**	(0.007)***	(0.006)***	(0.006)***	(0.010)	(0.011)	(0.005)***
Secondary complete	0.025	0.036	0.065	0.072	0.091	0.037	-0.004	0.131
	(0.009)***	(0.002)***	(0.008)***	(0.006)***	(0.008)***	(0.009)***	(0.016)	(0.007)***
Tertiary incomplete	0.115	0.072	0.114	0.117	0.107	0.092	0.024	0.146
	(0.016)***	(0.004)***	(0.014)***	(0.010)***	(0.015)***	(0.015)***	(0.019)	(0.007)***
Tertiary complete	0.163	0.090	0.122	0.151	0.145	0.108	0.145	0.123
	(0.016)***	(0.003)***	(0.010)***	(0.008)***	(0.008)***	(0.012)***	(0.019)***	(0.007)***
Household income p/c (log)	0.019	0.029	0.049	0.030	0.036	0.061	0.031	0.132
	(0.004)***	(0.001)***	(0.003)***	(0.002)***	(0.003)***	(0.004)***	(0.005)***	(0.003)***
Household size	0.013	0.005	0.014	0.008	0.009	0.024	0.002	0.008
	(0.002)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.002)***	(0.002)	(0.002)***
Location (1=urban)	0.053	0.030	0.084	0.043	0.057	0.047	-0.005	-0.017
	(0.006)***	(0.002)***	(0.005)***	(0.004)***	(0.004)***	(0.007)***	(0.008)	(0.008)**
Inactive (1=yes)	-0.018	-0.009	0.029	-0.010	0.024	n/a	0.012	0.007
	(0.031)	(0.005)*	(0.015)*	(0.016)	(0.018)	n/a	(0.024)	(0.012)
Employed (1=yes)	-0.017	-0.013	0.006	-0.007	0.000	-0.014	0.010	0.037
	(0.029)	(0.005)***	(0.014)	(0.015)	(0.017)	(0.010)	(0.023)	(0.012)***
PC or tablet in household (1=yes)	0.225	0.806	0.548	0.640	0.656	0.511	0.689	0.735
	(0.011)***	(0.002)***	(0.007)***	(0.006)***	(0.005)***	(0.009)***	(0.015)***	(0.004)***
Language (1= not Spanish)	-0.036	n/a	n/a	-0.002	n/a	-0.038	-0.005	n/a
	(0.006)***	n/a	n/a	(0.004)	n/a	(0.008)***	(0.008)	n/a
Children (1=yes)	-0.012	0.012	-0.000	0.025	-0.000	-0.013	0.008	-0.083
	(0.009)	(0.002)***	(0.006)	(0.005)***	(0.005)	(0.008)	(0.009)	(0.004)***
Constant	-0.152	-0.230	-0.298	-0.288	-0.293	-0.276	-0.187	-0.910
	(0.038)***	(0.007)***	(0.020)***	(0.020)***	(0.023)***	(0.029)***	(0.034)***	(0.023)***
Observations	9,753	121,241	22,879	29,653	26,911	14,401	4,438	48,461
R-squared	0.214	0.770	0.504	0.615	0.560	0.411	0.692	0.606
Mean	0.160	0.410	0.308	0.302	0.397	0.322	0.229	0.563

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2a: Likelihood of Using Internet (Yes=1)

	BOL	BRA	COL	ECU	MEX	PER	PRY	URY
Age	-0.006	-0.012	-0.010	-0.009	-0.011	-0.007	-0.007	-0.011
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Gender (1=male)	0.036	-0.006	0.029	0.026	0.047	0.025	0.005	-0.016
	(0.004)***	(0.001)***	(0.003)***	(0.003)***	(0.003)***	(0.004)***	(0.006)	(0.002)***
Primary complete	0.087	0.129	-0.004	0.015	-0.073	0.199	0.056	0.044
	(0.006)***	(0.003)***	(0.004)	(0.003)***	(0.004)***	(0.006)***	(0.011)***	(0.004)***
Secondary incomplete	0.302	0.250	0.242	0.351	0.168	0.438	0.218	0.287
	(0.007)***	(0.003)***	(0.005)***	(0.004)***	(0.004)***	(0.005)***	(0.009)***	(0.004)***
Secondary complete	0.256	0.327	0.316	0.374	0.315	0.386	0.366	0.431
	(0.007)***	(0.002)***	(0.006)***	(0.005)***	(0.006)***	(0.005)***	(0.013)***	(0.005)***
Tertiary incomplete	0.604	0.389	0.508	0.561	0.471	0.704	0.458	0.453
	(0.008)***	(0.002)***	(0.006)***	(0.005)***	(0.005)***	(0.006)***	(0.012)***	(0.005)***
Tertiary complete	0.689	0.446	0.575	0.634	0.580	0.729	0.510	0.506
	(0.008)***	(0.002)***	(0.006)***	(0.005)***	(0.005)***	(0.007)***	(0.013)***	(0.005)***
Household income p/c (log)	0.033	0.110	0.063	0.074	0.074	0.066	0.103	0.157
	(0.002)***	(0.001)***	(0.002)***	(0.002)***	(0.002)***	(0.003)***	(0.004)***	(0.002)***
Location (1=urban)	0.159	0.197	0.098	0.085	0.097	0.061	0.067	0.053
	(0.005)***	(0.002)***	(0.003)***	(0.003)***	(0.003)***	(0.004)***	(0.008)***	(0.005)***
Inactive (1=yes)	0.010	-0.060	0.025	-0.032	0.032	n/a	-0.077	-0.025
	(0.014)	(0.004)***	(0.009)***	(0.009)***	(0.009)***	n/a	(0.017)***	(0.006)***
Employed (1=yes)	-0.037	-0.065	-0.039	-0.064	-0.058	-0.026	-0.042	-0.001
	(0.014)***	(0.003)***	(0.009)***	(0.009)***	(0.009)***	(0.004)***	(0.017)**	(0.006)
Language (1=not Spanish)	-0.079	n/a	n/a	-0.037	n/a	-0.001	-0.132	n/a
	(0.005)***	n/a	n/a	(0.004)***	n/a	(0.006)	(0.008)***	n/a
Constant	-0.021	0.114	0.232	0.101	0.291	-0.105	-0.177	-0.224
	(0.017)	(0.005)***	(0.012)***	(0.011)***	(0.012)***	(0.013)***	(0.025)***	(0.014)***
Observations	32,261	304,962	60,600	95,612	82,477	47,225	15,276	106,023
R-squared	0.407	0.469	0.501	0.426	0.449	0.399	0.428	0.455
Mean	0.384	0.560	0.475	0.485	0.508	0.394	0.439	0.571

Note: Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 2b: Likelihood of Using Internet (Yes=1) Among Adults (18 and Over)

	BOL	BRA	COL	ECU	MEX	PER	PRY	URY
Age	-0.008	-0.009	-0.007	-0.008	-0.007	-0.010	-0.009	-0.009
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Gender (1=male)	0.049	-0.008	0.009	0.025	0.014	0.048	0.017	-0.021
	(0.005)***	(0.001)***	(0.003)***	(0.003)***	(0.003)***	(0.004)***	(0.007)**	(0.002)***
Primary complete	-0.039	0.171	0.015	-0.024	-0.011	-0.048	-0.046	0.039
	(0.004)***	(0.003)***	(0.004)***	(0.003)***	(0.003)***	(0.005)***	(0.012)***	(0.004)***
Secondary incomplete	-0.020	0.280	0.159	0.164	0.188	-0.030	0.091	0.264
	(0.008)**	(0.004)***	(0.006)***	(0.006)***	(0.004)***	(0.007)***	(0.012)***	(0.004)***
Secondary complete	0.130	0.384	0.358	0.331	0.418	0.104	0.264	0.423
	(0.007)***	(0.002)***	(0.006)***	(0.005)***	(0.006)***	(0.006)***	(0.015)***	(0.005)***
Tertiary incomplete	0.505	0.467	0.595	0.536	0.643	0.411	0.364	0.462
	(0.009)***	(0.003)***	(0.007)***	(0.006)***	(0.006)***	(0.009)***	(0.015)***	(0.005)***
Tertiary complete	0.602	0.495	0.606	0.589	0.660	0.463	0.443	0.485
	(0.009)***	(0.003)***	(0.006)***	(0.006)***	(0.005)***	(0.008)***	(0.015)***	(0.005)***
Household income p/c (log)	0.028	0.107	0.064	0.075	0.071	0.084	0.096	0.176
	(0.003)***	(0.001)***	(0.002)***	(0.002)***	(0.002)***	(0.003)***	(0.005)***	(0.002)***
Location (1=urban)	0.087	0.171	0.091	0.089	0.084	0.082	0.049	0.054
	(0.006)***	(0.002)***	(0.004)***	(0.003)***	(0.003)***	(0.005)***	(0.009)***	(0.006)***
Inactive (1=yes)	0.008	-0.109	-0.059	-0.084	-0.095	n/a	-0.049	-0.081
	(0.014)	(0.004)***	(0.009)***	(0.009)***	(0.010)***	n/a	(0.019)***	(0.007)***
Employed (1=yes)	-0.024	-0.067	-0.047	-0.074	-0.073	-0.017	-0.032	-0.016
	(0.014)*	(0.004)***	(0.009)***	(0.009)***	(0.010)***	(0.005)***	(0.018)*	(0.007)**
Language (1=not Spanish)	-0.074	n/a	n/a	-0.028	n/a	-0.034	-0.124	n/a
	(0.005)***	n/a	n/a	(0.004)***	n/a	(0.006)***	(0.009)***	n/a
Children (1=yes)	-0.031	0.056	0.025	0.022	0.010	-0.007	0.029	0.059
	(0.005)***	(0.002)***	(0.003)***	(0.003)***	(0.003)***	(0.004)	(0.007)***	(0.003)***
Constant	0.310	-0.010	0.104	0.154	0.102	0.127	0.146	-0.402
	(0.020)***	(0.006)	(0.013)***	(0.013)***	(0.014)***	(0.017)***	(0.033)***	(0.016)***
Observations	21,734	251,463	50,529	66,003	67,252	34,663	11,354	95,441
R-squared	0.508	0.499	0.508	0.503	0.460	0.430	0.483	0.449
Mean	0.360	0.516	0.405	0.425	0.431	0.382	0.438	0.536

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Likelihood of Having Mobile Phone (Yes=1)

	BOL	BRA	COL	ECU	MEX	PER	PRY	URY
Age	0.003	-0.003	0.001	0.002	-0.001	-0.002	-0.002	-0.004
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Gender (1=male)	-0.022	-0.038	-0.063	-0.006	-0.029	-0.018	0.003	-0.045
	(0.004)***	(0.001)***	(0.003)***	(0.003)**	(0.007)***	(0.004)***	(0.008)	(0.002)***
Primary complete	0.169	0.153	0.138	0.309	0.041	0.124	0.042	0.143
	(0.009)***	(0.003)***	(0.006)***	(0.005)***	(0.010)***	(0.009)***	(0.012)***	(0.006)***
Secondary incomplete	0.369	0.184	0.088	0.275	0.069	0.127	0.050	0.214
	(0.007)***	(0.002)***	(0.006)***	(0.004)***	(0.010)***	(0.009)***	(0.010)***	(0.005)***
Secondary complete	0.436	0.193	0.226	0.474	0.111	0.294	0.054	0.241
	(0.007)***	(0.002)***	(0.005)***	(0.004)***	(0.012)***	(0.008)***	(0.011)***	(0.006)***
Tertiary incomplete	0.513	0.192	0.267	0.586	0.102	0.411	0.055	0.247
	(0.006)***	(0.002)***	(0.007)***	(0.005)***	(0.020)***	(0.009)***	(0.011)***	(0.006)***
Tertiary complete	0.426	0.167	0.230	0.495	0.084	0.384	0.056	0.234
	(0.007)***	(0.002)***	(0.005)***	(0.005)***	(0.012)***	(0.008)***	(0.011)***	(0.006)***
Household income p/c (log)	0.036	0.060	0.044	0.057	0.060	0.047	0.013	0.067
	(0.003)***	(0.001)***	(0.002)***	(0.002)***	(0.004)***	(0.003)***	(0.004)***	(0.002)***
Location (1=urban)	0.179	0.217	0.021	0.081	-0.068	0.030	0.038	-0.049
	(0.006)***	(0.002)***	(0.004)***	(0.003)***	(0.006)***	(0.005)***	(0.009)***	(0.005)***
Inactive (1=yes)	-0.070	-0.149	-0.152	-0.193	-0.048		-0.022	-0.096
	(0.015)***	(0.003)***	(0.008)***	(0.010)***	(0.027)*		(0.023)	(0.006)***
Employed (1=yes)	0.119	0.003	0.031	0.029	-0.043	0.215	-0.001	0.089
	(0.015)***	(0.003)	(0.008)***	(0.010)***	(0.025)*	(0.005)***	(0.021)	(0.005)***
Constant	-0.041	0.337	0.449	-0.067	0.226	0.138	0.898	0.464
	(0.019)**	(0.005)***	(0.012)***	(0.012)***	(0.033)***	(0.016)***	(0.032)***	(0.013)***
Observations	32,258	304,962	60,600	95,612	26,916	41,447	4,438	106,023
R-squared	0.379	0.226	0.157	0.371	0.024	0.205	0.065	0.229
Mean	0.674	0.786	0.789	0.549	0.440	0.698	0.944	0.829

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Likelihood of Using Mobile Internet (Yes=1)

	COL	ECU	MEX	PER	PRY
Age	-0.006	-0.002	-0.003	-0.004	-0.006
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Gender (1=male)	-0.013	0.004	-0.002	0.021	-0.008
	(0.003)***	(0.002)**	(0.002)	(0.003)***	(0.007)
Primary complete	-0.019	0.042	-0.021	-0.035	0.075
	(0.003)***	(0.002)***	(0.002)***	(0.004)***	(0.011)***
Secondary incomplete	0.050	0.102	0.011	-0.046	0.223
	(0.004)***	(0.002)***	(0.002)***	(0.004)***	(0.009)***
Secondary complete	0.155	0.201	0.048	-0.014	0.391
	(0.005)***	(0.004)***	(0.004)***	(0.004)***	(0.013)***
Tertiary incomplete	0.289	0.389	0.109	0.106	0.446
	(0.008)***	(0.006)***	(0.007)***	(0.007)***	(0.013)***
Tertiary complete	0.303	0.373	0.092	0.092	0.425
	(0.007)***	(0.006)***	(0.005)***	(0.006)***	(0.015)***
Household income p/c (log)	0.052	0.045	0.034	0.031	0.074
	(0.002)***	(0.001)***	(0.001)***	(0.002)***	(0.004)***
Location (1=urban)	0.048	0.035	0.025	0.005	0.102
	(0.003)***	(0.002)***	(0.002)***	(0.003)	(0.007)***
Inactive (1=yes)	-0.053	-0.080	-0.047		-0.094
	(0.009)***	(0.010)***	(0.009)***		(0.018)***
Employed (1=yes)	-0.020	-0.015	-0.017	0.028	-0.042
	(0.009)**	(0.010)	(0.009)*	(0.003)***	(0.018)**
Household access	0.233	0.120	0.135	0.282	0.074
	(0.004)***	(0.003)***	(0.003)***	(0.004)***	(0.009)***
Constant	0.087	-0.124	0.017	0.013	-0.029
	(0.012)***	(0.012)***	(0.011)	(0.010)	(0.026)
Observations	60,581	97,519	82,539	41,447	15,279
R-squared	0.353	0.274	0.136	0.270	0.343
Mean	0.296	0.173	0.133	0.158	0.388

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Likelihood of Citing Barrier for Residential Adoption — Colombia (2015)

	Cost	Interest	Skills	Availability	Other
Age	-0.003	0.003	0.002	-0.001	-0.001
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Gender (1=male)	-0.053	0.031	0.010	0.007	0.001
	(0.009)***	(0.008)***	(0.004)**	(0.003)**	(0.006)
Primary complete	0.014	0.003	-0.023	0.002	0.004
	(0.011)	(0.010)	(0.006)***	(0.005)	(0.007)
Secondary incomplete	0.003	0.001	-0.032	0.001	0.024
	(0.012)	(0.011)	(0.006)***	(0.005)	(0.008)***
Secondary complete	-0.030	0.023	-0.045	0.006	0.039
	(0.013)**	(0.012)**	(0.005)***	(0.006)	(0.009)***
Tertiary incomplete	-0.044	0.027	-0.050	0.021	0.039
	(0.027)	(0.025)	(0.007)***	(0.014)	(0.020)**
Tertiary complete	-0.091	0.046	-0.051	0.021	0.051
	(0.018)***	(0.017)***	(0.007)***	(0.009)**	(0.013)***
Household income p/c (log)	-0.047	0.035	-0.010	0.012	0.008
	(0.005)***	(0.004)***	(0.003)***	(0.002)***	(0.003)***
Household size	0.032	-0.021	-0.017	0.003	0.004
	(0.003)***	(0.002)***	(0.001)***	(0.001)**	(0.002)**
Location (1=urban)	0.059	-0.009	-0.010	-0.077	0.028
	(0.008)***	(0.008)	(0.004)**	(0.004)***	(0.005)***
Inactive (1=yes)	-0.085	0.064	0.004	-0.002	0.022
	(0.025)***	(0.021)***	(0.011)	(0.010)	(0.017)
Employed (1=yes)	-0.051	0.026	0.008	-0.003	0.023
	(0.024)**	(0.020)	(0.010)	(0.010)	(0.016)
PC or tablet in household (1=yes)	0.009	-0.068	-0.018	0.083	-0.039
	(0.012)	(0.010)***	(0.003)***	(0.007)***	(0.008)***
Children (1=yes)	0.151	-0.144	-0.040	0.013	0.023
	(0.010)***	(0.009)***	(0.004)***	(0.005)***	(0.007)***
Constant	0.718	0.080	0.110	0.026	0.061
	(0.035)***	(0.032)**	(0.017)***	(0.014)*	(0.024)***
Observations	15,835	15,835	15,835	15,835	15,835
R-squared	0.111	0.094	0.076	0.057	0.017
Mean	0.440	0.316	0.0662	0.0476	0.110

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Likelihood of citing barrier for residential adoption — Ecuador (2015)

	Cost	Interest	Skills	Availability	Other
Age	-0.005	0.003	0.002	-0.000	-0.000
	(0.000)***	(0.000)***	(0.000)***	(0.000)	(0.000)***
Gender (1=male)	-0.078	0.026	0.030	0.020	0.002
	(0.007)***	(0.006)***	(0.005)***	(0.003)***	(0.002)
Primary complete	0.032	0.006	-0.050	0.016	-0.003
	(0.008)***	(0.007)	(0.007)***	(0.004)***	(0.002)
Secondary incomplete	0.027	0.009	-0.055	0.024	-0.005
	(0.011)**	(0.009)	(0.008)***	(0.006)***	(0.003)*
Secondary complete	-0.003	0.038	-0.086	0.045	0.007
	(0.011)	(0.009)***	(0.007)***	(0.006)***	(0.004)*
Tertiary incomplete	-0.003	0.043	-0.107	0.044	0.023
	(0.020)	(0.017)**	(0.010)***	(0.011)***	(0.009)***
Tertiary complete	-0.084	0.092	-0.102	0.074	0.020
	(0.018)***	(0.016)***	(0.010)***	(0.012)***	(0.008)**
Household income p/c (log)	-0.041	0.026	-0.007	0.013	0.009
	(0.004)***	(0.003)***	(0.003)**	(0.002)***	(0.001)***
Household size	0.037	-0.022	-0.022	0.007	0.001
	(0.002)***	(0.001)***	(0.001)***	(0.001)***	(0.001)
Location (1=urban)	0.111	-0.007	-0.014	-0.089	-0.000
	(0.007)***	(0.006)	(0.005)***	(0.004)***	(0.002)
Inactive (1=yes)	-0.120	0.075	0.024	0.026	-0.005
	(0.023)***	(0.019)***	(0.014)*	(0.008)***	(0.008)
Employed (1=yes)	-0.082	0.033	0.018	0.031	0.001
	(0.021)***	(0.017)*	(0.012)	(0.007)***	(0.008)
PC or tablet in Household (1=yes)	-0.042	-0.018	-0.037	0.073	0.024
	(0.010)***	(0.008)**	(0.004)***	(0.007)***	(0.004)***
Language (1=not Spanish)	-0.108	0.052	0.020	0.028	0.007
	(0.010)***	(0.008)***	(0.007)***	(0.006)***	(0.003)**
Children (1=yes)	0.179	-0.121	-0.064	0.008	-0.003
	(0.009)***	(0.007)***	(0.005)***	(0.005)*	(0.003)
Constant	0.943	-0.021	0.162	-0.061	-0.022
	(0.032)***	(0.027)	(0.021)***	(0.016)***	(0.011)**
Observations	20,691	20,691	20,691	20,691	20,691
R-squared	0.211	0.125	0.113	0.061	0.015
Mean	0.600	0.195	0.118	0.0662	0.0208

Note: Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Likelihood of Citing Barrier for Residential Adoption — Mexico (2014)

	Cost	Interest	Skills	Others
Age	-0.002	0.000	0.002	-0.000
	(0.000)***	(0.000)	(0.000)***	(0.000)***
Gender (1=male)	-0.070	0.041	0.024	0.004
	(0.009)***	(0.008)***	(0.005)***	(0.003)
Primary complete	0.045	-0.011	-0.041	0.003
	(0.010)***	(0.009)	(0.007)***	(0.003)
Secondary incomplete	0.042	-0.000	-0.060	0.003
	(0.010)***	(0.009)	(0.007)***	(0.003)
Secondary complete	0.008	0.038	-0.093	0.013
	(0.015)	(0.013)***	(0.008)***	(0.005)**
Tertiary incomplete	0.024	0.025	-0.105	0.025
	(0.032)	(0.029)	(0.011)***	(0.015)*
Tertiary complete	-0.076	0.119	-0.112	0.033
	(0.019)***	(0.018)***	(0.008)***	(0.009)***
Household income p/c (log)	-0.044	0.043	-0.010	0.003
	(0.005)***	(0.004)***	(0.003)***	(0.002)*
Household size	0.034	-0.015	-0.022	-0.000
	(0.002)***	(0.002)***	(0.001)***	(0.001)
Location (1=urban)	0.021	0.005	-0.021	-0.022
	(0.007)***	(0.007)	(0.005)***	(0.003)***
Inactive (1=yes)	-0.090	0.091	-0.001	0.009
	(0.028)***	(0.023)***	(0.015)	(0.009)
Employed (1=yes)	-0.099	0.076	0.026	0.006
	(0.026)***	(0.021)***	(0.014)*	(0.008)
PC or tablet in Household (1=yes)	-0.098	-0.084	-0.053	0.090
	(0.011)***	(0.008)***	(0.003)***	(0.006)***
Children (1=yes)	0.226	-0.173	-0.061	0.006
	(0.009)***	(0.008)***	(0.004)***	(0.003)*
Constant	0.808	0.053	0.201	0.004
	(0.040)***	(0.034)	(0.024)***	(0.013)
Observations	16,231	16,231	16,231	16,231
R-squared	0.152	0.099	0.094	0.057
Mean	0.613	0.235	0.0885	0.0248

Note: Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Likelihood of Citing Barrier for Residential Adoption — Peru (2014)

	Cost	Interest	Skills	Availability	Other
Age	-0.001	0.005	0.000	-0.001	-0.002
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Gender (1=male)	-0.033	0.018	-0.003	0.012	-0.010
	(0.011)***	(0.012)	(0.003)	(0.006)**	(0.009)
Primary complete	0.006	-0.038	-0.005	0.009	0.004
	(0.014)	(0.016)**	(0.003)	(0.009)	(0.011)
Secondary incomplete	0.007	-0.017	-0.007	-0.006	0.015
	(0.016)	(0.017)	(0.003)**	(0.010)	(0.013)
Secondary complete	-0.010	-0.043	-0.005	-0.015	0.026
	(0.014)	(0.015)***	(0.003)	(0.008)*	(0.011)**
Tertiary incomplete	-0.013	-0.066	-0.010	0.002	0.032
	(0.022)	(0.024)***	(0.003)***	(0.013)	(0.019)*
Tertiary complete	-0.037	-0.056	-0.007	-0.020	0.036
	(0.018)**	(0.020)***	(0.004)*	(0.009)**	(0.015)**
Household income p/c (log)	-0.025	-0.020	0.001	0.004	0.018
	(0.006)***	(0.007)***	(0.001)	(0.004)	(0.005)***
Household size	0.017	-0.038	-0.002	0.006	0.009
	(0.003)***	(0.004)***	(0.001)***	(0.002)***	(0.003)***
Location (1=urban)	0.084	0.034	-0.003	-0.154	0.044
	(0.010)***	(0.011)***	(0.002)	(0.007)***	(0.008)***
Employed (1=yes)	0.012	-0.018	0.004	-0.008	-0.002
	(0.014)	(0.016)	(0.004)	(0.007)	(0.011)
PC or tablet in household (1=yes)	0.036	-0.104	-0.004	-0.011	-0.102
	(0.013)***	(0.013)***	(0.001)***	(0.006)*	(0.009)***
Language (1=not Spanish)	-0.043	0.012	0.001	-0.011	-0.020
	(0.012)***	(0.013)	(0.003)	(0.008)	(0.009)**
Children (1=yes)	0.055	-0.125	0.000	0.007	0.000
	(0.011)***	(0.012)***	(0.002)	(0.007)	(0.009)
Constant	0.301	0.469	0.001	0.206	0.091
	(0.041)***	(0.047)***	(0.009)	(0.026)***	(0.035)**
Observations	9,769	9,769	9,769	9,769	9,769
R-squared	0.034	0.112	0.010	0.095	0.023
Mean	0.240	0.395	0.00727	0.0712	0.150

Note: Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Likelihood of Citing Barrier for Individual Adoption — Mexico (2014)

	Interest	Skills	Availability	Others
Age	-0.001	0.004	-0.003	-0.000
	(0.000)***	(0.000)***	(0.000)***	(0.000)**
Gender (1=male)	0.012	-0.024	0.012	0.000
	(0.005)**	(0.005)***	(0.003)***	(0.001)
Primary complete	0.033	-0.018	-0.015	-0.000
	(0.007)***	(0.007)***	(0.003)***	(0.001)
Secondary incomplete	0.088	-0.113	0.023	0.002
	(0.007)***	(0.007)***	(0.003)***	(0.001)**
Secondary complete	0.190	-0.248	0.054	0.004
	(0.010)***	(0.010)***	(0.006)***	(0.002)**
Tertiary incomplete	0.247	-0.348	0.101	-0.004
	(0.030)***	(0.026)***	(0.022)***	(0.001)***
Tertiary complete	0.236	-0.340	0.090	0.014
	(0.018)***	(0.016)***	(0.012)***	(0.005)***
Household income p/c (log)	0.013	-0.015	0.002	0.000
	(0.003)***	(0.003)***	(0.002)	(0.000)
Location (1=urban)	0.007	-0.003	-0.008	0.003
	(0.005)	(0.005)	(0.003)***	(0.001)***
Inactive (1=yes)	0.008	-0.015	0.009	-0.001
	(0.019)	(0.019)	(0.012)	(0.003)
Employed (1=yes)	0.010	0.007	-0.012	-0.003
	(0.019)	(0.019)	(0.012)	(0.003)
Constant	0.288	0.523	0.184	0.003
	(0.024)***	(0.024)***	(0.014)***	(0.004)
Observations	40,556	40,556	40,556	40,556
R-squared	0.021	0.061	0.055	0.002
Mean	0.386	0.537	0.0727	0.00434

Note: Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Likelihood of Citing Barrier for Individual Adoption — Peru (2014)

	Cost	Interest	Skills	Availability	Other
Age	-0.000	0.004	0.007	-0.001	0.000
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)
Gender (1=male)	0.001	-0.036	-0.062	0.004	-0.001
	(0.002)	(0.005)***	(0.005)***	(0.003)	(0.001)
Primary complete	0.016	0.067	0.128	0.060	-0.001
	(0.003)***	(0.008)***	(0.009)***	(0.005)***	(0.002)
Secondary incomplete	0.025	0.134	0.146	0.095	-0.002
	(0.003)***	(0.008)***	(0.009)***	(0.005)***	(0.001)
Secondary complete	0.028	0.206	0.045	0.069	0.006
	(0.003)***	(0.008)***	(0.008)***	(0.004)***	(0.002)***
Tertiary incomplete	0.026	0.287	-0.025	0.068	0.014
	(0.006)***	(0.017)***	(0.016)	(0.007)***	(0.005)***
Tertiary complete	0.032	0.325	-0.114	0.075	0.002
	(0.005)***	(0.014)***	(0.013)***	(0.006)***	(0.003)
Household income p/c (log)	-0.003	0.004	-0.032	-0.011	0.003
	(0.001)***	(0.004)	(0.004)***	(0.002)***	(0.001)***
Location (1=urban)	0.004	0.097	-0.036	-0.130	-0.002
	(0.002)**	(0.006)***	(0.006)***	(0.004)***	(0.001)
Employed (1=yes)	0.004	0.050	0.110	0.001	0.003
	(0.002)*	(0.007)***	(0.007)***	(0.003)	(0.001)**
Language (1=not Spanish)	-0.010	0.057	-0.063	0.034	0.010
	(0.002)***	(0.008)***	(0.009)***	(0.006)***	(0.002)***
Constant	0.030	-0.037	0.247	0.184	-0.010
	(0.006)***	(0.017)**	(0.019)***	(0.010)***	(0.003)***
Observations	28,603	28,603	28,603	28,603	28,603
R-squared	0.009	0.138	0.162	0.101	0.005
Mean	0.0216	0.312	0.398	0.0584	0.00755

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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CIGI MASTHEAD

Communications

For media enquiries, please contact communications@cigionline.org.

CIGI

67 Erb Street West
Waterloo, Ontario N2L 6C2
tel +1 519 885 2444 fax +1 519 885 5450
www.cigionline.org

CHATHAM HOUSE
The Royal Institute of International Affairs

10 St James's Square
London, England SW1Y 4LE, United Kingdom
tel +44 (0)20 7957 5700 fax +44 (0)20 7957 5710
www.chathamhouse.org