Financial Inclusion in Latin America: Facts and Obstacles

Liliana Rojas-Suarez

Abstract

This paper shows that, in spite of recent progress in the usage of alternative financial services by adult populations, Latin America's financial inclusion gaps relative to either high-income countries or the region's comparators (countries with a similar degree of development) have not reduced generally and, in some cases, have even increased during the period 2011-2014. An econometric investigation of potential country-level obstacles explaining these gaps finds that institutional weaknesses play the most salient role through direct and indirect effects. Lack of enforcement of the rule of law directly reduces depositors' incentives to entrust their funds to formal financial institutions. Indirectly, low institutional quality reinforces the adverse effects of insufficient bank competition on financial inclusion.

JEL Codes: D14, G21, G28

Keywords: financial inclusion, Latin America, financial regulation, institutional quality

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Financial Inclusion in Latin America:
Facts, Obstacles, and Central Banks' Policy Issues

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I. Introduction

Improvements in the usage of formal financial services are widely recognized by policymakers and academics as supportive to development.[1] In addition to facilitating payments in a timely and efficient manner—a central component of modern societies, financial inclusion allows individuals and firms to move away from short-term decision making toward an inter-temporal allocation of resources. This encourages savings and removes the straitjacket of self-finance, thus improving incentives for productive investments (including investment in human capital through education). Moreover, when properly designed, financial services and products can help the poor to manage and insure themselves against a multiplicity of risks (ranging widely from health problems to natural disasters affecting crops, property or other sources of income and wealth). In a nutshell, financial inclusion can have substantial effects on welfare and can contribute to the reduction of poverty.

Not surprisingly, financial inclusion has become a key development focus for the G-20 summits since 2010 and efforts to improve financial inclusion around the world have been significant, including in Latin America. However, in spite of progress, the region lags behind significantly not only with respect to high-income countries, but also with respect to countries that can be called *comparators,* in the sense of having a similar degree of development as Latin America. For example, based on World Bank data for 2014, the median value of financial inclusion in Latin America, measured as the percentage of the adult population that owns an account in a formal financial institution, was 40.8 percent. In contrast, the corresponding median for the region's comparators reached 60.3 percent and that for high-income countries was 97 percent. The overall picture is more worrisome when looking at country-level data: only in three Latin American countries (Brazil, Chile and Costa Rica) more than half of the adult population have account ownership and in some countries (Honduras, Peru and Nicaragua) less than one-third of the adult population is served. Data for usage of accounts for making payments, savings and borrowing also reveals substantial gaps between Latin American countries and their comparators.

This paper builds on previous research and new databases to understand two fundamental questions related to financial inclusion in the region: (a) where does Latin America stand in terms of financial inclusion, defined as the usage of formal financial services? and (b) what factors explain the significant financial inclusion gaps between Latin American countries and other country groupings?

Data for the analysis is largely based on measures of *usage* of financial services, using a major World Bank project, named the *Global Findex Database* that started in 2011 with a follow-up in 2014. Data are based on worldwide surveys undertaken at the individual level, and

[1] See, for example GPFI (2014), Allen et al. (2012), Beck et al. (2008) and Dabla-Norris et al. (2015)

designed to allow cross-country and time-series comparisons.[2, 3] The analytical framework in the paper is taken from Rojas-Suarez and Amado (2014), who undertook an econometric analysis to assess the relative importance of country-level obstacles in explaining differences in financial inclusion between Latin America and their comparators in 2011. This paper updates the econometric analysis with 2014 data and undertakes additional calculations to assess the relative importance of obstacles in explaining the region's financial inclusion gaps not only with respect to its comparators but also with respect to high-income countries.

The rest of this paper is organized as follows: Section II uses data from Global Findex database to characterize changes in financial inclusion in Latin America between 2011 and 2014. Based on alternative indicators of financial inclusion, the section addresses whether the region has improved financial inclusion gaps with respect to high income countries and Latin America's comparators. After identifying important obstacles to financial inclusion, Section III presents an econometric analysis in order to help explain Latin America's financial inclusion gaps; some important policy implications are derived from this analysis. Finally, Section IV concludes the paper.

II. Latin America's Financial Inclusion: Where Does It Stand?

Based on the concept of *usage of financial services* to define financial inclusion, this section explores some characteristics of financial inclusion in Latin America across two dimensions: cross-country and (limited) intertemporal dimensions. Comparable data from Global Findex 2011 and 2014 databases are used for this purpose. Using data for 2011 only, Rojas-Suarez and Amado (2014) found that Latin American countries lagged behind significantly in terms of ownership and usage of accounts in formal financial institutions relative to both high income countries as well as the region's comparators, i.e., countries comparable to Latin America in terms of income per capita. With the new data available for 2014, this section explores the extent of progress achieved by the region in closing the financial inclusion gap.

For a straightforward intertemporal comparison, Charts 1a, 1b and 1c compare the 2011 versus the 2014 values of three indicators of financial inclusion taken from Global Findex: The first, and most commonly used indicator, provides a *stock* measure: the percentage of adults that have an account at a formal financial institution. The other two reflect *flows* measures of households' financial behavior: the percentage of adults that have saved at a financial institution over the past year and the percentage of adults that have borrowed from a financial institution over the past year. These three variables are chosen because of the

[2] See http://www.worldbank.org/en/programs/globalfindex for a full description of this survey. In the 2014 Global Findex, the survey included about 150,000 adults in over 140 countries. Analysis of the survey results are in Demirguc-Kunt et al. (2015)

[3] Other databases used throughout the paper include the *Financial Access Survey* by the International Monetary Fund (IMF), which compiles country-level indicators of financial access and usage with annual data starting in 2004 (http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C&ss=1412015057755) and the World Bank's *Enterprise Surveys,* which contain firm-level data that informs how access to credit affects enterprises of all sizes in emerging and developing countries (http://www.enterprisesurveys.org/)

availability of comparable data for 2011 and 2014.[4] The comparisons are undertaken for four country categories: *high income countries*, *Latin America*, *Latin America's comparators* (countries with similar degree of development as defined by income per capita) and *rest of the world*. Annex I lists countries in each category. While Latin America's *comparators* are mostly emerging market countries, the category *rest of the world* includes the poorest countries in the world.

To facilitate comparisons, a 45-degree line is included in the graphs. Countries placed to the left of the line are those whose value for the corresponding indicator has increased.

As shown in the charts, the indicators reveal progress for the world in general, and for Latin America in particular. Measurements of stocks (having an account) and flows (savings and borrowing) indicate that in 2014 a larger percentage of the Latin American adult population owned accounts, saved through those accounts and got loans through the formal financial sector than in 2011. Indeed, in Latin America the median value for account ownership at a formal financial institution increased by 15 percentage points from 2011 to 2014 (from 26.2 percent to 40.8 percent—see Table 1). The increase in the median value for the savings variable was much less impressive though: only 4 percentage points (from 10 to 14.3 percent).

With respect to the borrowing variable, the increase in the median value for Latin America is even smaller: less than 3 percentage points (from 10 to 12.7 percent). Assessment of this variable, however, requires some special consideration. For any given year, the desirability of observing an increase in the percentage of adults who borrowed depends on country-specific economic conditions, quality of financial institutions and borrowers' characteristics. In contrast to payments and savings, it is important to rule out that the increase in borrowing does not reflect a case of households' over-indebtedness, even if starting from a very low base of debt. In this regard, it is not surprising to observe in Chart 1c that in some high income countries, the percentage of households that borrowed in 2011 is larger than in 2014: in some European countries, households were deleveraging after the financial crisis that started precisely in 2011.[5]

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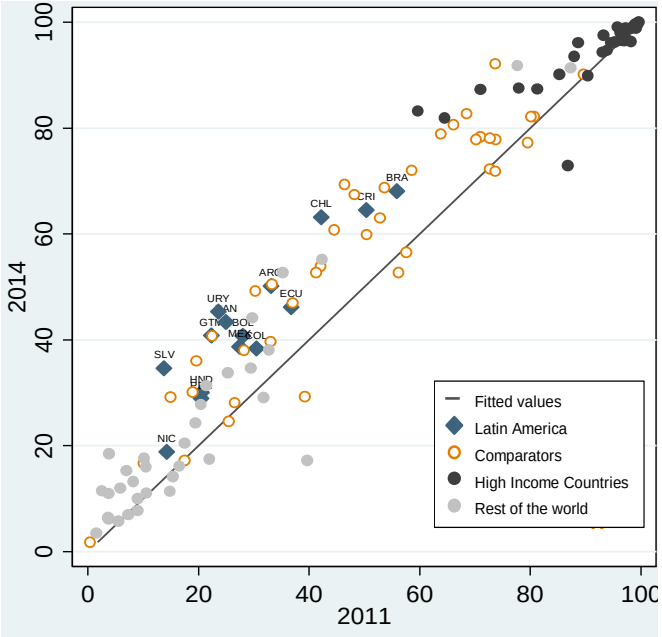
[4] Data for variables reflecting the usage of insurance products are available in the Global Findex database for 2011 but not for 2014. Likewise, there is data on the usage of accounts through formal financial institutions for the purpose of making or receiving payments (such as using an account to receive wages or to send remittances) for 2014, but not for 2011.

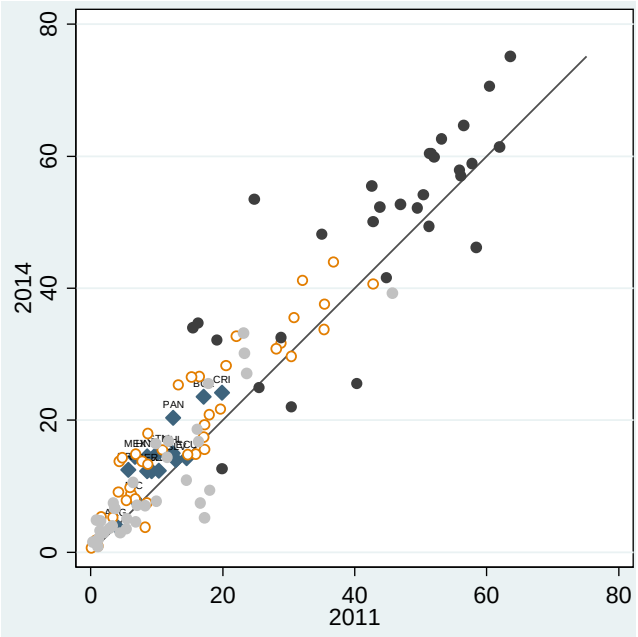
[5] Not surprisingly, Cyprus is the country placed closest to the lower right corner in Chart 1c. The significant slowdown in economic growth in 2014 relative to 2011 in a number of European countries also explain the lower percentage of adults in those countries who saved in 2014 (Ireland, Greece, Portugal and Cyprus are among the countries to the right of the 45 degrees line in Chart 1b).

Chart 1. Indicators of Financial Inclusion 2011 vs 2014 (percent of adult population)

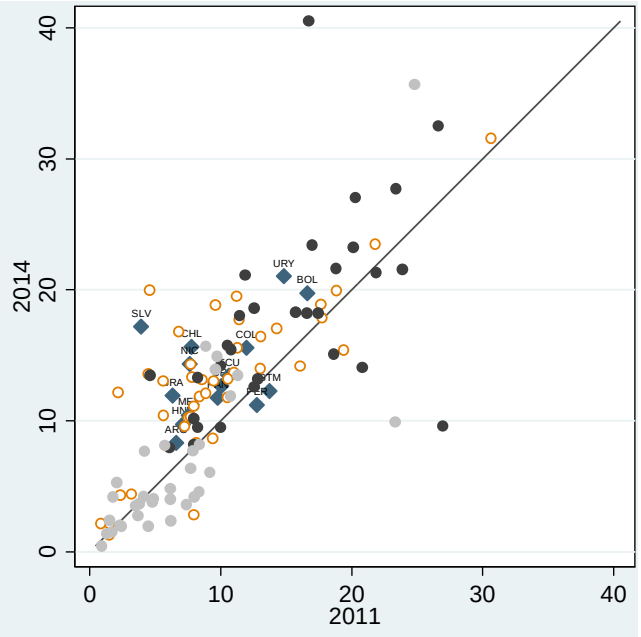
1a. Has an Account at a Formal Financial Institution



1b. Has Saved at a Financial Institution



1c: Has Borrowed from a Formal Financial Institution



Source: Global Findex Database 2014, World Bank

While a full understanding of the significant increase in ownership of accounts at formal institutions requires further analysis on individual countries' peculiarities and policies, Demirguc-Kunt et al. (2015) suggest that the use of government transfer payments to increase financial inclusion may be one of the reasons, not only in Latin America, but in many other developing countries. They highlight the case of Brazil, where 88 percent of the population receiving transfers (15 percent of the adult population), receive these payments directly into an account. The authors, however, also indicate that only 12 percent of Brazilians receiving government transfers into an account withdraw the money over time; 88 percent withdraw all the money as soon as it is received. Another reason lies in the expansion of banks' infrastructure through branches and ATMs (more on this below). With respect to the increased usage in some countries of banking correspondents (banking agents, such as retailers and small shops that provide financial services through their *points of sale (POS)*), current analysis suggests that this modality has faced important limitations in increasing the number of new clients who open bank accounts, especially among those in lower-income brackets. Brazil, Colombia, Mexico and Peru are examples of countries where banks are heavy users of the banking correspondent model.[6]

The saving story is much less encouraging. The Global Findex savings indicator still places almost all Latin American countries among the economies whose adult populations save the least through financial institutions (Chart 1b). Based on Global Findex data, only about one-third of Latin American adults that have an account have saved through formal financial institutions in the past year. One can infer that accounts are mostly used for payments purposes.[7] There are some interesting examples: Among Latin American countries, Brazil, the country with the highest ratio of adults having an account at a formal institution (68 percent) has the third lowest ratio of adults that have saved during the past year (12 percent).[8] Likewise, in Chile, the country with the second highest ratio of adults having an account (63 percent), the percentage of adult population that has saved in the past year only reaches 15 percent.

While keeping in mind the caveats mentioned above in interpreting the behavior of borrowing, the story is similar to the one for savings: only a small proportion of Latin American adults that have an account have borrowed through formal financial institutions in the past year. Similar to the savings examples, even in Brazil and Chile, the countries with the highest ratios of adults owning accounts, the percentage of the adult population that has borrowed in the past year is very low (12 and 15 percent respectively).

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[6] For example, De Olloqui et al. (2015) argue that the banks' correspondent model in Latin America has had limited success in reaching the lowest income populations partly because of high costs involved in moving and protecting cash in remote and insecure areas. High levels of informality and a strong preference for undertaking cash transactions by low-income populations result in elevated ratios of cash-in/cash-out transactions which are very costly for financial institutions. Likewise, in an analysis on Brazil's banking correspondents, Sanford and Cojucaro (2013) concluded that while these agents networks have significantly facilitated person-to-person payments and bill payments, few users of these facilities have opened bank accounts or accessed credit through though the agent channel.

[7] The proportion of *dormant* accounts is also high in Latin America. On average, about 14 percent of accounts are dormant in the region (no deposit or withdrawal has taken place in the past year). This compares with 5.6 percent in high income countries. The Latin America average also disguises important differences between countries. For example, dormant account ratios are much higher for Central America, with the ratio reaching 25 percent in Nicaragua.

[8] This is also consistent with the finding that the lion's share of government transfers in Brazil are withdrawn as soon as they are received

What about the Latin America's financial inclusion gap with respect to advanced economies and Latin America's *comparators*? Has the increase in account ownership in formal financial institutions from 2011 to 2014 (and savings and borrowing to a much lesser extent) translated into reduced gaps? There are a few positive outcomes, but the overall results are not encouraging. These results are presented in Table 1 where, for each of the three financial inclusion variables, gaps are defined as the difference between Latin America's median value and the corresponding value for alternative country groupings. Thus, the smaller the median value for Latin America, the larger the Latin America's financial inclusion gap is.[9]

On the positive side, although Latin America's ownership of accounts lags behind significantly relative to high-income countries, the median gap has reduced by about 12 percentage points (from 68.4 to 55.7). However, on the negative side, relative to its comparators (countries with a similar degree of development as measured by real income per capita), Latin America's financial inclusion gap, measured by ownership of accounts has not decreased significantly. Indeed, the reduction is only 0.7 percentage points (from 20.2 to 19.5). Measured by savings, Latin America's median financial inclusion gap has deteriorated relative to high income countries by 3 percentage points, while it has improved relative to its comparators by only 1 percentage point. Finally, the borrowing variable yields the worst results: Latin America's median financial inclusion gap has deteriorated with respect to both high income countries and Latin America's comparators.

[9] Therefore, negative values imply that Latin America lags the country grouping under consideration.

Table 1. Latin America's Financial Inclusion Gaps

Has an account at a formal financial institution (% age 15+)				
	2011		2014	
	Median (percentage)	Latin America's gap (percentage points)	Median (percentage)	Latin America's gap (percentage points)
High Income Countries	94.59	-68.41	96.47	-55.68
Latin America	26.18	..	40.79	..
Latin America Comparators	46.42	-20.24	60.31	-19.52
Rest of the World	15.94	10.24	16.14	24.65
Has Saved at a formal financial institution (% age 15+)				
	2011		2014	
	Median (percentage)	Latin America's gap (percentage points)	Median (percentage)	Latin America's gap (percentage points)
High Income Countries	44.81	-34.85	52.51	-38.24
Latin America	9.97	..	14.26	..
Latin America Comparators	12.24	-2.27	15.17	-0.90
Rest of the World	7.90	2.07	7.05	7.21
Has Borrowed from a formal financial institution (% age 15+)				
	2011		2014	
	Median (percentage)	Latin America's gap (percentage points)	Median (percentage)	Latin America's gap (percentage points)
High Income Countries	12.56	-2.67	16.88	-4.22
Latin America	9.89	..	12.66	..
Latin America Comparators	8.55	1.34	13.16	-0.50
Rest of the World	6.13	3.76	4.19	8.47

Source: Own calculations based on Findex Database (2014)

To better assess diversity between countries, Table 2 presents the financial inclusion gaps for each Latin American country relative to its own set of comparators. That is, for each country the table shows the difference in financial inclusion between that country and the group of countries with a similar degree of development.[10] For the large majority of Latin American countries, the financial inclusion gaps with respect to comparators is very high. A notable result is that some of the countries considered to be the best performers in the region in terms of macroeconomic policies (such as Colombia, Mexico, Peru and Uruguay) are among the countries with the largest financial inclusion gaps[11]. Even in Chile, the relative high level of development among emerging markets has not translated into sufficiently high levels of financial inclusion.

Table 2. Financial Inclusion Gaps in Latin American Countries (relative to countries with a similar degree of development, 2014) (percentage points) 1/

	Has an account at a formal financial institution 2/	Has saved at a financial institution in the past year 2/	Has borrowed from a formal financial institution 2/
Argentina	-29.4	-25.8	-6.2
Bolivia	2.9	10.1	8.3
Brazil	-5.3	-12.8	-2.0
Chile	-10.2	-10.1	1.7
Colombia	-20.6	-7.9	3.3
Costa Rica	-8.9	-0.9	-1.2
Ecuador	8.4	0.8	2.0
El Salvador	-24.3	-6.1	4.9
Guatemala	-12.1	2.5	-1.9
Honduras	-7.7	1.1	-1.8
Mexico	-34.8	-10.6	-3.5
Nicaragua	-9.3	-0.8	7.0
Panama	-30.0	-4.7	-2.1
Peru	-29.9	-7.9	-1.1
Uruguay	-34.3	-17.4	6.5

1/ There is no 2014 data for Paraguay

2/ Percentage of adult population

Source: Own calculations based on *Findex Database 2014*

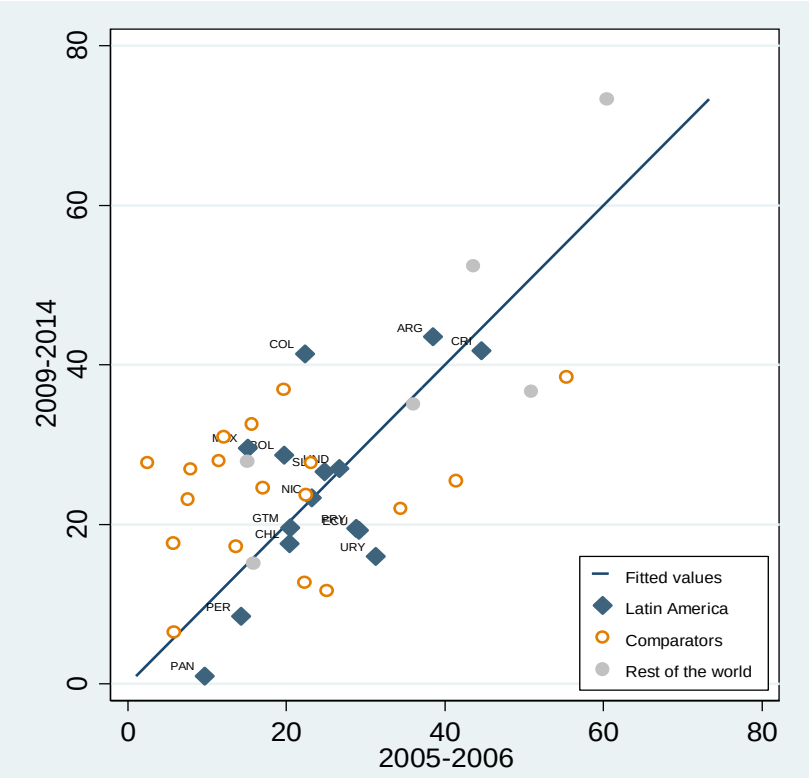
In order to complete the discussion before concluding this section, it is useful to provide some information on firms. Although, at the firm level, there is no information on financial inclusion comparable to that provided by Global Findex at the individual level, data from the

[10] The comparators for each country are defined as the group of countries belonging to the same decile of GDP per capita.

[11] With the exception of the borrowing variable in the case of Uruguay.

World Bank *Enterprise Surveys* allows gauging firms' perceptions regarding access to finance. Chart 2 displays the percentage of firms that identify access to finance as a major constraint in their operations. This data, however, is not compiled at the same time for every country. Thus, to assess the recent evolution of this variable and to maximize available information, the Chart compares firms' perceptions during the period 2005-06 with the most recent data collected by the survey. Countries to the left of the 45 degree line report an increased concern regarding their access to finance.

Chart 2. Percentage of Firms Identifying Access to Finance as a Major Constraint, 2005-06 vs Most Recent Data



Source: Enterprise Surveys, World Bank 2014

The results are mixed. In about one-third of the countries, a significantly smaller percentage of firms reported lack of financial inclusion as a major problem for their business in the period 2009-2014 relative to the period 2005-2006. For some others, however, a larger percentage of firms reported lack of financial inclusion as a problem in recent years than in the early 2000s. Colombia stands out. Given economic instabilities in Argentina in the later period, it is not surprising that almost more than one third of the enterprises in the country considered lack of access to finance as a major obstacle.

III. Obstacles Preventing Financial Inclusion in the Region: Are some more important than others?

As reported in Section II, indicators of usage of financial services show that Latin America's financial inclusion gaps with respect to countries with a similar degree of development are significant and persistent (the gaps have barely reduced from 2011 to 2014). Moreover, for some indicators, such as savings and borrowing, Latin America's gap with respect to high-income countries has even increased in the period considered. This section discusses obstacles to financial inclusion in order to shed light on reasons behind the low levels of financial inclusion in Latin America and the region's gaps with respect to other country groupings.

Obstacles to the provision of financial services to large segments of the population are multidimensional and encompass factors affecting the demand for and supply of these services. A large number of studies have shown that aggregate features at the country level as well as individual-level characteristics play major roles in explaining financial inclusion.[12] For example, Allen et al. (2012) show that in addition to country factors, individual characteristics such as age, sex, education level, income, employment and geographical location are significant determinants of populations' ownership and usage of accounts in the formal financial system.

In the case of Latin America, Rojas-Suarez and Amado (2014) conducted an empirical investigation that underlined the crucial role of the social, economic and institutional environment where the markets for financial services operate.[13] This section updates and builds on that research to present a discussion on four categories of obstacles for financial inclusion: (a) socio-economic constraints that limit both the supply and the demand for financial services; (b) vulnerabilities in the macroeconomic environment that deters large segments of the population from using the services provided by the formal financial system; (c) institutional weaknesses, with emphasis on the quality of governability of countries; and (d) characteristics of the formal financial system's operations that impede the adequate provision of financial services. These operations respond both to the regulatory framework and to the specific features of the financial system (such as the competitive environment).

The section is divided in two parts: the first presents graphs and simple correlations between financial inclusion and alternative obstacles to get some insights on the behavior of these obstacles in Latin America relative to other country groupings. The second part presents an econometric analysis that serves to assess the relative importance of these alternative constraints in explaining Latin America's financial inclusion gaps.

[12] As reviewed in Rojas-Suarez (2007) and Allen (2012)

[13] Based on data from Global Findex 2011, Rojas-Suarez and Amado (2014) also analyzed the effects of individual characteristics on financial inclusion. Unfortunately, at the time of this writing, individual-level data was not available in the Global Findex 2014 database.

In the main text of this section, the metric presented as a measure of a country's degree of financial inclusion is the percentage of adult population that owns an account in a formal financial institution, taken from Global Findex 2014. Annex II presents results based on the other two alternative metrics (savings and borrowings) discussed in Section I as well as an additional variable that measures usage of payments services: percentage of the adult population that have used an account to receive wages.[14]

1. Alternative obstacles constraining financial inclusion

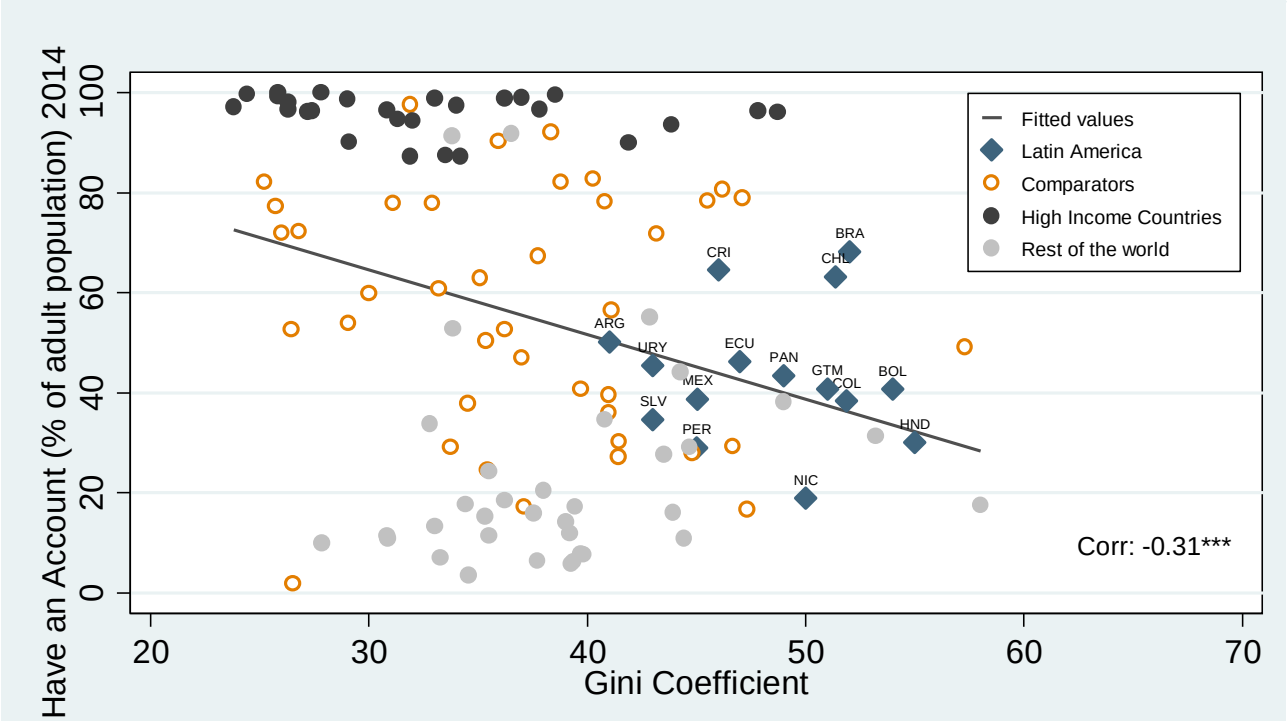
It is no surprise that **social** factors, the first category of obstacles considered in this section, have an important impact on financial inclusion. As expected, in general terms, countries with greater access to social services and a better quality of life are countries that have also developed a stronger "financial culture" in which the use of financial services through formal markets becomes essential. Indeed, using worldwide country data, the correlation between the financial inclusion indicator measuring account ownership and the UN Human Development Indicator, a well-known measure of social development, is very high.[15]

Income inequality is another variable that can affect the usage of financial services through formal institutions. As argued by Claessens and Perotti (2005), inequality can hinder financial reforms that can support improved financial inclusion. In highly unequal economies, with a highly skewed distribution of income, powerful interests are likely to block or manipulate reforms. Other authors, however, argue that improved financial inclusion can be a driver for reducing inequality.[16] Thus, there is the possibility of reverse causality between these two variables.[17]

Chart 3 presents the correlation between income inequality, as measured by the Gini coefficient and financial inclusion, measured by the percentage of the adult population with accounts in formal financial institutions. While the data for financial inclusion is for the year 2014, the data for the Gini coefficient is the latest available data from the World Income Inequality Database. As shown in the chart, there is a significant negative correlation between these two variables (significant at the 1 percent level).[18] In this and the following charts in this section, countries are categorized as high-income (black dots), Latin American (dark diamonds), Latin American comparators (orange circles) and rest of the world (light-gray dots).

[14] As mentioned before, this variable was not used in the intertemporal comparisons of Section I because of lack of available data for 2011.
[15] The correlation equals 0.8 using either Global Findex 2011 or Global Findex 2014. Alternatively, real GDP per capita can be used as a proxy for social development. In that case, the correlation with the financial inclusion indicator was 0.83 and 0.87 in 2011 and 2014 respectively.
[16] See, for example, Honohan (2007)
[17] However, as will be shown in the econometric investigation below, causality seems to run from income inequality to financial inclusion.
[18] Rojas-Suarez and Amado (2014) found a negative and significant correlation between these variables equal to -0.56 using Global Findex data for 2011 and values for the Gini coefficient taken from the World Income Inequality Database (WIID-v.2.0a)

Chart 3. Financial Inclusion and Income Inequality



Source: Own calculations based on World Income Inequality Database (WIID v. 3.3) and Global Findex Database 2014

A well-known stylized fact is that Latin America is the most unequal region in the world. This is shown in the graph, where a significant number of Latin American countries are located on the lower-right side, indicating a combination of high income inequality and low financial inclusion. In this worldwide chart, Honduras and Nicaragua are among the countries with very high Gini and very low financial inclusion.

As shown in Annex II.1, the basic results do not change for two of the three other measures of financial inclusion. The variables for payments and savings are also negatively and significantly correlated with the Gini coefficient. Perhaps the most interesting observation is that in terms of savings, a number of other Latin American countries (Brazil, Guatemala and Colombia) join Honduras and Nicaragua as countries with very high Gini and very low values for the savings variable.[19]

Macroeconomic stability can also have a significant influence on financial inclusion. Deep macroeconomic instabilities leading to financial crises drastically reduce the provision of credit and other financial services to small- and medium-sized firms as well as to non-wealthy individuals since banks attempt to restore their regulatory capital ratios by curtailing credit, especially to borrowers considered as riskier subjects of credit. The provision of payments services to low-income individuals and firms is also reduced to the extent that serving these populations involves higher costs than servicing wealthier groups.

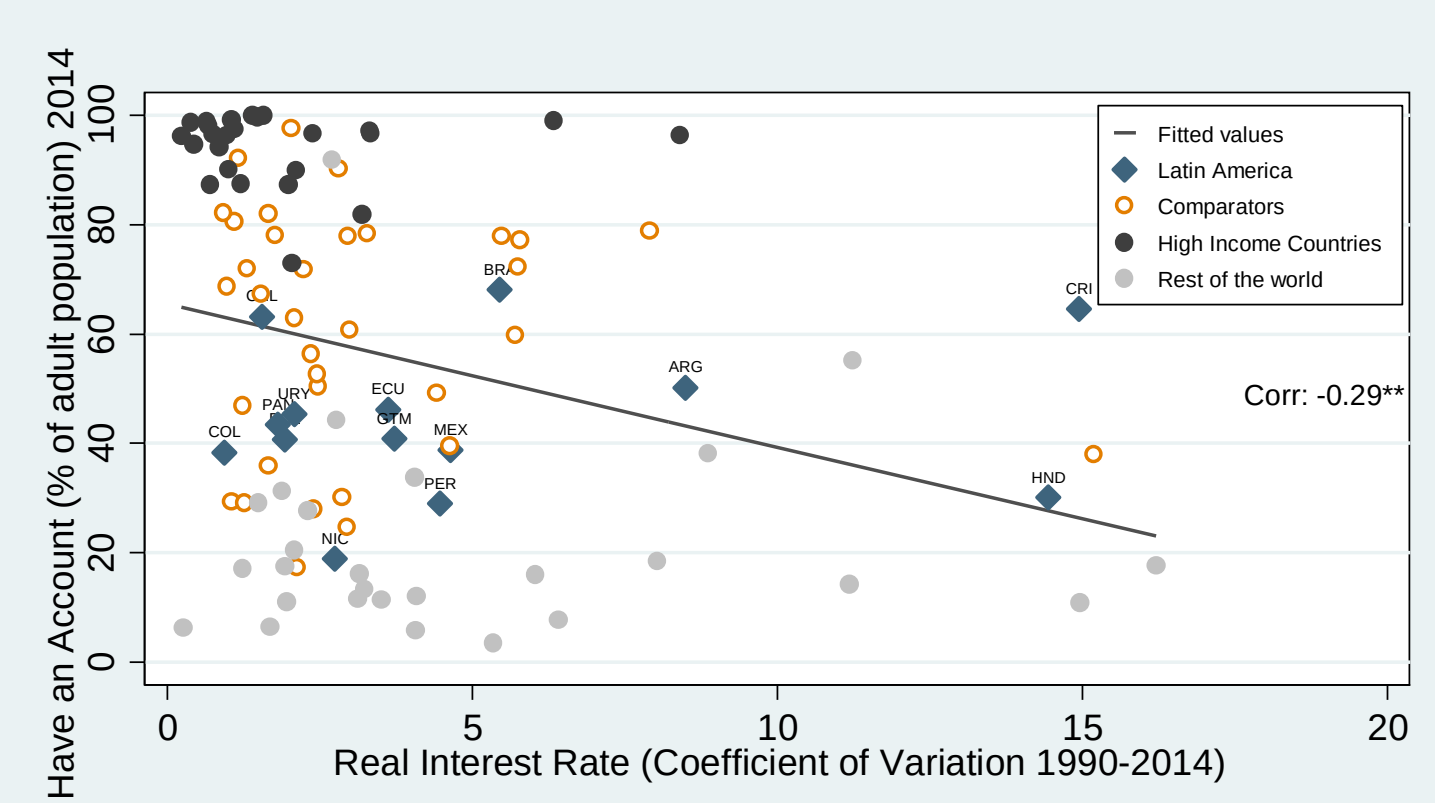
On the demand side, macroeconomic stability plays a central role in determining people's willingness to entrust their funds to the formal financial sector. In many emerging markets, especially in Latin America, depositors have suffered large losses in the value of their wealth

[19] The correlation between the Gini coefficient and the borrowing variable is negative, but not significant.

when following severe macro/financial problems, policymakers imposed policies that hurt depositors the most, such as deposit freeze, interest rate controls and/or forced conversion of deposits denominated in foreign currency (usually dollars) into local-currency denominated deposits at undervalued exchange rates. Moreover, memories of the losses in real terms suffered by depositors during periods of high and volatile inflation, and reflected in negative and volatile real interest rates, linger for a long period of time and are an important disincentive for savings through financial institutions.

Chart 4 and Annex II.2 show the correlation between alternative financial inclusion variables and real interest rate volatility (approximated by the coefficient of variation during the period 1990-2014). There is a significant and negative correlation between these variables.

Chart 4. Financial Inclusion and Real Interest Rate Volatility



Source: Own calculations based on IMF International Financial Statistics (IFS) & Global Findex Database 2014

When considering the variable on account ownership (Chart 4), among Latin American countries, the hyperinflation experienced during the early 1990s and macroeconomic difficulties in the 2000s place Argentina among those with high real interest rate volatility. Costa Rica is an interesting case. Several periods of high inflation and negative real interest rates were behind a high volatility of real interest rates. In this country, the high level of financial inclusion (relative to other Latin American countries) can certainly not be attributed to *sustained* macroeconomic stability; other country-specific factors lie behind these advances.

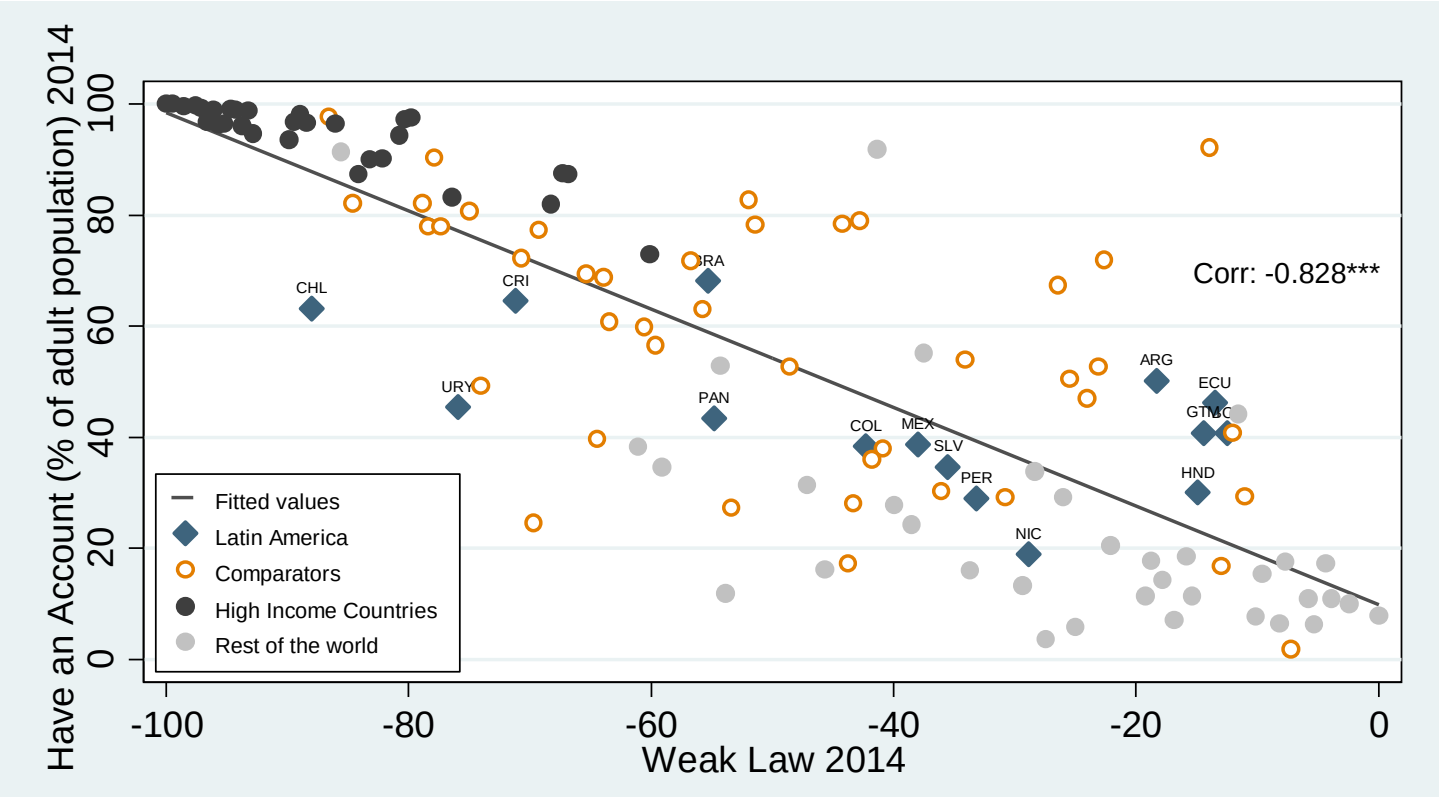
On the other hand, Chile stands out for having a combination of low volatility of real interest rates and "relatively" high financial inclusion. As illustrated in Annex II.2, the negative correlation between financial inclusion and real interest rate volatility also holds when considering the payments, savings and borrowing variables, with the strongest correlation for the payments variable.

The **quality of institutions**, broadly defined as the set of rules and conventions that "constitute the framework for human interaction and determine the incentives for members of society"[20] has long been recognized as an important factor affecting access to and usage of all type of financial services.[21] As in previous studies, a country's quality of institutions is proxied here by the World Bank Governance Indicators, specifically the indicator *rule of law,* that measures agents' confidence in and commitment to abiding by the rules of society, the quality of contract enforcement, the police, the courts and the likelihood of crime and violence. When law enforcement is strong, contracts between creditors and debtors are observed. This gives depositors incentives to entrust their savings to banks and other financial institutions and increases bankers' willingness to lend to smaller and (relatively) riskier borrowers.

Chart 5 and Annex II.3 shows the relationship between financial inclusion and a transformation of the indicator *rule of law*, which we term *weak law* and ranges from -100 to 0.[22] The only reason for this transformation is to present the variable reflecting the (lack of good) quality of institutions as an *obstacle* to financial inclusion. The inverse relationship between *weak law* and all the financial inclusion variables considered is very strong and statistically significant. Indeed, the correlation value goes from -0.6 for the borrowing variable to -0.8 for the three other variables (ownership of accounts, payments and savings).[23]

[20] See, IMF (2005)
[21] See, Beck. e. al. (2003)
[22] The non-transformed *rule of law* indicator ranges from 0 to 100, where a larger number indicates stronger institutional quality.
[23] Using data from Global Findex 2011, the correlation between *account ownership* and the 2010 Governance Indicator for rule of law equaled -0.83.

Chart 5. Financial Inclusion and Quality of Institutions



Source: Own calculations based on the Worldwide Governance Indicators (2015) and GlobalFindex Database (2014)

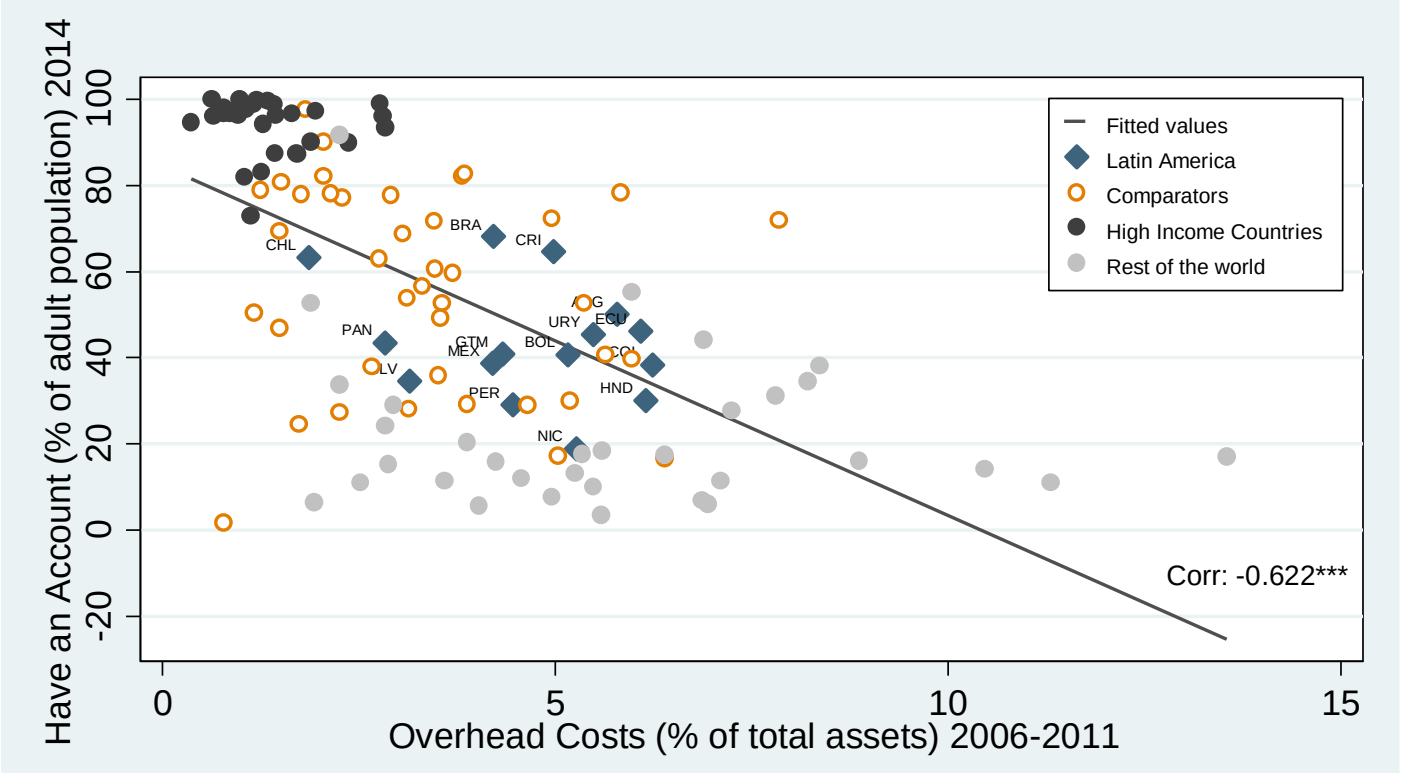
Not surprisingly, high-income countries are concentrated in the upper left corner of Chart 5 and Annex II.3. Latin American countries do not look good relative to their comparators. The median value for the "weak law" indicator in Latin America reached 34.4 in 2014, while the corresponding value for comparators equaled 50. Among the region, Peru, Honduras, Guatemala and Nicaragua are among the countries with the lowest quality of institutions and a low value for financial inclusion. In contrast, Chile is the only country in the region where the indicator representing institutional quality is closer to those in high-income countries. Chile also displays the second highest value in the region in terms of financial inclusion.

Inefficiencies and inadequacies in the financial sector are one of the most discussed obstacles for explaining financial exclusion and encompass a number of financial institutions and market characteristics that could lead to prohibitive high costs for access to financial services by the poor. For example, based on results from the Global Findex database, Demirguc-Kunt et al. (2015) argue that in Latin America and the Caribbean, one of the most cited reasons for not having an account (after not having enough money) is that opening and maintaining accounts are too expensive. High costs for maintaining accounts or for applying for credit are directly related to the banking system's method of operation. The causes, however, are varied; they may reflect inefficiencies in banking operations, lack of competition or simply the high financial costs of providing services on a small scale. Distinguishing among causes is, of course, extremely difficult. However, to the extent that operational inefficiencies, reflected in high administrative costs and/or high concentration in the financial sector, are present, they could restrict the availability and increase the price of financial services to low-income populations. [24]

[24] Of course, there are many other characteristics of the financial system landscape where financial institutions operate that are not conducive to improvements in financial inclusion, especially distortionary financial regulations that reduce

Chart 6 and Annex II.4 display the relationship between alternative variables of financial inclusion and the ratio of banks' overhead costs to total assets, a common indicator of banks' operational efficiency. To smooth annual fluctuations in this ratio, we considered the average covering the period 2006-2011.[25] For the variables reflecting account ownership, payments and savings, the correlation equals -0.6 and is significant at the 1 percent level. The correlation for the borrowing variable equals -0.4 and is as significant as the rest of variables.[26]

Chart 6. Financial Inclusion and Bank Inefficiency



Source: Financial Development and Structure Dataset 2013 (Beck et al.) and Global Findex 2014

While Chile displays ratios of overhead costs similar to those of high income countries, the median value of overhead costs as a percentage of assets reached 5.07 percent in Latin America—about 62 percent higher than the median value for comparators (3.14 percent).

What about high levels of concentration? The argument is that oligopolistic behavior could be detrimental for financial inclusion as there are incentives for banks to focus on the least risky clients who can afford the higher prices of financial services (above those resulting from a more competitive system) due to insufficient competition. The data, however, does

financial institutions' incentives to deal with the poor; interest rate controls (caps on deposits and lending rates) as well as government-directed lending are two examples. Other features, such as sufficient economies of scale among scattered populations in distant locations, also constrain financial inclusion, but these features are mostly related to the socio-economic conditions of potential clients and individual-level, rather than country-level, analyses are needed to better understand their importance.

[25] We'll try to update this number in the final version of the paper.

[26] The correlation equaled -0.55 using 2011 Global Findex data and the 2006-2010 average for overhead costs.

not show a significant correlation between financial concentration and financial inclusion. Instead, consistent with recent literature,[27] the effects of high levels of concentration in the financial system on financial inclusion seem to depend on the quality of institutions. More precisely, the hypothesis is that bank concentration is negatively associated with financial inclusion mostly in countries with weak institutional quality. In those countries, lack of contract enforcement combines with oligopolistic power arising from high bank concentration to discriminate against low-income customers (individuals) or small borrowers (SMEs). This pervasive combination also impedes the passing of regulation allowing new providers of financial services to enter the market.

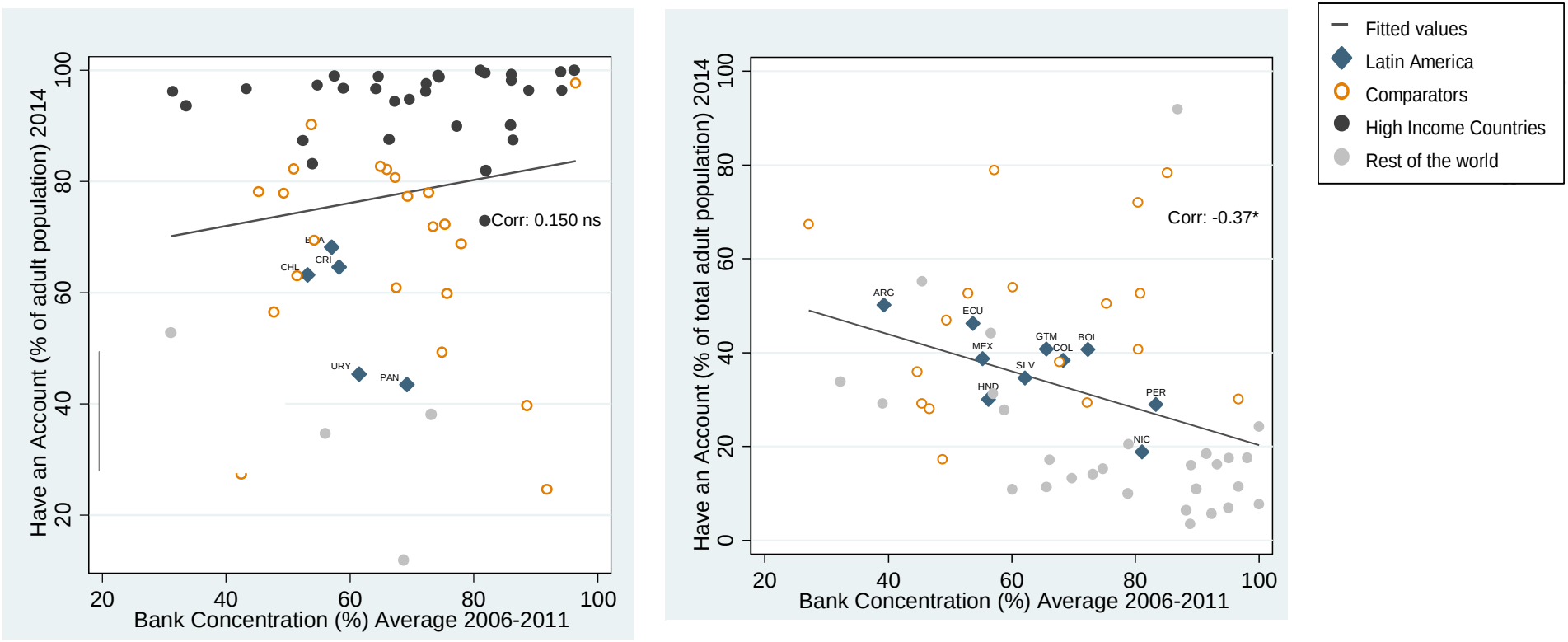
Chart 7 and Annex II relate financial inclusion and a ratio of bank concentration; the latter is defined as the percentage of total system assets held by the three largest banks. Countries are divided into two groups: countries with high institutional quality, which are simply defined as those with a value of the variable *weak law* below the full sample average; and countries with low institutional quality where the value of *weak law* is above the full sample average. Correlations are shown in Charts 7a and 7b respectively for the account ownership variable; and in Annex II.5a and II.5b respectively for the rest of financial inclusion variables.

[27] See, for example, Claessens (2005).

Chart 7: Financial Inclusion and Bank Concentration

Chart 7a. High Institutional Quality

Chart 7b. Low Institutional Quality



Source: Financial Development and Structure Database (2013), Worldwide Governance Indicators (2015) and Global Findex Database (2014)

Note: Countries with high institutional quality are those with values of the rule of law index higher than 49.58 (sample average). Low institutional quality countries are the remaining countries in the sample.

The results support the hypothesis. There is no significant correlation between bank concentration and any of the financial inclusion variables for countries with high institutional quality (Chart 7a and Annex II.5.a), but the relationship is negative and statistically significant for the set of countries classified as having low institutional quality (Chart 7b).

Not surprisingly, and similar to results obtained using Global Findex 2011, most Latin American countries are classified as having low institutional quality and are, therefore, depicted in Chart 7b and Annex II.5.b (only five Latin American countries can be classified as having high institutional quality). To exemplify the results, compare Chile and Costa Rica with Mexico and Honduras. The four countries have a similar degree of bank concentration, but the quality of institutions is much higher in the former set of countries than in the latter. This is consistent with much higher financial inclusion in terms of bank ownership, payments, savings and borrowing in Chile and Costa Rica.

2. The Relative Importance of Obstacles: An Econometric Analysis

The discussion above illustrated the association between a set of variables measuring the extent of populations' usage of financial services and obstacles for financial inclusion identified in the theoretical and empirical literature. This section builds on that discussion by presenting an econometric analysis to explain the determinants of financial inclusion. In this section, and for expositional purposes, financial inclusion is represented by the account ownership variable. Following Rojas-Suarez and Amado (2014), the following equation is estimated:

$$Fin\_Inclusion_i = \alpha_0 + \beta Latin\_America_i + \lambda Other\_countries_i + \sum_{k=1} \alpha_k Y_{ki} + \epsilon_i \qquad (1)$$

Where 'i' denotes a country, $Fin\_Inclusion_i$ is the percentage of the adult population that holds an account at a formal financial institution in 2014, Y_k is a vector representing the different obstacles to financial inclusion, $Latin\_America_i$ is a dummy variable that indicates if the country is from Latin America, $Other\_countries_i$ is a dummy variable that indicates if the country is neither from Latin America nor their comparators[28] and ϵ_i is assumed to be a disturbance with the usual properties of zero mean and constant variance.

The estimation of equation (1) updates the work in Rojas-Suarez and Amado (2014) by using data from Global Findex 2014 and updated values of the explanatory variables. A number of methodological issues are discussed in the former paper and need not to be repeated here. The explanatory variables used in the estimation of equation (1) represent the four categories of obstacles discussed above.[29] They are:

Income Inequality is the latest observation of the Gini coefficient available since 2000. The variable is taken from the World Income Inequality Database (WIID) and represents the category of *socioeconomic factors*.

[28] Thus, countries in *Other_countries* are either high income countries or countries categorized as *rest of the world* (see Annex I).

[29] As in Rojas-Suarez and Amado (2014), additional variables were considered as proxies for the four identified obstacles to financial inclusion; however, lack of data availability or multicollinearity problems prevented their inclusion in the estimated equation.

RealInterestRate_Volatility[30] is the coefficient of variation of the real interest rate, measured as the ratio of the standard deviation of monthly real interest rates to its average, for the period 1990-2014. This variable was constructed from the Fisher equation, where the nominal interest rate (deposit rates) and inflation came from the IMF's International Financial Statistics (IFS) database and represents the category *macroeconomic constraints*.

Weak Law represents the lack of enforcement of the rule of law, which was taken from the Worldwide Governance Indicators for the year 2014. The original variable, *rule of law*, was rescaled to a range from 0 to 100, and the variable *Weak_Law* is calculated by multiplying the rescaled variable by minus 1. This variable belongs to the category *institutional factors*.

Overhead_Costs is an indicator of banking operational inefficiencies, measured as the ratio of overhead costs to total assets. This variable was taken from the dataset created by Beck et al., and updated in November 2013. The original data is from the *Fitch BankScope* database. The variable in the regression corresponds to 2011 (the latest available data) and it is under the category of *financial sector inefficiencies*.

Bank_Concentration is measured as the share of the three largest banks' assets to all commercial banks' assets. This variable was taken from the dataset created by Beck et al. and updated in November 2013. The original data is from the *Fitch BankScope* database. The variable in the regression corresponds to 2011 (latest available data) and belongs to the category of *financial sector inefficiencies*.

As discussed above, the literature suggests the potential presence of reverse causality between financial inclusion and income inequality. To tackle this possible endogeneity issue, we evaluate the convenience of using instrumental variables estimation (IV) to deal with this problem.[31] The endogeneity test is shown in Annex III. The main result is that it is possible to reject the endogeneity of *Income_Inequality* in the regression. This suggests that OLS is an appropriate estimator; a consistent and more efficient estimator than the IV estimator.

Table 3 presents the OLS estimation of equation (1). Starting with the *Latin_America* and *Other_countries* dummies in the first column, each successive column in the table introduces one control variable at a time, with all the variables considered shown in column 7. This methodological presentation sheds light on the robustness of the variables included. In Table 3, the order in which variables were introduced simply follows the order in which alternative obstacles were discussed in this paper. We conducted alternative exercises (not presented here) to show whether the ordering mattered. It did not. For example, the variable *Overhead_Costs* had the right sign but was never significant; it did not matter whether this variable was introduced early on in the exercise or at the end (as in regression 7). Likewise, all other variables considered were always significant regardless of the ordering of variables.

[30] In Rojas-Suarez and Amado (2014), the volatility of inflation, rather than the volatility of real interest rates was used. While this does not modify results in any significant way, we decided to change variables since, conceptually, real interest rates volatility is a better determinant of the usage of financial services.
[31] A similar exercise was conducted in Rojas-Suarez and Amado (2014).

Table 3: OLS regression—Dependent variable: Financial Inclusion Ratio (2014) (percentage of adults owning an account)

	1	2	3	4	5	6	7
Latin_America (1/0)	-13.7284 ***	-1.6422	3.5134	0.8775	3.7758	2.6872	2.5358
	(0.008)	(0.810)	(0.650)	(0.897)	(0.565)	(0.674)	(0.694)
Income_Inequality		-1.1778 ***	-1.5305 ***	-0.53 **	-0.5392 **	-0.5521 **	-0.5439 **
		(0.003)	(0.000)	(0.021)	(0.032)	(0.030)	(0.042)
RealInterestRate_Volatility			-1.6743 ***	-0.8164 **	-0.8615 ***	-0.8424 ***	-0.8096 **
			(0.005)	(0.013)	(0.010)	(0.009)	(0.027)
Weak_Law				-0.7926 ***	-0.8133 ***	-0.4401 **	-0.4196 **
				(0.000)	(0.000)	(0.011)	(0.029)
Bank_Concentration					-0.1943 *	-0.4447 ***	-0.4506 ***
					(0.055)	(0.008)	(0.010)
Bank_Concentration*Weak_Law						-0.0051 **	-0.0052 **
						(0.022)	(0.025)
Overhead_Costs							-0.2648
							(0.804)
Other_countries (1/0)	-0.9498	-4.2369	-6.5596	-6.6041	-2.6756	-2.5486	-2.5766
	(0.876)	(0.494)	(0.291)	(0.134)	(0.519)	(0.545)	(0.543)
Constant	57.2024 ***	101.984 ***	123.537 ***	41.3839 ***	51.5385 ***	70.0531 ***	71.787 ***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Observations	122	117	99	99	94	94	94
R-squared	0.0184	0.0852	0.2165	0.6747	0.7096	0.7179	0.7182

****, ** and * denote significance at the 1%, 5% and 10% respectively*

P-values in parentheses

The goodness of fit of the regression including all controls (column 7) or the regression excluding the non-significant variable *Overhead_Costs* (column 6) is quite high: the adjusted R-squared is above 0.7 in both cases. All the *obstacles* considered also had the expected negative sign: an increase in their values had an adverse effect on financial inclusion.

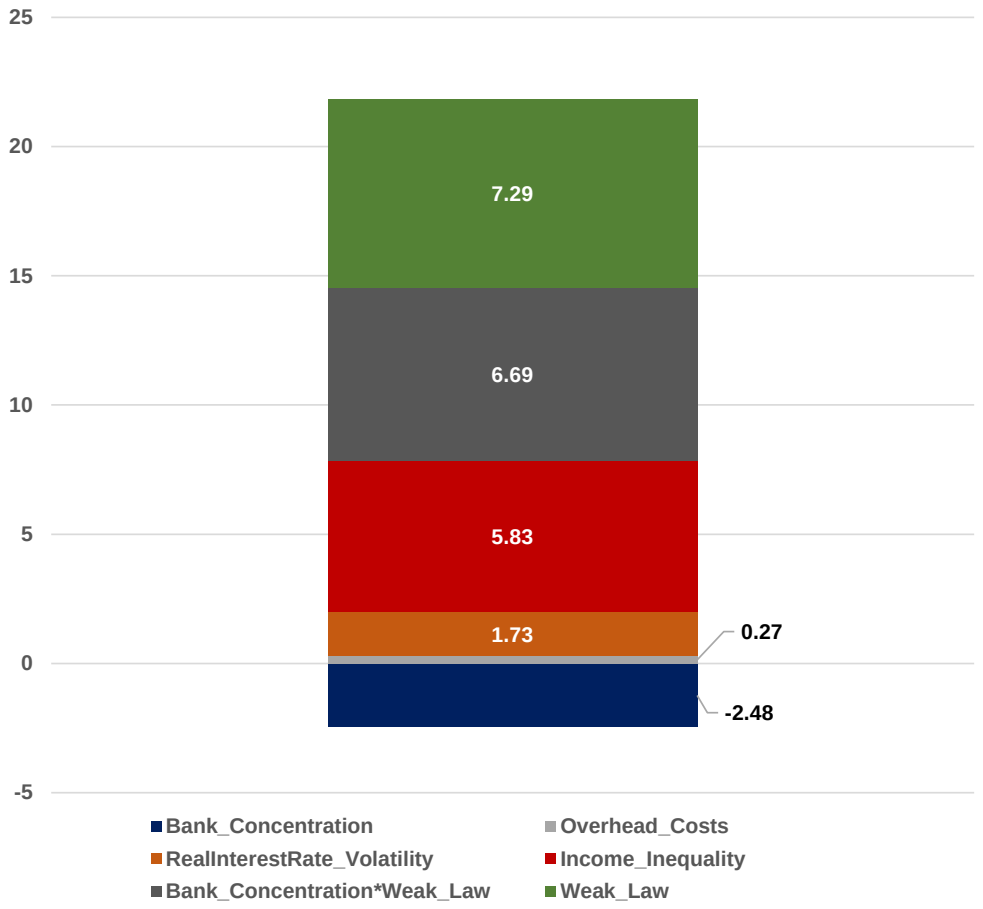
An important result from the analysis is that, with the exception of the regression in column 1, the coefficient for the *Latin_America* dummy in regressions 2 till 7 is not significant, implying that the controls included in the regressions are as good for explaining financial inclusion in Latin America as they are for any other country grouping. By construction, the value of the coefficient of the Latin America dummy in column 1 reflects the difference between the *average* financial inclusion in Latin America and its comparators (13.7 percentage points in absolute terms); that is, this value equals Latin America's financial inclusion gap relative to its comparators.[32] Using the estimated value of the coefficients from equation 7 and the average values of the variables considered for Latin America and its comparators,

[32] Notice that we are underscoring that here we are referring to the *average* gap for Latin America relative to its comparators. The value of the *median* gap for Latin America with respect to its comparators is presented in Table 1 (19.5).

the predicted value of Latin America's financial inclusion gap equals 16.8 percentage points in absolute terms.[33]

How important are the alternative explanatory variables considered in Table 3 to understand Latin America's financial inclusion gap relative to its comparators? Based on the estimated coefficients, Chart 8 presents the implied contribution of each non-idiosyncratic determinant of financial inclusion (that is, excluding the *Latin_ America* dummy) to explain the financial inclusion gap.

Chart 8: Decomposition of Financial Inclusion Gap between Latin America and its Comparators (percentage points)



Source: own elaboration

Income inequality (Gini) and institutional quality deficiencies (weak law) are the most important obstacles for explaining the gap. The effect of macroeconomic instability (through

[33] The estimated gap is calculated using the following formula: $Fin\_Inclusion\_Gap = \hat{\beta}\overline{Latin\_America} + \sum_{k=1}\left(\overline{Y}_k^{\,Latin\ America} - \overline{Y}_k^{\,Comparators}\right)$. The resulting gap is a negative number. In order to facilitate the exposition, the values are multiplied by -1.

the volatility of interest rates) follows, but is much less important. The effect of the overhead cost ratio in explaining the gap is minimal.[34]

As discussed above, the role of the quality of institutions is dual: Low institutional quality has a direct adverse effect on financial inclusion, but it also has an indirect effect through its impact on the concentration of the banking system in affecting financial inclusion. These roles are clearly presented in the graph. First, through its direct effects, *Weak_Law* explained 7.3 percentage points of the predicted financial inclusion gap (in absolute values). Second, even though the variable *Bank_Concentration* reduced the gap (indicating that banking systems are more concentrated in comparator countries than in Latin America), the interaction between *Weak_Law* and *Bank_Concentration* significantly contributed to explain the financial inclusion gap (6.7 percentage points). That is, on their own, differences in bank concentration did not contribute to the financial inclusion gap, but they did have an effect when adjusted for the impact of institutional quality.

Because of the importance of this interaction, Annex IV further discusses its implications in Latin America by estimating the marginal effect of bank concentration on financial inclusion at the country level.

The results from Table 3 can also be used to calculate the relative importance of alternative obstacles in explaining Latin America's financial inclusion gap with respect to high-income countries. In this case, the observed value of the average gap equaled 50.7 percentage points (in absolute value), while the predicted gap from the regression equaled 45.8 percentage points. The implied contributions of the non-idiosyncratic variables are shown in Chart 9.[35]

The results are similar to those obtained for the Latin America's financial inclusion gap relative to its comparators, with the effects (direct and indirect) of institutional quality being even more dramatic. Indeed, differences in institutional quality tell most of the story, but income inequality is also important.

To recapitulate, the four categories of factors discussed above affect financial inclusion in Latin America. Albeit having different degrees of importance, they are all relevant for improving the usage of financial services.

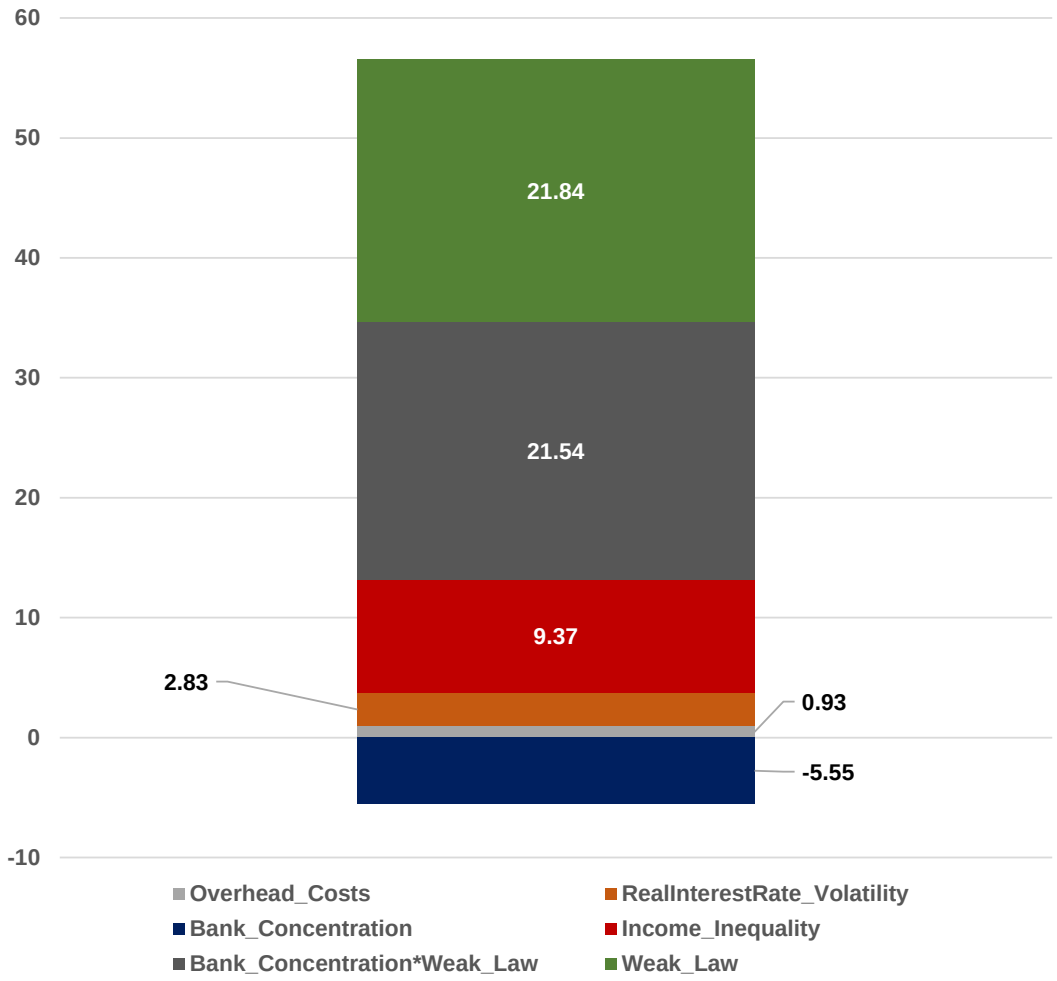
At the regional level, because of important advances in the conduct of monetary policy, inflation has been under control in many Latin American countries in recent years. Thus, the volatility of real interest rates, while important, is not a strong obstacle explaining the financial inclusion gap between Latin America and its comparators or between Latin America and high income countries at this time. Keeping inflation stability has not only

[34] Overhead cost is included in these calculation for completeness, but as mentioned before, the coefficient of this variable is not significant.

[35] The estimated gap is calculated using the following formula: $\widehat{Fin\_Inclusion\_Gap} = \hat{\beta}\overline{Latin\_America} + \hat{\lambda}\overline{Other\_Countries} + \sum_{k=1}\left(\overline{Y}_k^{\,Latin\ America} - \overline{Y}_k^{\,High\ Income}\right)$. The resulting gap is a negative number. In order to facilitate the exposition, the values are multiplied by -1.

helped macroeconomic stability but has also supported lower financial inclusion gaps. The role of Central Banks here is crucial, especially in light of current turbulence in international financial markets.

Chart 9: Decomposition of Financial Inclusion gap between Latin America and High Income Countries (percentage points)



Source: own elaboration

On the other hand, high income inequality and low institutional quality play key roles in explaining the Latin American financial inclusion gap. Efforts to improve the rule of law and other symptoms of institutional weaknesses are central to improving financial inclusion in Latin America, both in absolute and relative terms.

The analysis has been conducted at the regional level. Important differences between countries (reflected in the large difference between average and median values) suggest that further research is needed to identify country-specific importance of each type of obstacle and to guide policy recommendations. For example, high costs in the provision of financial services (reflected in overhead cost ratios) was not significant in the cross-country

econometric analysis of Table 3. However, in many Latin American countries, it would be difficult to deny that advances in technology can help to leap-frog outdated payment systems and infrastructure for a more efficient delivery of these services.

IV. Conclusions

This paper has dealt with two key issues regarding financial inclusion in Latin America: (a) the recent evolution of the region's financial inclusion gaps relative to other country groupings and (b) the relative importance of alternative obstacles in explaining these gaps.

The analysis reveals that in spite of recent progress in the usage of alternative financial services by adult populations in Latin America, the region's financial inclusion gaps relative to its comparators (countries with a similar degree of development) have not reduced generally and, in some cases, have even increased during the period 2011-2014. Specifically, when measuring financial inclusion by the percentage of adults that own an account in a formal financial institution, a gap with a median value of about 20 percentage points (in absolute terms) has persisted in that period. While there was a slight reduction in the gap (1 percentage points) if financial inclusion is measured in terms of savings, the gap increased (by 2 percentage points) if financial inclusion is measured in terms of borrowing behavior. When compared with high-income countries, the results were mixed. In terms of account ownership, while remaining large (56 percentage points), the gap reduced between 2011 and 2014. However, the gap increased when savings and borrowing are used as indicators of financial inclusion.

An econometric investigation of potential country-level obstacles explaining Latin America's large financial inclusion gaps in terms of account ownership finds that institutional weaknesses play the most salient role. There are direct and indirect adverse effects from low institutional quality. Lack of contract enforcement between creditors and debtors directly reduces depositors' incentives to entrust their funds to formal financial institutions. Indirectly, low institutional quality reinforces the adverse effects of insufficient bank competition on financial inclusion. Efforts to improve the rule of law and other symptoms of institutional weakness in Latin America are key to improving the region's financial inclusion, both in absolute terms and relative to other country groupings.

Income inequality follows institutional quality in explaining Latin America's financial inclusion gaps. While important in determining the degree of financial inclusion in the region, macroeconomic instabilities, measured as the volatility of interest rates, do not play a major role in explaining the gaps relative to other country groupings. Advances in the conduct of monetary policy in Latin America drive this result.

A caveat to the econometric results must be mentioned. The analysis was conducted at the regional level and due to restrictions on the sample size, no fixed effects to reflect individual country characteristics were included. Thus, to reach policy recommendations at the country level further research is needed. For example, high costs in the provision of financial services was not significant in the cross-country regressions. However, in many Latin American countries it would be difficult to deny that outdated payment systems and infrastructure, among other deficiencies, are important factors raising the costs of providing financial services.

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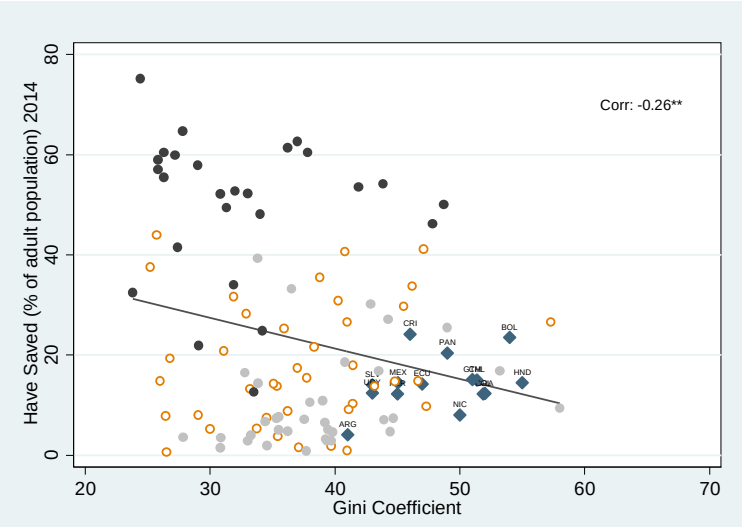
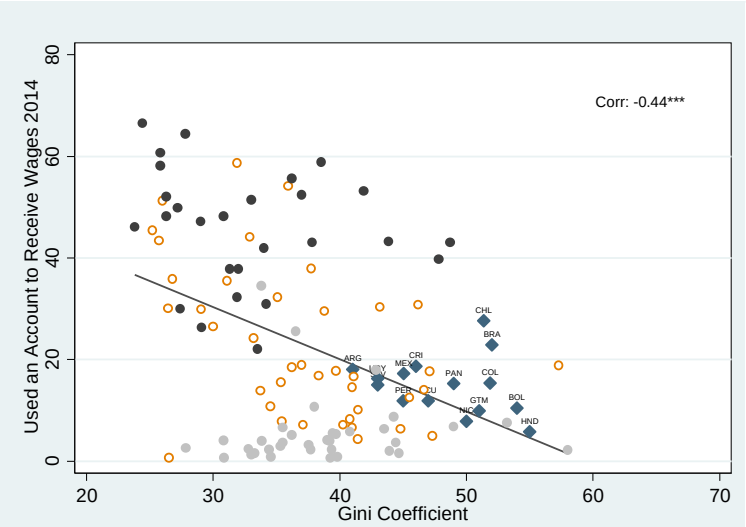
Annex I: Grouping of Countries by Category

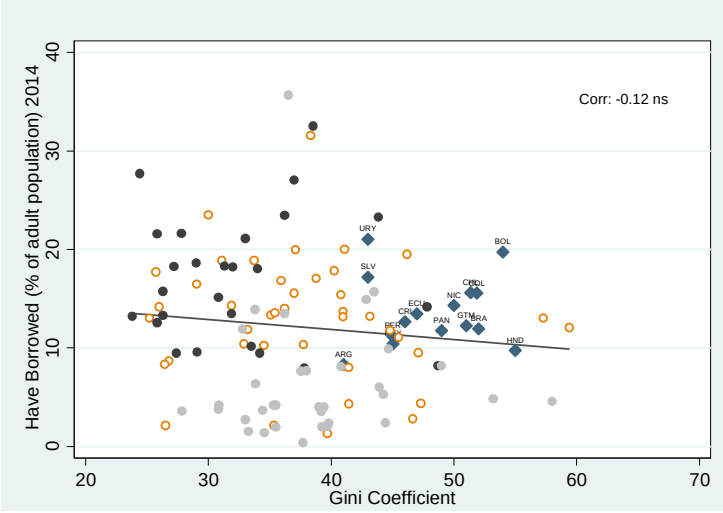
Latin America	Latin America comparators			High Income countries		Rest of the world		
Argentina	Albania	Indonesia	Saudi Arabia	Australia	Kuwait	Afghanistan	Lesotho	Togo
Bolivia	Algeria	Iran, Islamic Rep.	Slovak Republic	Austria	Luxembourg	Bangladesh	Liberia	Uganda
Brazil	Angola	Jamaica	South Africa	Bahrain	Malta	Benin	Madagascar	West Bank and Gaza
Chile	Armenia	Jordan	Sri Lanka	Belgium	Netherlands	Burundi	Malawi	Yemen, Rep.
Colombia	Azerbaijan	Kazakhstan	Swaziland	Canada	New Zealand	Cameroon	Mali	Zambia
Costa Rica	Belarus	Latvia	Syrian Arab Republic	Cyprus	Oman	Central African Republic	Mauritania	Zimbabwe
Ecuador	Bosnia and Herzegovina	Lebanon	Thailand	Denmark	Portugal	Chad	Mongolia	
El Salvador	Botswana	Lithuania	Tunisia	Finland	Qatar	Comoros	Nepal	
Guatemala	Bulgaria	Macedonia, FYR	Turkey	France	Singapore	Congo, Dem. Rep.	Niger	
Honduras	China	Malaysia	Turkmenistan	Germany	Slovenia	Ghana	Nigeria	
Mexico	Congo, Rep.	Mauritius	Ukraine	Greece	Spain	Guinea	Rwanda	
Nicaragua	Czech Republic	Montenegro	Uzbekistan	Hong Kong SAR, China	Sweden	Haiti	Senegal	
Panama	Djibouti	Morocco		Ireland	Trinidad and Tobago	India	Sierra Leone	
Paraguay	Estonia	Philippines		Israel	United Arab Emirates	Iraq	Somalia	
Peru	Gabon	Poland		Italy	United Kingdom	Kenya	Sudan	
Uruguay	Georgia	Romania		Japan	United States	Kyrgyz Republic	Taiwan, China	
	Hungary	Russian Federation		Korea, Rep.		Lao PDR	Tajikistan	

Annex II: Alternative Measures of Financial Inclusion and Obstacles to Financial Inclusion

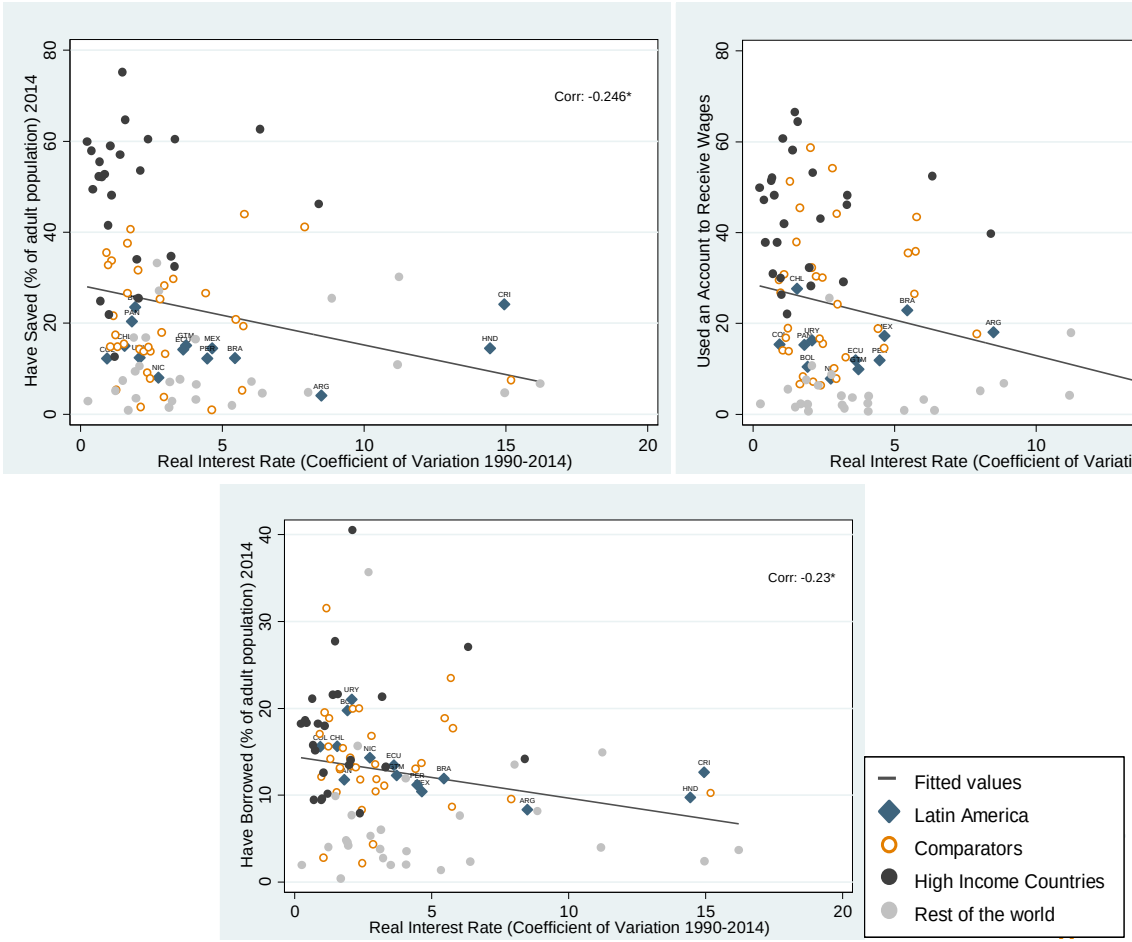
1. Income Inequality: Gini Coefficient



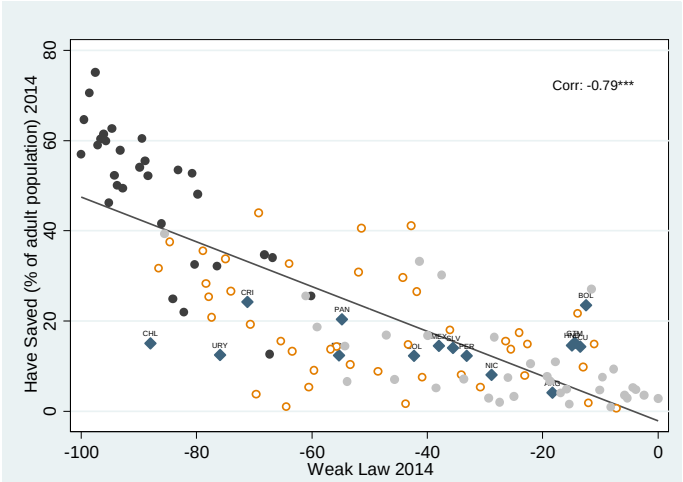


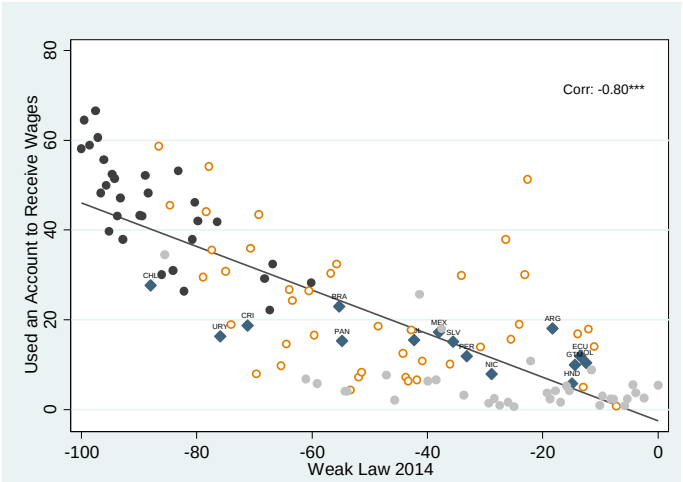


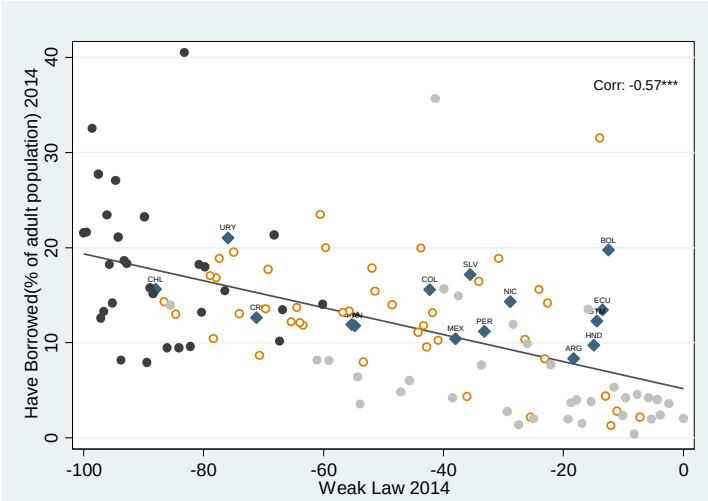
2. Macroeconomic Instability: Coefficient of Variation of Real Interest Rates



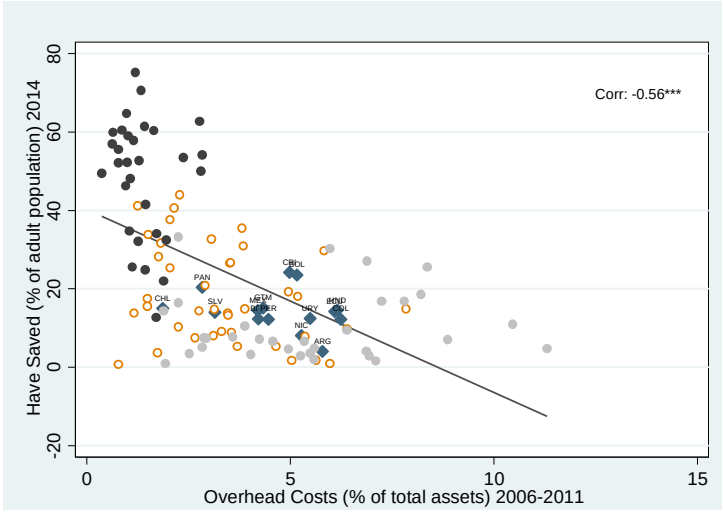
3. Quality of Institutions: Weak Law

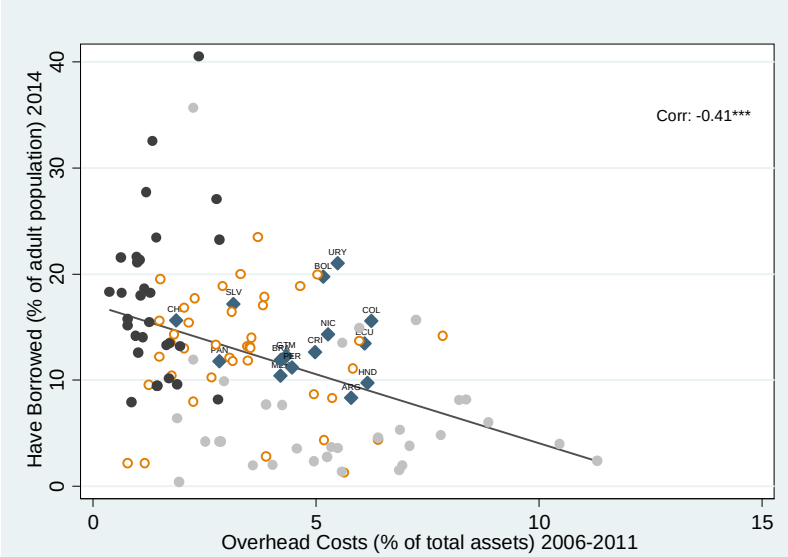






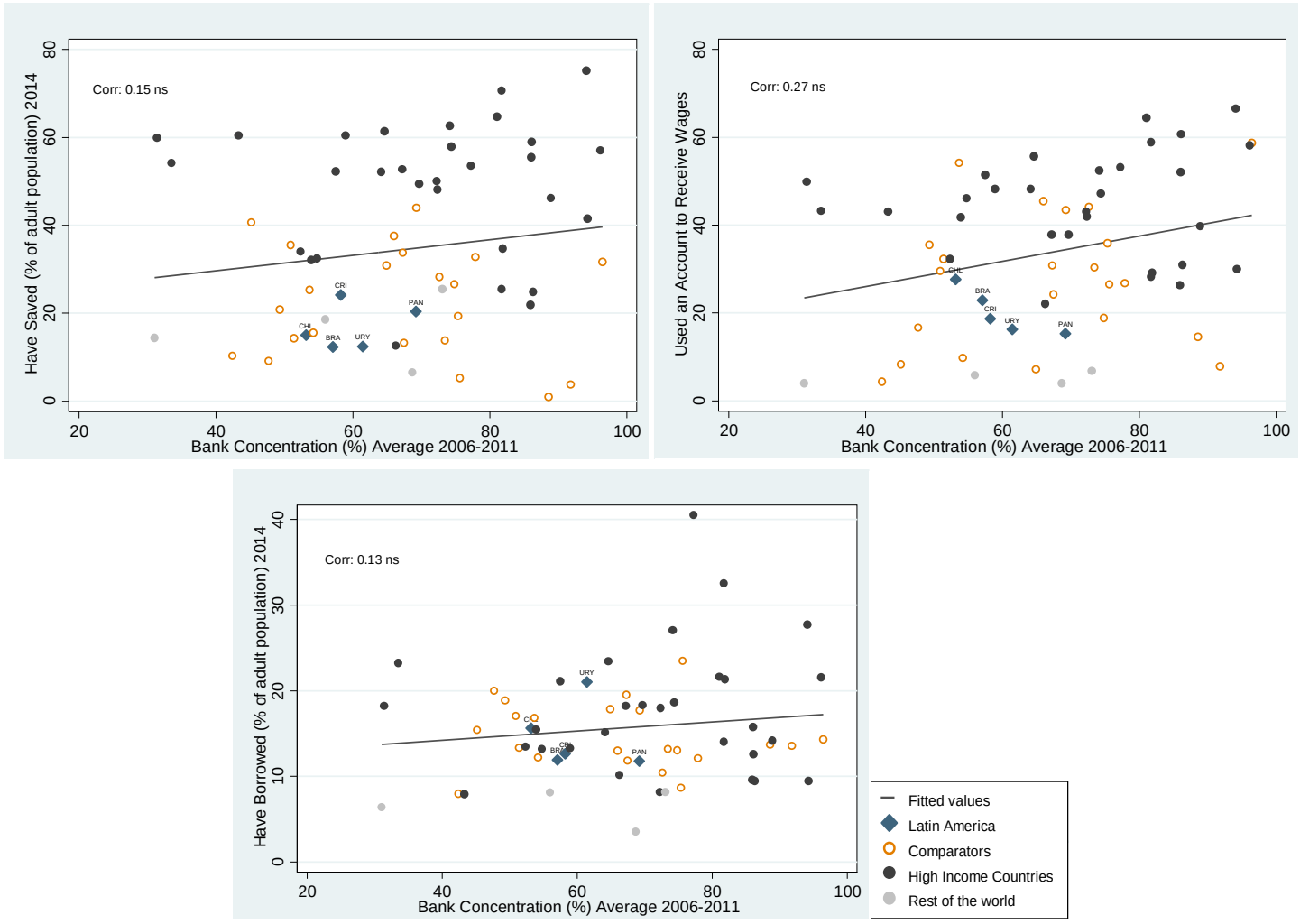
4. Inefficiencies/Inadequacies Financial Sector: Overhead Costs/Total Assets



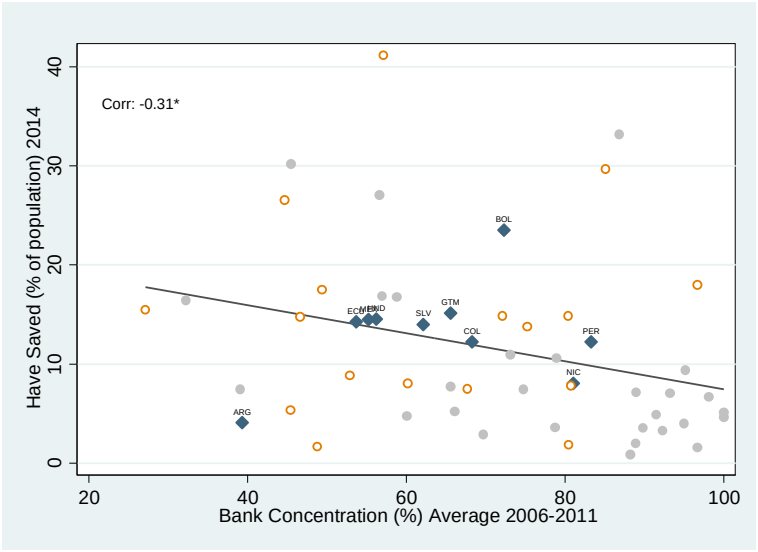


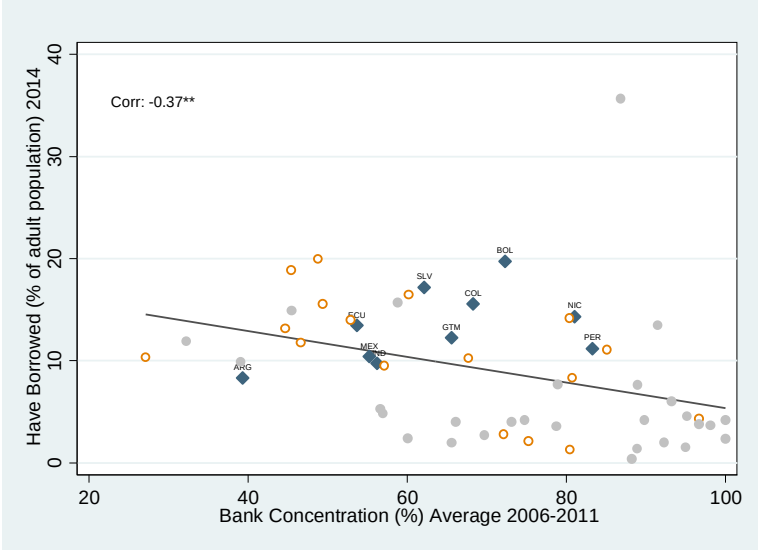
5. Inefficiencies/Inadequacies Financial Sector: Bank Concentration

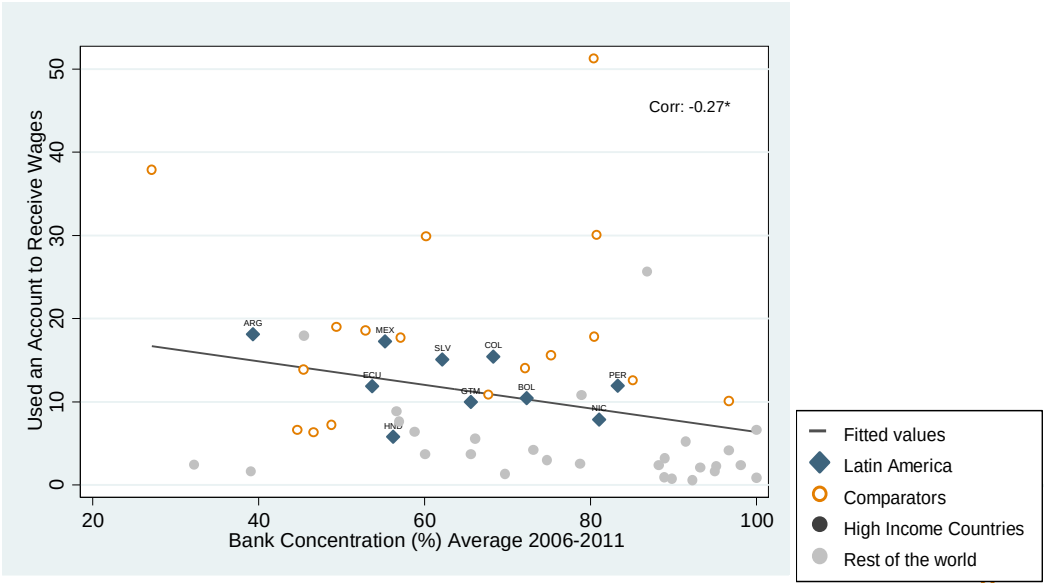
a. High Institutional Quality Countries



b. Low Institutional Quality Countries







Annex III: Endogeneity Test for *Income Inequality*

The Durbin-Wu-Hausman test is used to identify the potential endogeneity of *Income_Inequality*. To this end, and following Calderon and Chong (2001), the following trade variables are used as instruments: (a) *Trade_Openness:* ratio of exports plus imports to GDP in 2013 from the World Bank database; and (b) the interaction between trade openness and trade concentration (*Trade_Openness*Trade_Concentration*)**:** *Trade_Concentration* is a concentration index (HHI) of merchandise exports and imports for 2013, normalized to obtain values ranging from 0 to 1 (1 represents maximum concentration). The source of these data is the United Nations Conference on Trade and Development (UNCTAD). Calderon and Chong (2001) argue that although higher level of trade openness decrease income inequality, the effect is reduced at high levels of trade concentration.
The following table shows the results from the Durbin-Wu-Hausman test

Instrumented variable: *Income_Inequality*

Excluded Instruments	Durbin-Wu-Hausman	P-value
Trade_Openness		
Trade_Openness*Trade_Concentration	0.2677	0.6048

** Null: variables are exogenous*

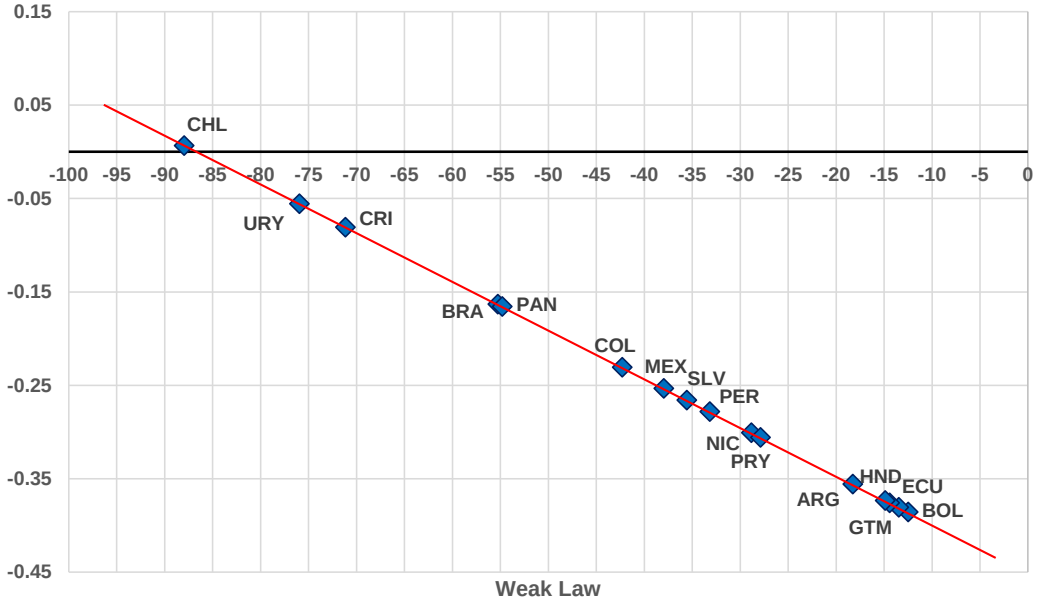
The p-value from the test show that the endogeneity of *Income_Inequality* in the regression can be rejected.

Annex IV: The Marginal Effect of Bank Concentration on Financial Inclusion in Latin American Countries

Taking into account the importance of the interaction between bank concentration and institutional quality to explain financial inclusion, the relevant coefficients from the regression discussed in Table 3 can be used to estimate the *marginal effect of bank concentration on financial inclusion*. This effect has two components: (a) the linear, direct effect of bank concentration (equal to the estimated regression coefficient of the variable *bank concentration*) and (b) the non-linear effect derived from the impact of institutional quality (*Weak_Law)* on bank concentration in affecting financial inclusion (equal to the value of the estimated parameter of the interaction, *Bank_Concentration*Weak_Law,* multiplied by the 2014 value of the variable *Weak_Law*.

Such a computation generates the straight line depicted in the chart below. Clearly, the marginal effect of bank concentration varies for every possible value of the variable *Weak_Law*. As shown in the Chart, the lower the quality of institutions (the higher the value of the *Weak_Law* variable), the larger the negative total effect of bank concentration on financial inclusion. The chart also shows that there is a range where institutional quality is high enough that increases in bank concentration do not have an adverse effect on financial inclusion (the most advanced economies are in that range).

Marginal Effect of Bank Concentration on Financial Inclusion



Source: Own calculations based on regression 7 of Table 3 in the main text and Worldwide Governance Indicators (2014)

For 2015 values of the variable *Weak_Law,* Chile is the only country that passes the threshold. In Chile the quality of institutions is high enough to more than offset the negative impact of bank concentration on financial inclusion. In the rest of Latin American countries, an increase in bank concentration affects financial inclusion negatively.