



Financing Infrastructure in Latin America and the Caribbean: How, How much and by Whom?

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Introduction

Infrastructure is vital for economic growth and development; production in modern societies and the provision of basic services such as education or health would be impossible without reliable roads, water, sanitation, and electricity. Infrastructure spurs growth by increasing productivity, reducing production costs, facilitating the accumulation of human capital (through easier access to educational opportunities), helping diversify the productive structure, and creating employment (IDB 2014).¹

Empirical research shows a positive correlation between growth and infrastructure investment in Latin America and the Caribbean (LAC). Calderón and Servén (2010) find that the increase in the infrastructure stock between the five-year periods 1991–95 and 2001–05 contributed 1.1 percentage points a year to economic growth in the region. Standard & Poor’s (2015) estimates that infrastructure spending of 1 percent of GDP would increase the size of the economy by 2.5 percent in Brazil, 1.8 percent in Argentina, and 1.3 percent in Mexico after three years. Despite this evidence—and the massive body of research on the positive impact of infrastructure on growth more generally—total infrastructure investment in LAC has fallen since the late 1980s.

Low investment levels have created a sizable infrastructure gap in LAC. A range of studies suggests the need for LAC to invest about 5 percent of GDP in infrastructure for a prolonged period of time to close the gap (IDB 2014, 2013; Bhattacharya et al. 2012; ECLAC 2011; Kohli and Basil 2010; Fay and Yepes 2003; Calderón and Servén 2003; Perrotti and Sanchez 2011).

Much attention has been devoted to how much infrastructure investment LAC needs. Less attention has been devoted to where that investment comes from. This report examines how much LAC invests in infrastructure, who is doing the investing, and what financial instruments are being used. The first section describes the problem of underinvestment in infrastructure. The next sections examine public and private investment, with a focus on how to increase investment. The third section analyzes the pattern of public sector investing, documenting the effect of public saving on public infrastructure investment. The fourth section lays out the need to make infrastructure a more appealing asset, in particular to institutional investors, who administer an increasing share of private savings. The last section proposes recommendations for the development of infrastructure as an asset class in LAC.

1 Theoretical work on the contribution of infrastructure to productivity and growth began with Arrow and Kurz (1970), who were the first to include public capital as an input in the economy’s aggregate production function. Empirical research started later, with Aschauer (1989).

2 For a comprehensive review of the theoretical and empirical literature on the impact of infrastructure on productivity and growth, see Infrastructure Canada (2007).

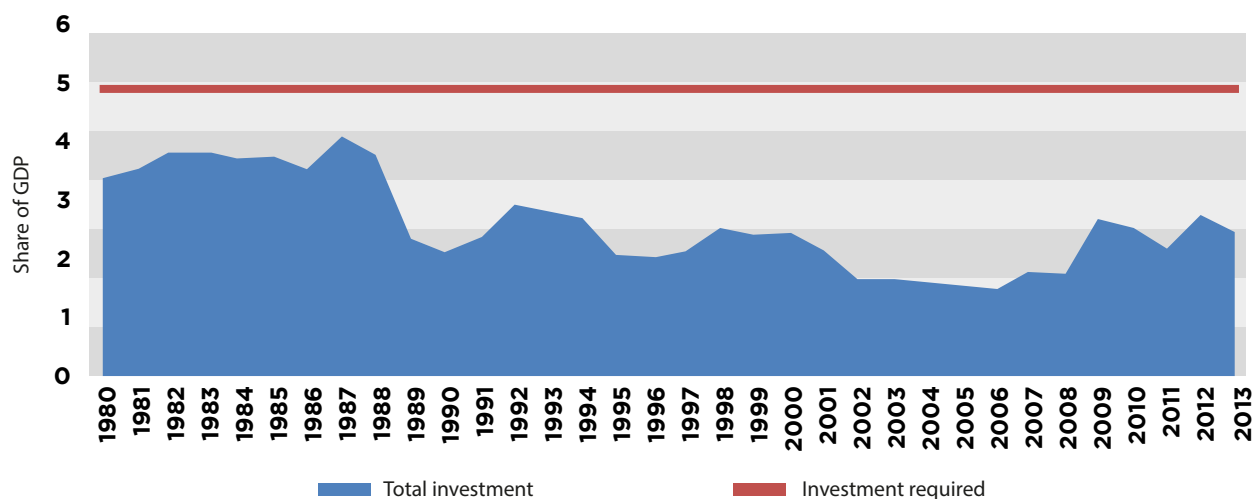


Underinvestment in Infrastructure

LAC has a sizable infrastructure gap (figure 1). The most common approaches to measure the infrastructure gap are defined in terms of the infrastructure a country or region needs (a) to meet a target growth rate, (b) to achieve a specific objective, such as a coverage rate (for example, 100 percent of access to water and sanitation), or (c) to achieve an infrastructure stock similar to a country or group of countries. A range of studies concludes that the region needs to invest at least 5 percent of GDP in infrastructure for a prolonged period of time (Bhattacharya, Romani, and Stern 2012); Calderón and Servén 2003; ECLAC 2011; Fay and Yepes 2003; IDB 2013, 2014; Kohli and Basil 2010; Perrotti and Sanchez 2011).³ If these estimates are correct, the region requires additional infrastructure investment of 2.0–2.5 percent of GDP or \$120–\$150 billion a year (based on the region’s 2013 GDP).

Figure 1

Annual investment in infrastructure in Latin America and the Caribbean, 1980–2013



Note: Figure includes data for Brazil, Chile, Colombia, Mexico, and Peru, the countries for which data are available from the 1980s.

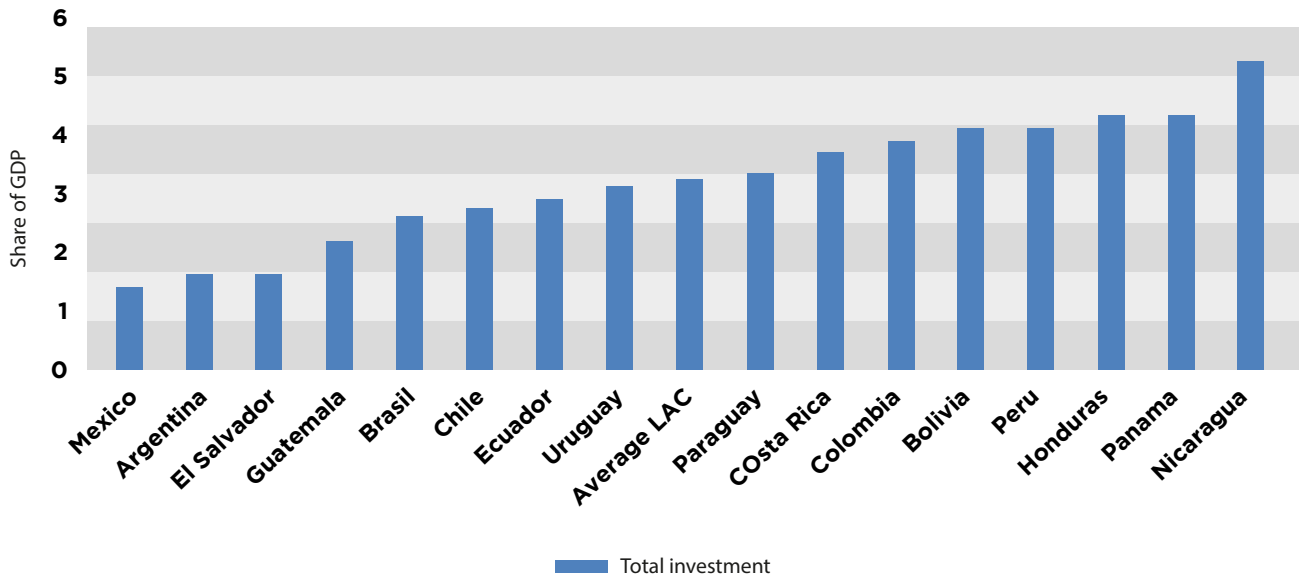
Source: Data from CAF 2013, Calderón and Servén 2010, and ECLAC 2014.

A regional and country-basis comparison supports the hypothesis that LAC is underinvesting in infrastructure. Investment in infrastructure averaged 2.4 percent between 1992 and 2013. Investment in other regions and countries was significantly higher: 8.5 percent in China, 5.0 percent in Japan and India, and about 4.0 percent in other industrial economies (Australia, Canada, Croatia, the Republic of Korea, and New Zealand, and among others). Infrastructure investment in LAC is 0.8 percent of GDP lower than in the United States and the European Union, regions with much more developed capital stocks, which require more maintenance investment rather than new infrastructure capacity (McKinsey Global Institute 2013).

³ This figure does not include the investment required to mitigate and adapt to climate change, estimated at \$30 billion a year, or 0.6 percent of GDP (Vergara et al. 2013), or to maintain infrastructure in all cases (IDB 2014).

Figure 2

Annual average investment in infrastructure in selected countries in Latin America and the Caribbean, 2008-13



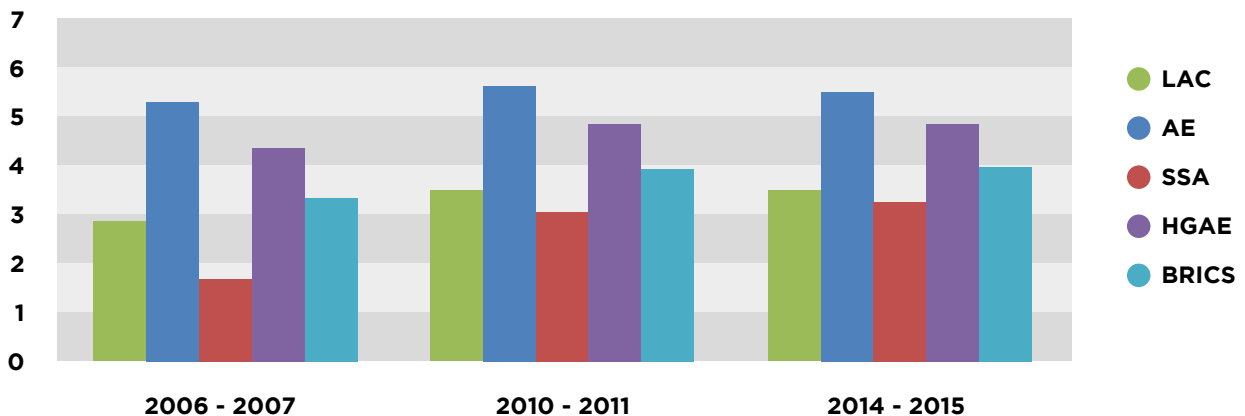
Source: Data from CAF 2013 and ECLAC 2014.

The low level of investment in infrastructure is a problem across LAC. In fact, only one small country (Nicaragua) surpassed the 5 percent of GDP threshold between 2008 and 2013. None of the largest economies (Argentina, Brazil, Chile, and Mexico) invested more than 3 percent of GDP, far less than what studies recommend to close the infrastructure gap.

The World Economic Forum’s survey on perceptions of infrastructure quality—the most cited and used survey worldwide—reveals that the quality of infrastructure in LAC is lagging, particularly compared with advanced economies and high-growth Asian economies (figure 3). Even more worrisome is the comparison with Sub-Saharan Africa (SSA), where the quality gap is being reduced. If the rate of improvement in SSA continues, LAC risks becoming the region with the worst perceptions of infrastructure quality.

Figure 3

Perceived Infrastructure Quality: a regional comparison (2006-2015)



Source: Source: Data from the World Economic Forum 2006-15.



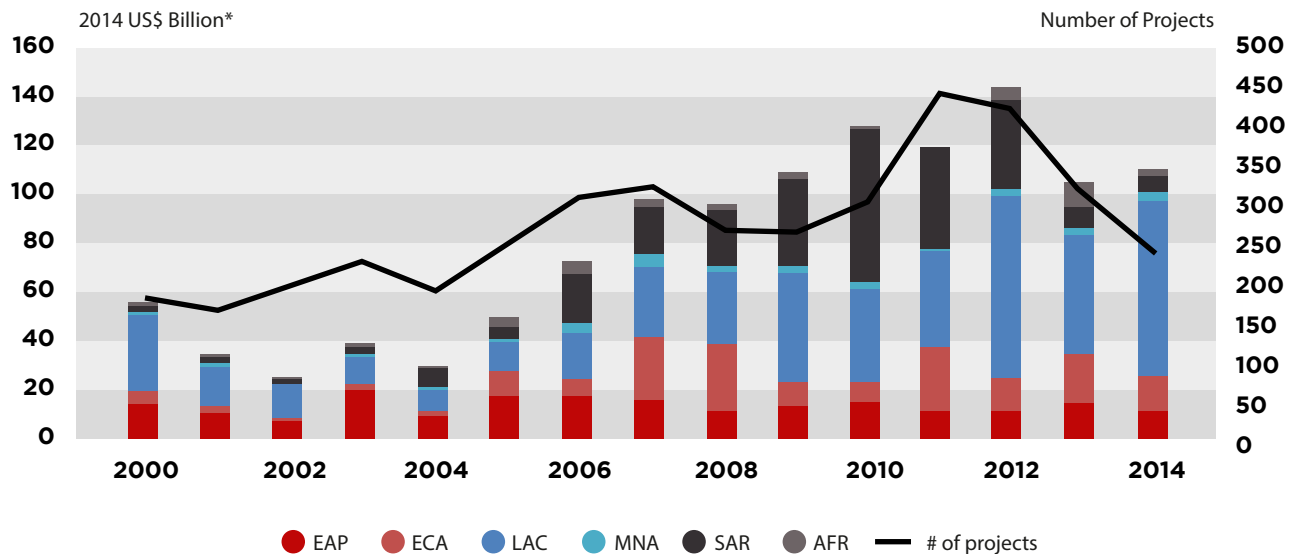
Public and Private Investment in Infrastructure

Is the public or the private sector to blame for the low levels of infrastructure investment in LAC? Only the public sector can plan and regulate infrastructure,⁴ but both the public and the private sectors can provide infrastructure. Indeed, private firms provide infrastructure services in many countries in LAC, through a variety of public-private partnerships, including management contracts and concessions.

LAC has been the leader among developing regions in private investment in infrastructure (figure 4). From 1990 to 2013, the private sector invested \$680 billion in LAC, about 30 percent more than in the high-growth Asian economies (\$503 billion) and more than five times as much as in Sub-Saharan Africa (\$130 billion).

Figure 4

Annual private investment in energy, water, and transport infrastructure, by region, 2000-14



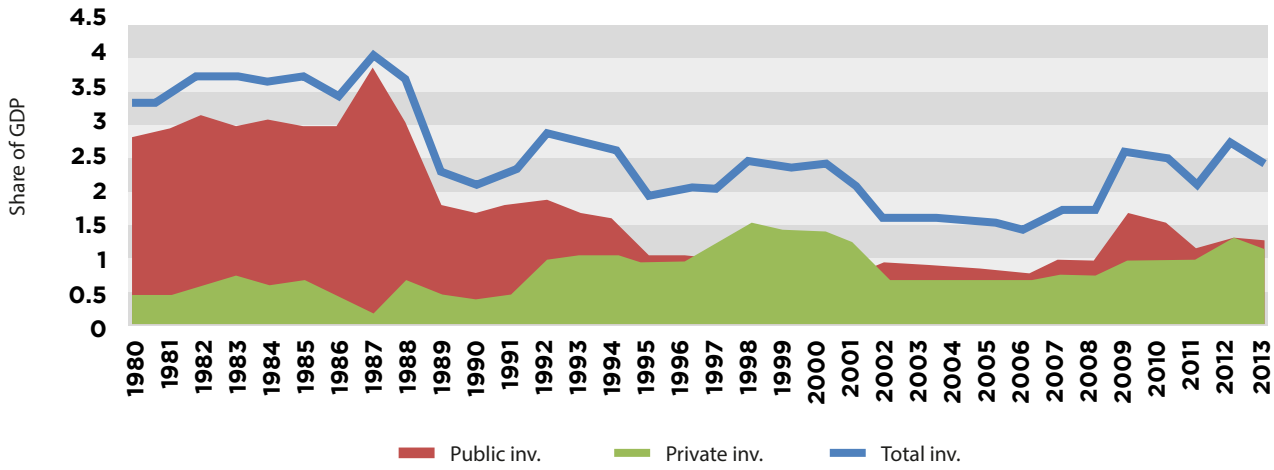
Source: World Bank Private Participation in Infrastructure (PPI) database 2015.

Although the level of private investment increased in LAC from the early 1990s, reaching 1.5 percent of GDP in some years, it was not sufficient to replace public investment. Total investment levels as a percent of GDP were lower than in the 1980s (figure 5).

⁴ Infrastructure requires rigorous planning, because it creates positive externalities (network effects) and negative ones (mainly environmental and social). It requires proper supervision to ensure that services comply with adequate quality standards.

Figure 5

Annual public and private investment in infrastructure in Latin America and the Caribbean, 1980-2013



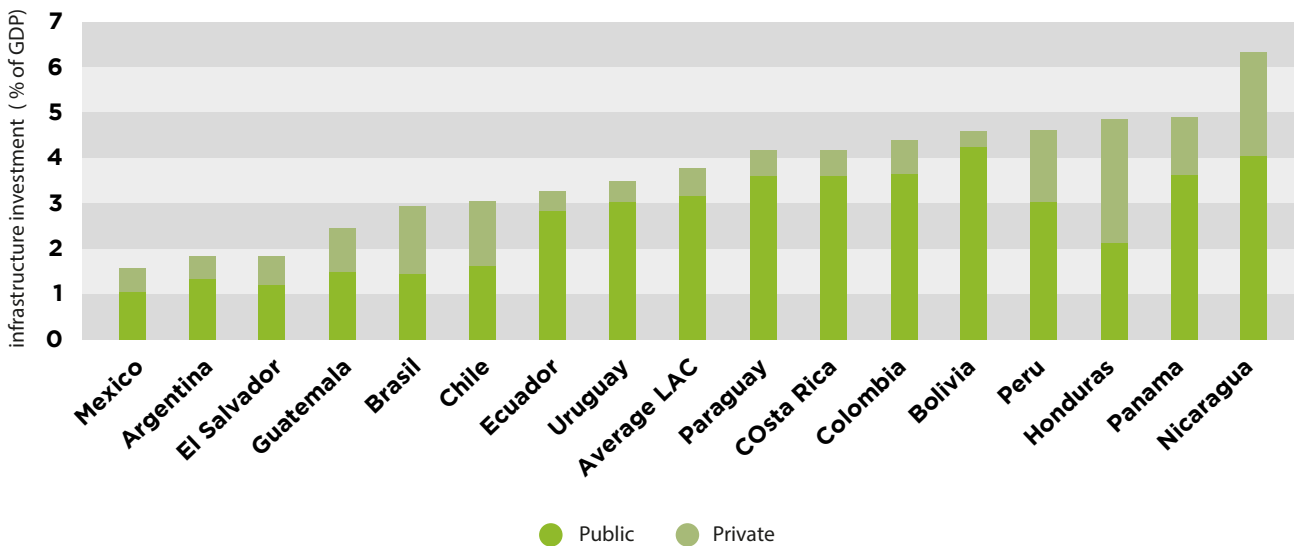
Source: Data from CAF 2013, Calderón and Servén 2010, and ECLAC 2014.

Note: Figure shows investment by Brazil, Chile, Colombia, Mexico, and Peru, the only countries in the region for which data are available from the 1980s.

Public investment in infrastructure is higher than private investment in all countries in LAC (figure 6). It fell after 1987, for two main reasons. First, fiscal space narrowed, as a consequence of the adoption of macroeconomic policies in the 1990s aimed at reducing public sector expenditures. Second, policy makers believed that opening infrastructure services to private ownership and operations would compensate for the reduction in public investment in infrastructure (Fay and Morrison 2007).

Figure 6

Average annual public and private investment in infrastructure in Latin American and the Caribbean, by country, 2008-13



Source: Data from CAF 2013 and ECLAC 2014.

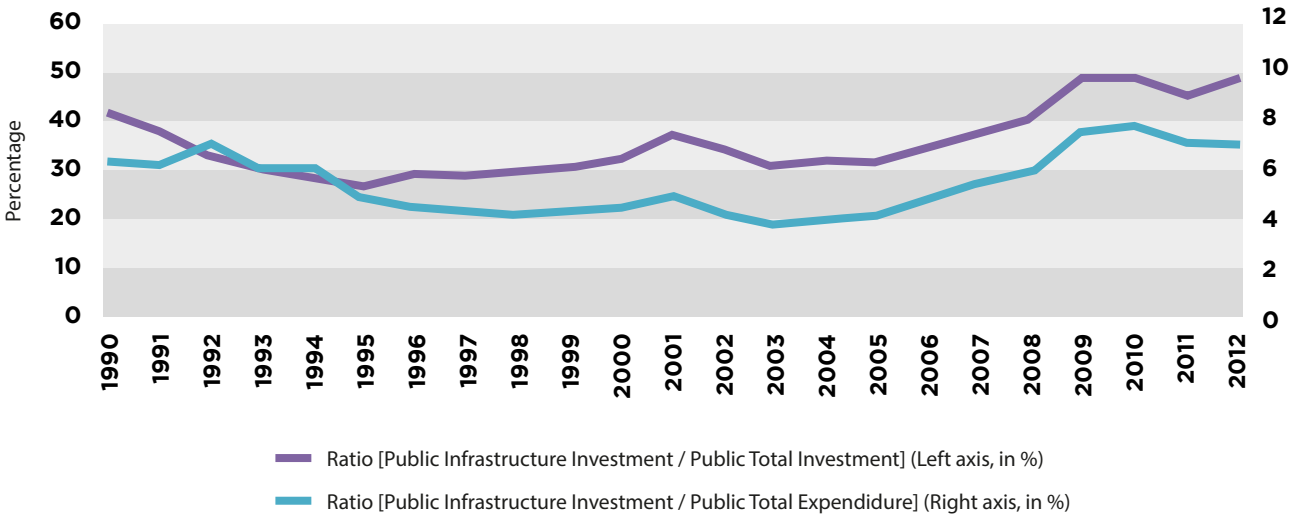


The Effect of Past Fiscal Balances on Investment in Infrastructure

Public investment in infrastructure as a percentage of total public investment declined during the 1990s, remaining at 30 percent until the mid-2000s. Starting in 2005, the composition of public investment changed in favor of infrastructure, as its share of public investment increased from 30 percent to 50 percent. The challenge is to sustain the increase in public infrastructure investment. If history is a good predictor of future behavior, prospects are not favorable to make the ramp-up in infrastructure investment permanent.

Figure 7

Annual public investment in infrastructure in Latin America and the Caribbean, 1990–2012



Note: Data are for LAC-6 (Argentina, Brazil, Chile, Colombia, Mexico, and Peru), because complete time series for other LAC countries are available only from the mid-2000s.
Source: Data from IMF 2014, Calderon and Servén 2010, and IDB, based on country data collection.

There is a widespread belief among experts, practitioners, and academics that when governments need to improve their fiscal accounts in times of deteriorating fiscal conditions, reductions in public allocations to infrastructure investment are proportionally much deeper than cuts in current expenditures or tax revenue.⁵ Between 1987 and 1992, a period of financial and fiscal crises in LAC, a third of the improvement in fiscal accounts came from lower infrastructure investment: On

average, public deficits were reduced by 6 percent of GDP and public investment in infrastructure by 2 percent of GDP—equivalent to reducing public infrastructure investment by more than 60 percent (Carranza et al. 2011). As a result of the slowdown in economic growth, subnational governments in Brazil reduced their investment in infrastructure by 46 percent during the first half of 2015 (Bächtold and Britto 2015).

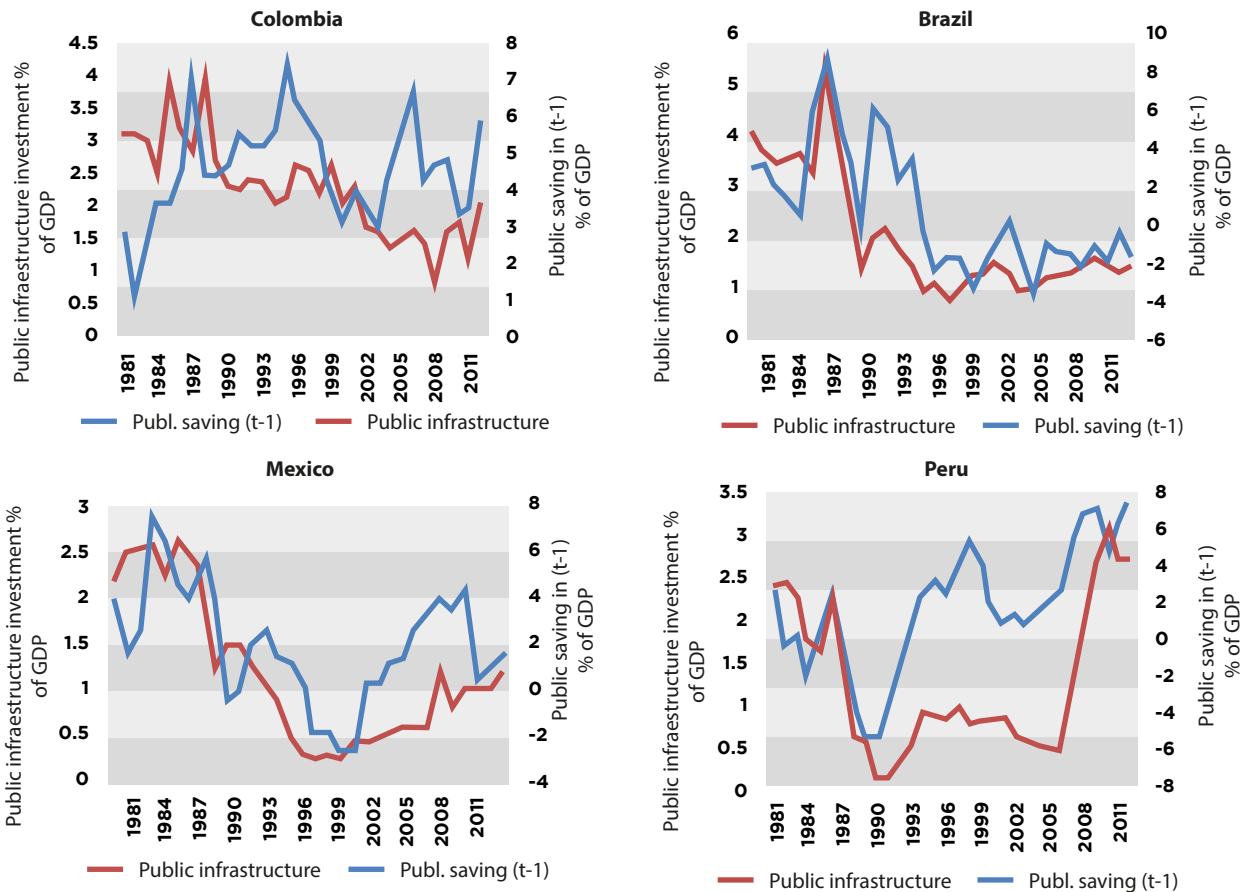
⁵ See, for example, CAF (2009); Calderón and Servén (2004); Carranza, Daude, and Melguizo (2011); de Mello and Mulder (2006); and Lora (2007).

The relationship between public infrastructure investment and fiscal balances is usually analyzed using contemporaneous correlations (that is, by examining how variables change during the same period, generally within a given year). This approach ignores the nature of the production of infrastructure assets. Designing, implementing, and executing a project usually takes years. Funding arrangements need to be secured when project planning starts, and resources have to be committed in advance (starting with preinvestment studies, which account for at least 2-5 percent of total project costs), sometimes years before initial disbursements. In addition, once a project starts, it is not always feasible to stop funding on short notice. It is therefore sometimes easier to cut spending in projects that are in the early phase of project preparation and thus have not yet begun to be executed. For these reasons, it is more appropriate to analyze lagged correlations.

As percentages of GDP, public investment in infrastructure and public savings in $t - 1$ move together: There are no significant increases in public investment in infrastructure in year t that do not coincide with an increase in public savings in year $t - 1$ (figure 8). Fiscal problems at the end of the 1980s dramatically affected infrastructure investment in the four countries studied.

Figure 8

Annual public infrastructure investment and lagged public savings in Brazil, Colombia, Mexico, and Peru, 1981-2012



Source: Data from CAF 2013, Calderón and Servén 2010, and IMF 2014.

The relationship between public savings and public investment is not necessarily symmetrical in good times and bad. Higher fiscal balances can be invested or not, depending, among other factors, on whether the improvement is perceived as permanent or transitory. Even when improvements last more than two or three years, the additional savings may not be invested. Bolivia, for example, experienced a dramatic increase in saving after 2005, but these additional saving did not translate into similar increases in public infrastructure investment (Jemio and Nina 2016). In contrast, when fiscal balances diminish and there are no alternative sources of funding, such as external credit, expenditure has to be reduced—and infrastructure is usually the main candidate. It is therefore likely to expect reductions in infrastructure investments in bad times to be larger than increases during good times.

Data to test this hypothesis are not readily available, as is usually the case in the infrastructure sector. The best available data for 1980–2006 come from Calderón and Servén (2010). We supplement them with data through 2012 from CAF (2013) and ECLAC (2014).⁶ These databases contain data for economic infrastructure in communications; energy (transport and distribution of electricity and natural gas, oil generation and transport are excluded); transport; and water and sanitation. The data cover Brazil, Chile, Colombia, Mexico, and Peru. These five countries encompass most of the public investments in infrastructure in LAC; together they account for 75 percent of the region’s GDP and more than 70 percent of the region’s public investments in infrastructure.

Data on fiscal space (public saving) come from the International Monetary Fund’s World Economic Outlook Database. We tested the hypothesis that lagged fiscal space affects investment in infrastructure by running a panel regression with country and year fixed effects. Table 1 displays the results.

Table 1

Regression results on relationship between public savings (S) and public investment in infrastructure

Variable: Public investment	1	2	3	4
S public (t - 1)	0.054*** (2.63)	0.092*** (3.25)		
S public (t - 2)	0.050** (2.44)	0.029 (1.00)		
S public (t - 1) +			0.048** (2.17)	0.097*** (3.42)
S public (t - 2) +			0.025 (1.02)	-0.011 (-0.30)
S public (t - 1) -			0.075*** (2.82)	0.133*** (3.07)
S public (t - 2) -			0.063** (2.66)	0.026 (0.71)
R²	0.63	0.63	0.63	0.65

Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

⁶ Calderon and Servén (2010) have data for six countries for 1980–2006. CAF (2013) has data for 10 countries from 2008 to 2011. We use the six countries that are common to both databases. Investments for 2007 and 2012 come from ECLAC estimates.

The results obtained are consistent with intuition. Public infrastructure investment responds to lagged changes in public saving, and the response is asymmetric: The increase in infrastructure investment when public saving rises is lower than the decrease in infrastructure investment when public saving falls.

We tested the hypothesis of an asymmetric response of public infrastructure investment to changes in public saving during 1981–2012. When public saving the previous year (t-1) rises by 1 percent of GDP, public investment in infrastructure in the current year (t) increases by 0.10 percent of GDP. When public saving in (t-1) declines by 1 percent of GDP, public investment in infrastructure in (t) decreases by 0.13 percent of GDP.

These numbers are significant and show that the availability of savings is a determinant of public investment: A decrease of 5 percent of GDP in public saving is associated with a drop of 0.65 percent in public infrastructure investment. Such a reduction represents more than 50 percent of the region’s average public infrastructure investment during the past 25 years and almost 40 percent of the average in 1980–2012.⁷ The evidence for LAC is conclusive: Fiscal crises dramatically reduce infrastructure investment.

These results also hold for total investment in infrastructure (table 2). As in the case of public investment, total investment in infrastructure reacts to lagged changes in public savings and shows an asymmetric response. Total investment in infrastructure increases by 0.16 percent of GDP when public saving rises by 1 percent of GDP the previous period, and it falls by 0.24 percent of GDP when public saving declines by 1 percent of GDP the previous period. This result points to the complementarity between public and private investment in infrastructure. This issue is an empirical one that has not been researched at length. In principle, there are many reasons why public and private investment in infrastructure are complementary. Cases in which governments grant concessions or participate in public-private partnership (PPP) programs are the best candidates for observing complementarities: Concessions open up space for government financing of infrastructure that does not receive private financing, while PPPs imply co-financing and allow public resources to be leveraged with private financing.

Table 2

Regression results on relationship between public savings and total investment in infrastructure

Variable: Public investment	1	2	3	4
S public (t - 1)	0.086*** (0.30)	0.156*** (0.044)		
S public (t - 2)	0.062** (0.030)	0.027 (0.60)		
S public (t - 1) +				
S public (t - 2) +			0.080** (0.033)	0.163*** (3.66)
S public (t - 1) -			0.041 (0.037)	-0.039 (0.514)
S public (t - 2) -			0.105*** (0.039)	0.237*** (3.490)
			0.073** (0.035)	0.006 (0.110)
R²	0.26			

Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

⁷ Public investments in infrastructure average 1.69 percent of GDP from 1980 to 2012, but they average just 1.15 percent of GDP between 1990 and 2010, after the retrenchment of the public sector. A reduction of 0.65 percent of GDP in public investments represents 57 percent of the region average public investments in infrastructure during the last 25 years, and 38 percent of the whole sample period average.

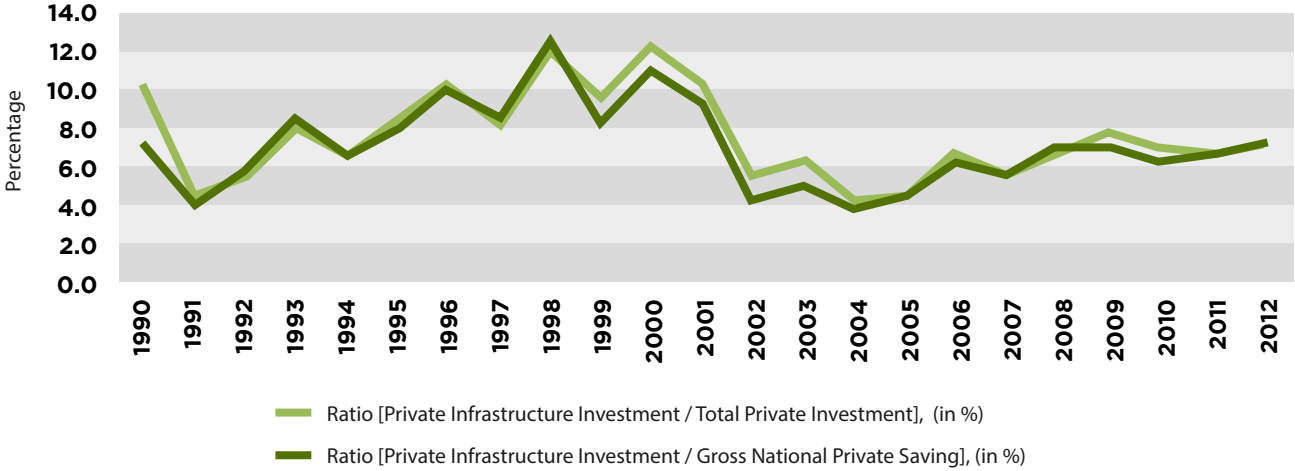


Increasing Private Financing of Infrastructure

Public investment alone will not be able to increase the stock and quality of infrastructure to adequate levels; LAC will need to increase private investment in infrastructure. The way forward for LAC is to generate the conditions required to substantially increase private investment in infrastructure. How much does private investment need to increase? The answer depends on the behavior of public investment. If public investment reaches 2 percent of GDP (an optimistic assumption), private investment would need to triple (from 1 percent to 3 percent of GDP) to reach the threshold of 5 percent of GDP required to close the infrastructure gap. Figure 9 illustrates the evolution of private infrastructure investment as a share of total private investment suggests that there is potential to increase private investment in infrastructure in the region, at least to the levels observed in the late 1990s, a level of investment that corresponds to more than 0.5 percent of GDP—far short of the required increase of 2 percent of GDP (figure 5).

Figure 9

Annual private investment in infrastructure in Latin America and the Caribbean, 1990–2012



Note: Data are for LAC-6 (Argentina, Brazil, Chile, Colombia, Mexico, and Peru), because complete time series for other LAC countries are available only from the mid-2000s.

Source: World Bank Private Participation in Infrastructure (PPI) database and IMF 2014.

The challenge of increasing private investment in infrastructure requires simultaneous action on two fronts: (a) strengthening the regulatory and institutional capacity to create a pipeline with well-prepared projects and (b) developing infrastructure as an asset class to channel private savings to infrastructure. A body of knowledge describes how to design and implement public-private partnerships or projects with private participation (for a recent LAC-specific study that surveys the enabling environment for public-private partnerships in infrastructure see MIF 2014). The studies that have been conducted concentrate almost exclusively on the project level—characteristics (sector, investment commitments, sponsors, project finance structuring) and performance (productivity, quality of services). There is a notable lack of evidence on what is missing in LAC to boost infrastructure as an asset class. Understanding the infrastructure financing market seems a next logical step to determine how to boost investment.

Several characteristics distinguish infrastructure assets from other types of fixed capital. They include significant up-front construction costs; high initial risks, because of unexpected construction costs and demand uncertainty; the time profile of revenues decoupled with highest expenditures and the impossibility of reconverting the assets to alternative uses. These characteristics imply that the only feasible way to pay for infrastructure assets is through long-term financing.

Ideally, long-term financing of infrastructure should be in local currency. Although it is possible to rely on foreign savings, the evidence for LAC suggests that doing so is not usually feasible. In recent years, when the region was growing, foreign direct investment (FDI) represented 3 percent of GDP, but only 10 percent of that amount was allocated to infrastructure, almost all of it in Chile and Brazil (IDB 2013). Analysis of FDI flows to infrastructure reinforces the fact that foreign savings are not a game changer for infrastructure financing in LAC. Even if FDI were available, there are clear advantages to obtaining long-term financing in local currency. In LAC, where capital markets are not sufficiently developed and hedging opportunities are rarely available; external financing is consequently difficult to secure for infrastructure projects where assets have no alternative use. Foreign financing creates a mismatch between the income obtained from the provision of infrastructure (in local currency) and the payment of debt obligations (in external currency). This currency mismatch has proven to be a source of instability and renegotiation of long-term contracts.

Another reason why long-term financing should be in local currency is that international investors usually require the active participation of local investors as co-financiers in infrastructure projects. Thus, national savings channeled with the appropriate instruments to accommodate the specific needs of infrastructure will be necessary to close the prevailing infrastructure gap in LAC.

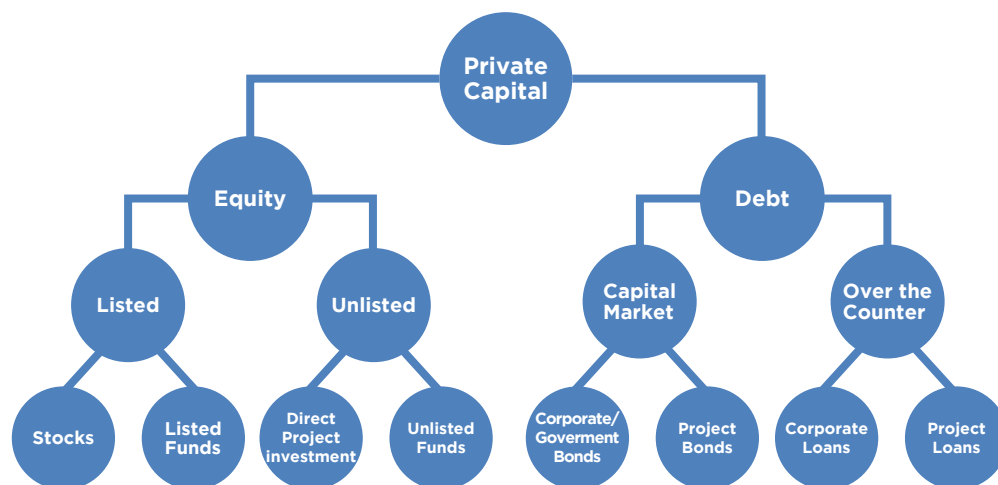
The financial crises of 2008/09 dramatically reduced private financing of infrastructure. Monoliners (financial vehicles that worked as credit enhancement instruments) disappeared, and commercial banks' desire to provide long-term lending cooled, as a consequence of stricter credit provision rules (imposed by Basel III regulations).⁸ The decline in infrastructure financing and the need of several countries to impose policies to reduce public expenditure sparked a rush of policy reports by multilateral development banks, the G-20, think tanks, and academia that advocated for more private sector participation in infrastructure as the only way to maintain and improve the stock and quality of infrastructure services (see, for example, G-20 2011; Inderst 2013; OECD 2013). A common feature of these reports is that they fail to identify who is included in the definition of private sector, what the role of each private sector actor is, and which vehicles are more frequently used to channel infrastructure investments. It should not come as a surprise that the lack of information is more acute in developing regions, including LAC.

Private infrastructure financing takes two forms. Investors can invest directly in infrastructure projects by committing equity, or they can lend to specific projects or infrastructure companies (figure 10). Investments can be allocated through listed vehicles, such as publicly traded stocks of infrastructure companies, publicly traded government or corporate bonds, and investments in listed infrastructure funds, or through unlisted vehicles, such as equity or debt transactions made through private markets or investments in unlisted infrastructure funds. The relative importance of each channel varies greatly across countries, with the preferred vehicle usually depending on the degree of development of the domestic capital market, the regulatory and governance frameworks, and investors' capacity and knowledge (Estache, Serebrisky, and Wren-Lewis forthcoming).

⁸ For information on Basel III rules, see <http://www.bis.org/bcbs/basel3.htm>.

Figure 10

Types of private financing for infrastructure



Source: Inderst 2013 and Inderst and Stewart 2014.

Alternative agents or instruments are generally used to fund different phases of the project cycle. Banks are usually better prepared to assume the risks involved in complex infrastructure operations and to address information asymmetries, particularly in the early stages of project design, while long-term bond issuances and financing from institutional investors are more viable alternatives to extend and consolidate investment financing later in the project life (Canuto 2014; Ehlerst 2014). Equity and bank loans (a form of over-the-counter debt financing, in the terminology of figure 10) are therefore more common during the construction phase, when risks are higher, while project bonds are normally used during the operational phases, when projects can generate reliable cash flows and thus risks are lower.

No publicly available source provides information on the detailed composition of LAC's infrastructure finance market. To fill this gap, this document relies on a sample of 377 infrastructure projects implemented in LAC between 2004 and 2014, totaling more than \$156 billion.⁹ The information, obtained from the Infrastructure Journal Database, reveals the typology of active investors in LAC's infrastructure financing market.¹⁰

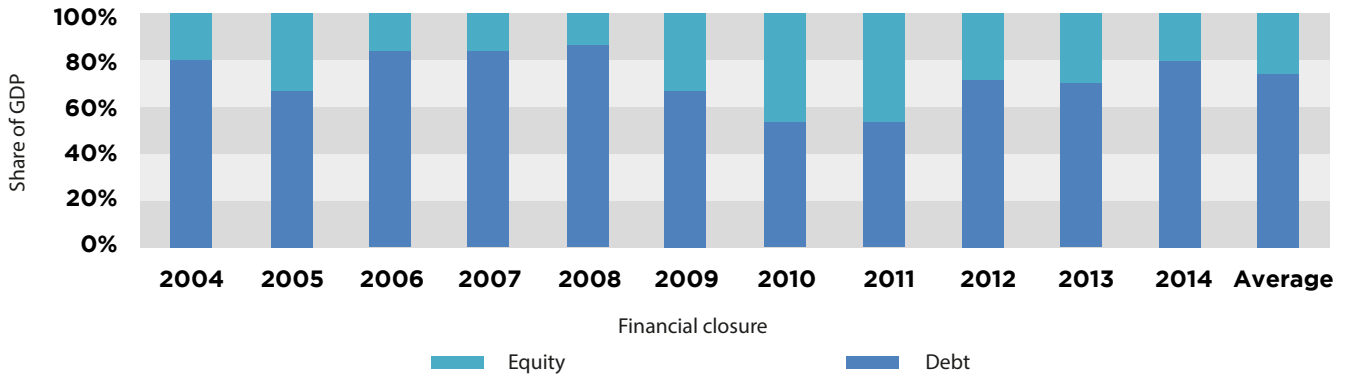
LAC's infrastructure has traditionally been financed with debt (figure 11). Equity gained ground at the end of the last decade, as a result of the financial crisis. Commercial banks decreased financing because of liquidity constraints and more restrictive regulation. At the same time, investors required sponsors to increase their participation with equity as a way to mitigate growing risks. But debt rapidly recovered. By 2011, the levels reached those in 2006-07. On average, debt accounted for two-thirds of private financing for infrastructure between 2004 and 2014. Almost all debt financing is over-the-counter debt (transactions that take place directly between two parties, without the supervision of an exchange, such as the New York Stock Exchange), a clear indication of the lack of depth of capital markets in LAC (figure 12).

9 The geographic distribution of the sample is as follows: Brazil (28.0 percent of projects), Mexico (26.7 percent), Chile (12.9 percent), Peru (7.9 percent), Panama (5.3 percent), Uruguay (3.8 percent), Honduras (2.8 percent), Colombia (2.1 percent), Jamaica (1.9 percent), Costa Rica (1.5 percent), Nicaragua (1.3 percent), and Argentina (1.3 percent). Other countries (the Bahamas, the Dominican Republic, Trinidad and Tobago, Belize, Bolivia, Ecuador, and Guatemala) together account for 4.4 percent. The sample covers the traditional economic infrastructure sectors. Power (the generation, transmission, and distribution of electricity, including renewables, and the transmission and distribution of natural gas) accounts for 50.9 percent of all projects. Transportation (roads, urban mass transit, rail, ports and airports, and river transport) accounts for 37.9 percent. Water and sanitation (provision of potable water, provision of sanitation services, and flood defenses) accounts for 6.5 percent. Telecommunications (fixed and mobile telecommunications, satellite, and Internet connectivity and multimedia services) accounts for 4.7 percent. Social infrastructure and the production of tradable goods such as oil and petrochemicals are not included.

10 The World Bank Private Participation in Infrastructure (PPI) Database also gathers information on infrastructure projects. Although it represents the most exhaustive database worldwide in terms of number of projects and investment (providing information on more than 6,000 infrastructure projects between 1984 and 2013), it does not break down projects by financing sources. The Infrastructure Journal Database is the most comprehensive source that provides this breakdown.

Figure 11

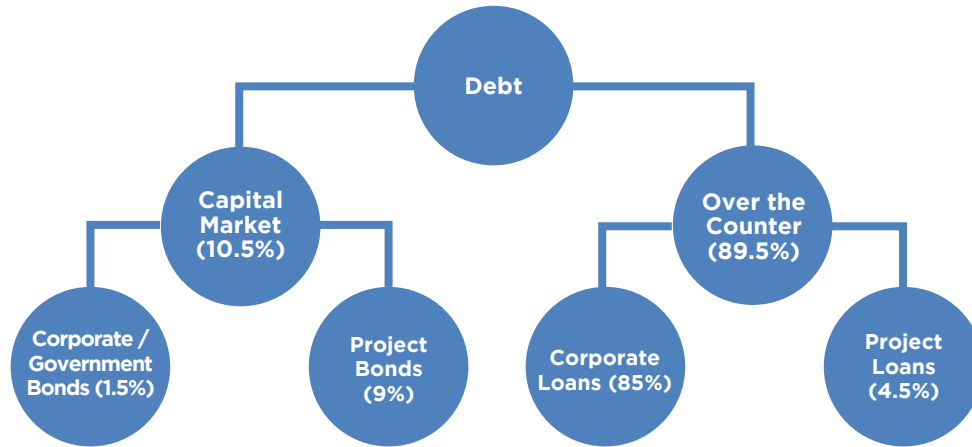
Annual equity and debt shares of private infrastructure funding in Latin America and the Caribbean, 2004-14



Source: Data from Infrastructure Journal Database.

Figure 12

Composition of debt financing for infrastructure in Latin America and the Caribbean in 2004-14



Source: Inderst 2013, Inderst and Stewart 2014, and data from the Infrastructure Journal Database.

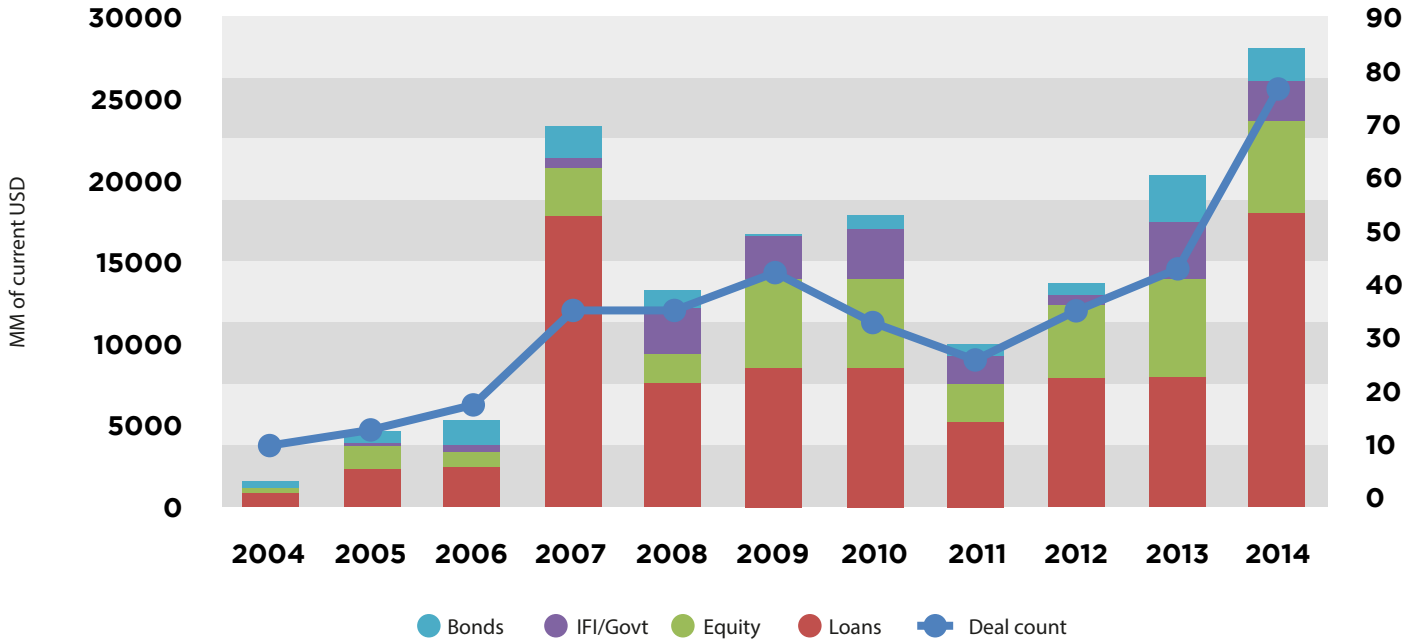
The data are insufficient to disentangle the components of equity financing. The scarce data that exist suggest that the most common type of equity investment in infrastructure is through unlisted options and direct equity contribution to projects. Most private infrastructure investment in LAC thus seems to be made directly rather than through the stock market or funds operated by third parties (listed or unlisted).

The composition of financing over time is very similar in LAC and the world (figure 13). LAC appears to have recovered earlier and faster from the financial crises, although the recovery has been tepid (it was not until 2014 that total private financing in LAC surpassed the levels reached in 2007). The shares of debt and equity are quite similar in LAC and the world. Bank loans contracted sharply as a direct consequence of more stringent reserve requirements.

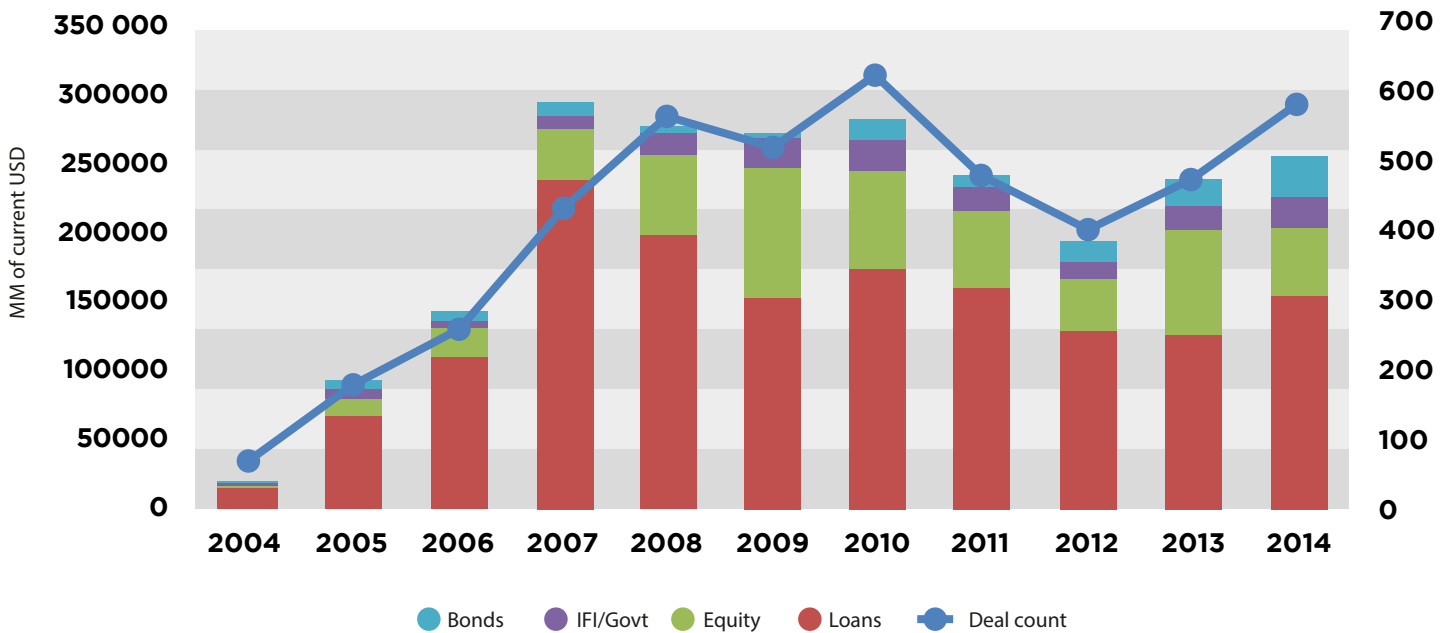
Figure 13

Annual private financing of infrastructure in Latin America and the Caribbean and the world, by type of instrument, 2004-14

a. Latin America and the Caribbean



b. World



Source: Data from Infrastructure Journal Database.

Many types of institutions participate in the private infrastructure finance market in LAC (table 3). Commercial banks account for by far the largest share, financing half of all infrastructure projects between 2004 and 2014.¹¹ National banks are the second most important, with a share of about 14 percent.¹² Multilateral development banks finance only about 7 percent of projects, consistent with previous estimations for sovereign and nonsovereign lending (see also IDB 2013). Participation by institutional investors, such as investment funds, pension funds, and insurance companies, is negligible (about 3 percent).

Table 3

Private suppliers of capital to infrastructure projects in Latin America and the Caribbean

Ranking	Type of agent	Percent
1	Commercial bank	50.55
2	National or state bank	13.65
3	Developer or engineering procurement or construction firm	9.12
4	Private company	8.83
5	Multilateral development bank	7.34
6	Investment bank	3.28
7	Export credit agency	2.05
8	Investment or infrastructure fund	1.90
9	Government agency/public authority	1.88
10	Pension fund	1.11
11	Sovereign fund	0.24
12	Insurance company	0.04

Note: Classification is one used by the Infrastructure Journal Database. Data cover 2005–14. Percentages are based on amounts.

Source: Data from Infrastructure Journal Database.

This financing structure presents challenges for future infrastructure projects. Commercial banks will likely refrain from increasing their exposure to infrastructure as a result of the more stringent rules imposed by Basel III. Investing in greenfield projects or during construction phase, means fixing assets for a long time with uncertain returns—precisely the type of investment discouraged by the new financial regulations, which favor more liquid assets with predictable returns. As commercial banks are the main player during the initial phases of infrastructure projects, the challenge going forward is to look for players that can fill the space once covered by commercial banks. The challenge for infrastructure financing is finding and matching suitable instruments for these new players.

11 The top commercial banks funding infrastructure in the region are Santander (5.6 percent of total project amount), Citigroup (3.3 percent), HSBC (3.2 percent), and BBVA (3.1 percent).

12 This share is biased by Brazil, where BNDES, the largest national development bank, accounts for 35 percent of private infrastructure financing in that country



Developing Infrastructure as an Asset Class to Attract Private Investors

Although infrastructure shares some characteristics with real estate, it differs fundamentally in specific attributes. Infrastructure involves assets with a long lifespan that are able to create recurring, stable returns that are usually indexed by inflation. Compared with real estate, infrastructure has less exposure to economic cycles, more predictable cash flows (enabling higher leverage), and legal and sometimes economic barriers to entry (making returns more stable if economic regulation is adequate).

According to a 2014 worldwide survey, more than 40 percent of investors still do not categorize infrastructure as an asset in their portfolios (Af2i 2014). The development of infrastructure as an asset class could help increase the share of private investment in infrastructure and channel the future growth of national savings to the sector.

LAC requires a stronger regulatory framework to enhance infrastructure as an asset class. Demand for infrastructure is growing rapidly, but high transactions costs, weak capacity, political and governance risks, and policy and regulatory barriers in most countries in the region make risk-adjusted investment returns too low to attract private investment. The pipeline contains too few well-prepared projects; appropriate financial instruments of sufficient liquidity (such as project bonds) are not available to attract local investors; inconsistencies in contracts, concessions, and bidding documents are

common; and critical underlying cost-recovery and cash flow challenges plague sectors that need private investment. According to a 2015 study by The Economist, 87 percent of investors in LAC consider institutional weaknesses a major drawback to infrastructure investment compared with 41 percent in Europe and the Middle East and just 31 percent in Asia-Pacific.

To address these problems, it is imperative to strengthen institutional capacity in LAC's public sector throughout the infrastructure project cycle. Better technical capacity in the public sector coupled with less political interference (which alters the economic condition of the provision of infrastructure services through arbitrary changes in tariffs and investment programs) would reduce uncertainty and consequently the cost of capital faced by private investors.



Increasing Participation by Pension Funds

In the global infrastructure arena, there is increasing attention on institutional investors. These investors, who remain largely untapped, can provide much-needed long-term financing.

Institutional investors, particularly pension funds, insurance companies, and mutual funds, are important players in financial markets. In the countries of the Organisation for Economic Co-operation and Development (OECD) alone, they held more than \$70 trillion in assets under management in 2012, including \$24 trillion by insurance companies and \$21 trillion by pension funds. Institutional investors in LAC held just over \$1 trillion in assets under management, or about 20 percent of GDP (OECD 2013).

Starting from a very low base, pension funds have been increasing their portfolio allocation to infrastructure. Pension funds and their portfolio allocation in infrastructure have attracted much more policy and data-based analysis than insurance companies. Information on their allocation to infrastructure is very difficult to obtain, however, in part because infrastructure is usually not considered an asset class.

The OECD is leading an effort to fill the data gap. In 2014 it surveyed pension funds about their allocations in infrastructure. It found that pension funds in Australia and Canada are the leaders in direct investment in infrastructure, allocating about 5 percent of total assets under management to the sector.¹³

LAC has an increasing pool of funds administered by pension funds. The largest portfolios of pension funds under management are in Chile (63 percent of GDP), Mexico (48 percent), Peru (18 percent), Colombia (16 percent), and Brazil (11 percent). Their allocations to infrastructure are low, however. Alternative sources report very different allocations to infrastructure by pension funds in these countries. OECD (2014a, 2014b) reports allocation by large funds only; its sample includes only six funds from LAC. According to it, the percent of funds allocated to infrastructure ranges from just 0.2 percent in Chile to 1 percent in Mexico and 7 percent in Brazil. Alonso, Arellano, and Tuesta (2015) report that the average allocation to infrastructure of the five countries is 2.6 percent. Relying on data from the *Infrastructure Journal*, we calculate an average regional allocation of 1.1 percent between 2005 and 2014.

What would be the impact of increasing the share of infrastructure in pension funds' assets under management? The current allocation of pension funds in LAC—in the range of 1 percent of total assets under management—is clearly low and not enough to boost infrastructure investment, but there are no obvious indicators of how much exposure to infrastructure would be reasonable for pension funds in LAC. Two alternative scenarios are assessed: (a) a minimum hypothesis of 3 percent of fund's investment portfolio, which represents the minimum level to (potentially) contribute in a meaningful way to increase investment in infrastructure and (b) a maximum hypothesis of 7 percent of funds' investment portfolio, which corresponds to the highest exposure to infrastructure by pension funds in the world (observed for some pension funds in Australia and Canada). A first approximation to measuring the impact on infrastructure investment focuses on stocks. It calculates the additional total investment in infrastructure that would result in a change in the allocation of the accumulated

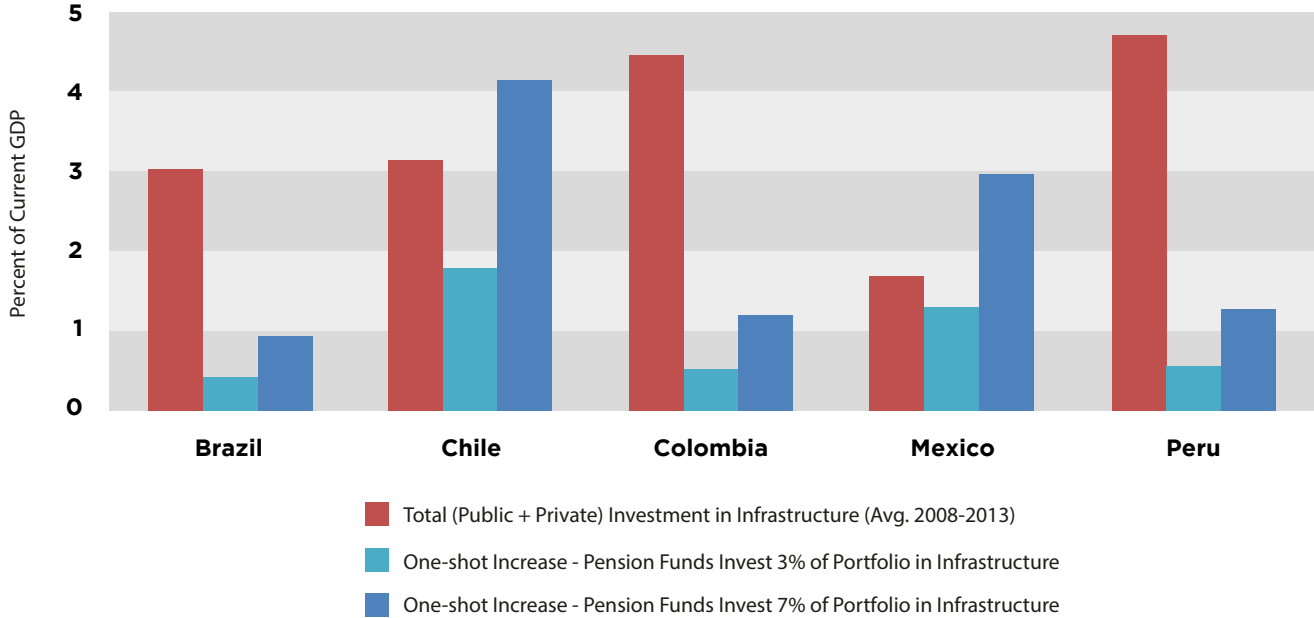
¹³ From an investor perspective, pension funds with a separate allocation to infrastructure aim to gain direct exposure to the characteristics of the infrastructure asset. Direct exposure is gained mainly through unlisted equity instruments (direct investment in projects and infrastructure funds) and project bonds; indirect exposure is normally associated with listed equity and corporate debt.

stock of pension fund assets under management. Suppose that pension funds in LAC increased their stock exposure to infrastructure by investing 3 (or 7) percent of their assets under management in infrastructure projects. Infrastructure investment would rise significantly in Chile and Mexico (figure 14). In Brazil, Colombia, and Peru, where the share of assets under management is smaller, it would rise, but not enough to have a notable impact. In Chile infrastructure investment could rise by 2–4 percent of GDP, potentially doubling the current investment rate. In Mexico a change in portfolio allocation by pension funds could more than double the current infrastructure investment rate, from less than 2 percent to almost 5 percent of GDP.¹⁴

Two complementary facts drive these results: infrastructure investment rates relative to GDP and pension fund assets under management as a share of GDP. Countries with higher infrastructure investment rates, like Colombia and Peru, would need larger shares of assets under management allocated to infrastructure to significantly increase infrastructure investments. In Chile and Mexico, where the share of assets under management is much larger, a change in portfolio allocation has a greater impact on infrastructure: 7 percent of pension funds' assets under management represents more than 3 percent of GDP in these countries.

Figure 14

Effect of one-shot increase in pension fund investment in infrastructure in selected countries in Latin America and the Caribbean



Source: Brazil: Superintendencia Nacional de Previdencia Complementar; Chile: Superintendencia de Pensiones; Colombia: Superintendencia Financiera de Colombia; Mexico: Comision Nacional del Sistema de Ahorro para el Retiro; Peru: Superintendencia de Banca, Seguros y AFP; total investment: IMF 2014.

¹⁴ The result is obtained by adding the current infrastructure investment rate of 1.8 percent of GDP and the additional 1.5–3.0 percent of GDP coming from new investments in infrastructure by pension funds.

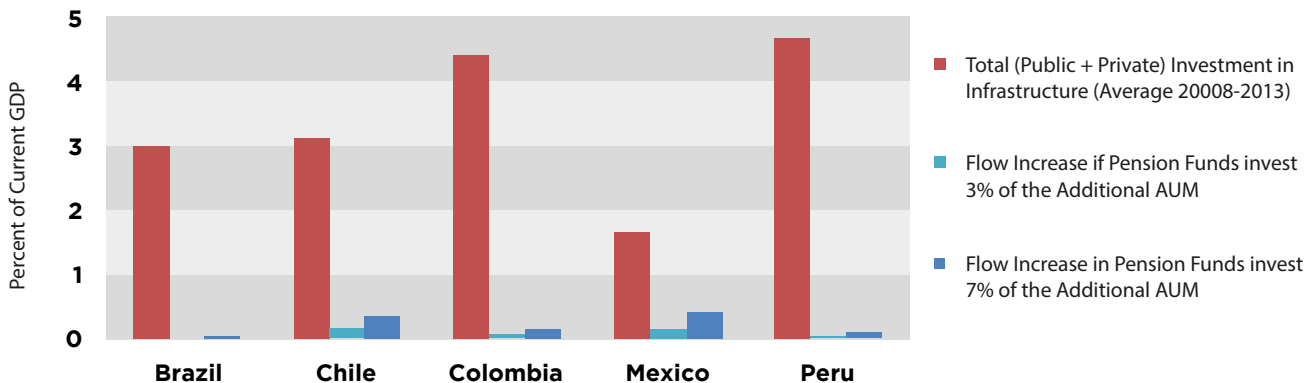
These figures come from using the stock of assets under management to increase investment in infrastructure, a one-shot exercise. Once pension funds reach the hypothesized 3 (or 7) percent exposure to infrastructure, no additional funds would finance investments in infrastructure. In order to increase the infrastructure investment rates not just once but continually through time, it is necessary to increase investments using flows rather than stocks.

Pension funds could invest in infrastructure using the additional funds they get from (net) new contributors to the system and their capital gains. These figures can be obtained by computing the variation in assets under management from one year to the next. Flows are not as large as stocks. Pension fund assets under management tend to grow from year to year (except during years of financial turmoil, like 2008). Between 2007 and 2014, assets under management grew at an average annual rate of about 5 percent of GDP in Chile and Mexico, 2 percent of GDP in Colombia and Peru, and less than 1 percent of GDP in Brazil. Investing 7 percent of these increments in assets under management in infrastructure generates an annual increase in total investment in infrastructure of 0.35 percent of GDP in Chile

and 0.4 percent of GDP in Mexico, the countries where investment would grow the most. In all other countries, pension fund contributions to (annual) increases in total infrastructure investment do not reach 0.2 percent of GDP (figure 15). Table 4 shows that an increase in investment in infrastructure of 3 percent of pension fund assets under management increases total investment in infrastructure by 0.02 percent of GDP in Brazil, 0.15 percent in Chile, 0.07 percent in Colombia, 0.18 percent in Mexico and 0.05 percent in Peru. Increasing investment to 7 percent would generate an annual increase in total investment in infrastructure of 0.06 percent of GDP in Brazil, 0.35 percent in Chile, 0.16 percent in Colombia, 0.41 percent in Mexico, and 0.11 percent in Peru.

Figure 15

Effect of increase in flows of additional assets under management to investment in infrastructure in selected countries in Latin America and the Caribbean



Source: Brazil: Superintendencia Nacional de Previdencia Complementar; Chile: Superintendencia de Pensiones; Colombia: Superintendencia Financiera de Colombia; Mexico: Comision Nacional del Sistema de Ahorro para el Retiro; Peru: Superintendencia de Banca, Seguros y AFP; total investment: IMF 2014.

Table 4**4 Estimated additional investment in infrastructure from increase in investment by pension funds**

Ranking	Total (public + private) investment, average 2008-13	Additional investment if pension funds invest:	
		3 percent of increase in assets under management	7 percent of increase in assets under management
Brazil	3.01	0.02	0.06
Chile	3.14	0.15	0.35
Colombia	4.45	0.07	0.16
Mexico	1.68	0.18	0.41
Peru	4.70	0.05	0.11

These increases are not large enough to allow LAC to catch up with infrastructure investment rates in high-growth Asian economies or advanced economies. Investing 7 percent of additional assets under management would increase investment in infrastructure by no more than 0.4 percent of GDP in the most optimistic scenario; infrastructure investment rates increase by less than 0.2 percent of GDP when just 3 percent of the increase is invested in infrastructure (and in Brazil and Peru even under the higher figure). Pension funds may thus not be the panacea to increasing infrastructure investments. Still, in a region that is in urgent need of infrastructure investment, every dollar counts, and it is necessary to create the enabling condition to attract investment from institutional investors.



Conclusions and Recommendations

LAC needs more investment in infrastructure: Most studies show that it needs to invest about 5 percent of GDP a year until it catches up with advanced economies. Given the size of the infrastructure gap, both public and private investment will have to increase.

Traditionally, the public sector has financed infrastructure. However, reliance on the public sector to undertake all necessary investments to close the infrastructure gap is risky: funding is inadequate and in times of crisis the public sector tends to cut investment in infrastructure. The role of private sector in financing infrastructure is therefore key.

The region needs investments in local currency. Long-term financing in foreign currency is not always possible or desirable. In the first place, big capital inflows, of the size required to close the infrastructure gap, tend to be volatile and likely to experience sudden stops. Additionally, foreign direct investment does not usually go to infrastructure sectors—the wave of privatizations financed with foreign funds was directed mostly acquisition of existing assets rather than building new ones. Finally, it is difficult to maintain large current account deficits for prolonged periods of time without abrupt reversals, or incurring external indebtedness problems.

The majority of private financing in local currency of infrastructure in LAC comes largely from commercial banks. Recent regulatory changes and economic conditions are likely to reduce the incentives they face to finance long-term projects. New players need to fill the gap that commercial banks will soon leave.

Infrastructure represents a suitable asset for long-term investors, such as pension funds, which hold funds equivalent to about 20 percent of the region's GDP. Their investment in infrastructure—of about 1 percent of their portfolios—is low by international standards. Additional investment in infrastructure by these funds would help reduce the regional infrastructure gap, although it alone would not be sufficient to close it.

Long-term investors can make an important contribution to growth in various ways, most importantly by financing long-term projects. A set of actions is required to increase the share of infrastructure in the portfolio of pension funds, both at a micro and macro levels.

At the micro level, regulatory impediments and institutional capacity prevent available private financing from reaching infrastructure investment. Strengthening regulatory and institutional capacity are needed to generate a well prepared pipeline of projects and developing infrastructure as an asset class, and thus to attract institutional investors to infrastructure. The pipeline of well-prepared projects is small; there is a lack of appropriate financial instruments of sufficient liquidity (e.g. project bonds) to mobilize local investors; daunting inconsistencies persist in contracts, concessions, bidding documents and critical underlying cost recovery and cash flow challenges plague sectors that need private investment. Thus, it is imperative to strengthen institutional capacity in LAC's public sector along the whole infrastructure project cycle.

At the macro level, the political risks associated with unstable macroeconomic and regulatory environments need to be reduced, and quantitative restrictions on the share of assets that pension funds can invest in infrastructure need to be revised. Barriers that require close collaboration between financial regulators and pension funds include asset valuation, transparency, risks and liquidity.

Fostering long-term investment also requires from new tax, accounting and financial measures. Some countries require pension funds to report daily variations in their account balances. Direct investment in infrastructure involves instruments that are not liquid and consequently require an ad hoc valuation formula to comply with daily portfolio valuation. Additionally, given limited information and capacity, it is difficult for a superintendent to value the performance risks of infrastructure assets. A superintendent needs to guarantee the liquidity of the

pension portfolio (especially in countries without tight constraints on changes in pension funds). Consequently, there are no incentives to foster the growth of assets, like infrastructure, that are illiquid.

Developing infrastructure as an asset class and encouraging the participation of institutional investors become crucial. There is a need of raising the profile of non-bank institutions to fill the infrastructure finance gap. Infrastructure may be thought as an asset class in its own right, rather than a sub-class derived from real estate. The development of infrastructure as an asset class in LAC will open up the possibility to increase the current share of private investment in infrastructure and at the same time will facilitate channeling future growth of national savings to infrastructure.

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