What Do We Know about Investment and Saving

in Latin America and the Caribbean?

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Introduction

Increasing saving—postponing current consumption—is costly. Why, then, do people save? One common answer is that by saving more, societies have more resources available to invest. Economies that save more can take advantage of investment opportunities and consequently grow faster. Investing to improve access to education and health, for example, has the potential to boost growth by increasing the population's productivity and income. Investing in plants and machinery is just as important, because such investment is critical to maintain, expand, and incorporate technological progress in countries' productive structures. Evidence on the importance of investment as an engine for growth is robust.

Latin America and the Caribbean (LAC) seems to be trapped in a bad equilibrium in which it invests too little. To make things worse, the region's national saving rate is even lower than its domestic investment rate, forcing it to rely on foreign saving. Foreign saving is not bad per se; it provides a much needed complement to national saving to foster investment. Economies have long relied on national saving to finance their capital stock. Relying heavily on foreign saving can increase macroeconomic vulnerabilities, however.

This paper examines saving and investment in LAC. The first section briefly reviews the literature on the relationship between saving and investment and the impact of investment on growth. The second section examines investment in LAC. The third section describes both foreign and national saving. The fourth section tries to identify the direction of causality between saving and investment in the region and takes on the question of whether national saving should be stimulated in order to generate more investment. The last section summarizes what LAC needs to do to spur growth.

The Literature on Saving and Investment

Although the empirical research is not entirely conclusive—results vary widely and are highly dependent on the theoretical approach and the nature of the variables used—there is little doubt that investment is a critical contributor to economic growth. Investment has the potential to increase growth, both in the short and the long run.

The literature suggests different channels of transmission. In the short to medium run, investment generates growth by boosting aggregate demand. In the long term, investment affects growth through aggregate supply and the productive structure: Higher investment triggers technological changes,

creates higher productive capacity, and fosters resource reallocation toward higher- productivity sectors (Jimenez and Manuelito 2013).

Many empirical studies show a strong relationship between GDP growth and investment. Levine and Renelt (1992) replicate a selection of studies linking economic growth with different macroeconomic and policy indicators. They find that the relationship between GDP growth and investment is among the strongest in the literature. Khan and Kumar (1997) run different empirical tests on a sample of 95 developing countries. They find that both public and private investment is a statistically

significant determinant of long-term growth. Gutiérrez (2005) shows that physical investment played an important role in the growth performance of the six largest economies in Latin America during the period 1960–2002.[1]

Blomstrom Lipsey, and Zejan (1996) and Lipsey and Kravis (1987) document a reverse causal relationship between investment and growth, showing that economic growth induces investment and not the other way around. Causation can run in this direction in the short run because there are timing gaps between investment planning by economic agents and the evolution of the business cycle (Schmidt-Hebbel, Serven, and Solimano 1996): Current growth performance serves as an indication of future demand levels, interest rates, and liquidity constraints, on the basis of which firms and governments make their decisions about future investment.

The debate on growth and aggregate investment is not over, mainly because growth is a complex process in which multiple factors intervene simultaneously. Investment is at the core of the growth process, but it is not the sole factor that matters; sustained economic growth also depends on country-specific features, including geography, human capital, technological knowledge, institutional framework, innovation capacity, and many others.

Most successful growth stories are associated with substantial investment outlays, as was the case in East Asia (Schmidt-Hebbel et al. 1996; Young 1995). Furthermore, it has been demonstrated that not all types of investment have the same potential effect on productivity and growth. DeLong and Summers (1991) find that investment in equipment is most important. Sala-i-Martín (1997) confirms that equipment investment exerts a stronger influence on growth than other types of investment. Easterly and Rebelo (1993) show that only transportation and communications are strongly and significantly associated with growth.

Several studies affirm that only high-quality investment has a positive and significant effect on growth. Anderson (1987) finds that investment powerfully predicts growth if its degree of allocative efficiency (measured as the rate of social return) is properly accounted for. Gupta et al. (2014) find that various measures of public investment quality significantly explain growth, particularly in low-income countries. Aschauer (2000) shows that how efficiently a country uses investment and how it pays for it are as important for growth as the amount invested.

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1 Aschauer was among the first to focus exclusively on the role of public investment on growth. In his 1989 study, he emphasized the positive growth effect of public capital. Successive studies—including Barro (1991); Easterly and Rebelo (1993); Knight, Loayza, and Villanueva (1993); and Miller and Tsoukis (2001)—obtained similar results.

Investment in Latin America and the Caribbean

Investment has been low in LAC. Accepting the argument that investment is an important determinant of economic growth, is Latin America and the Caribbean investing enough?

## BOX 1: Investment and saving in national accounts

The variable used in national accounts to measure investment is Gross Fixed Capital Formation (GFKF). GFKF is a component of a country's GDP (together with consumption, government spending, and net exports). It includes land improvements (fences, ditches, drains); plants, machinery, and equipment purchases; and the construction of roads, railways, and other infrastructure. It also includes schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. The variable used to measure saving is Gross National Saving (GNS), defined as disposable income less final consumption expenditure.[2]

Between 1980 and 2013, investment was higher than national saving in LAC in all but two years (Figure 1). In contrast, in the high-growth Asian economies (HGAE)[3], which invested the most, national saving was higher than investment.

Figure 1 — National saving and investment rates in Latin America and the Caribbean and high-growth Asian economies, 1980–2013

GFKF HGAE
GNS HGAE
GFKF HGAE
GNS HGAE
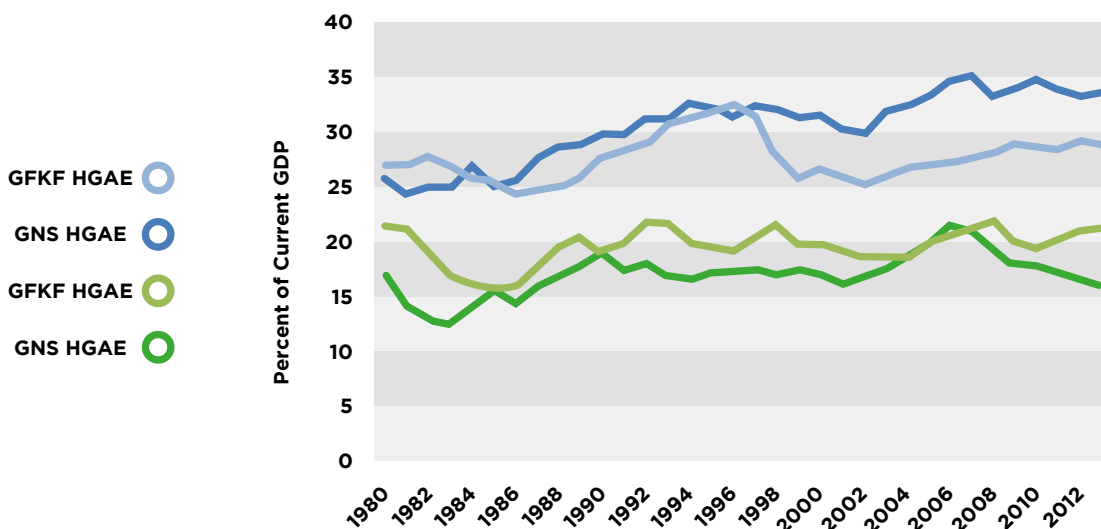
Note: GNS = gross national saving, defined as disposable income less final consumption expenditure. HGAE = high-growth Asian economies. GKFK = gross fixed capital formation. It includes land improvements (fences, ditches, drains); plant machinery and equipment purchases; roads, railways, and other infrastructure; and schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. LAC = Latin America and the Caribbean.
Source: Data from World Economic Outlook.

2 World Bank (2015) gives a precise definition of Gross Fixed Capital Formation (http://data.worldbank.org/indicator/NE.GDI.FTOT.CD). The definition of Gross National Saving come from the IMF-WEO database, which defines it as gross disposable income less final consumption expenditure after taking account of an adjustment for pension funds (https://www.imf.org/external/pubs/ft/weo/2015/01/weodata/index.aspx).
3 HGAE include China, Hong Kong; India; Indonesia; the Republic of Korea; Malaysia; Singapore; Sri Lanka; Thailand; and Vietnam.

Calculating the "ideal" level of investment in a region or country is difficult and outside the scope of this paper. The decision to invest is heavily influenced by the investment climate, which is determined by many variables, including the availability of financing instruments, tax incentives, perceptions of risk, and the rule of law. However, systematically lower investment over time by LAC relative to other regions suggests that LAC is not investing enough.

Until the year 2000, low-, middle-, and high-income countries invested a similar share of GDP, about 22 percent (Figure 2).[4] After 2000, the share of gross fixed capital formation by high-income countries declined, while investment by low- and middle-income countries as a group rose. LAC's performance differed significantly from that of other countries at the same income level: Gross fixed capital formation was 19 percent between 2000 and 2013, much lower than the 25 percent average of low- and middle-income countries in the same period.

Figure 2

Average gross fixed capital formation rates in Latin America and the Caribbean, high-income countries, and low- and middle-income countries, 1980–2013
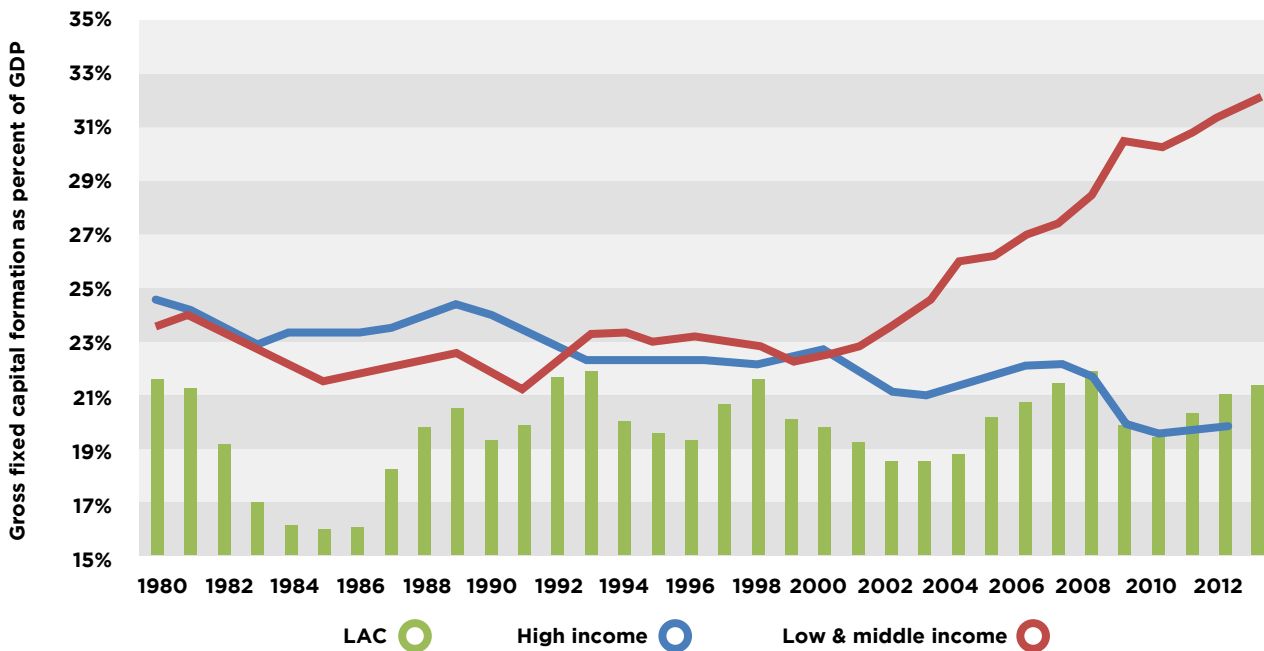
Source: Data from World Economic Outlook.

4 Countries are classified using the income classification of the World Bank database. Low-income economies are defined as having a gross national income (GNI) per capita, calculated using the World Bank Atlas method, of $1,045 or less in 2013; middle-income economies are economies with a GNI per capita of more than $1,045 but less than $12,746; high-income economies are economies with a GNI per capita of $12,746 or more. Lower-middle and upper-middle-income economies are separated at a GNI per capita of $4,125.

Between 1980 and 2013, LAC consistently had the lowest GFKF flows of any group of countries, spending 10.6 percentage points of GDP less than the HGAE (Figure 3). Investment in LAC would need to increase 50 percent to reach the level of the HGAE. The closest region to LAC in terms of investment was Sub-Saharan Africa, but even this region invested 4.5 percentage points of GDP more than LAC between 1980 and 2013.

Figure 3 **Average gross fixed capital formation rates in selected country groups, 1980–2013**
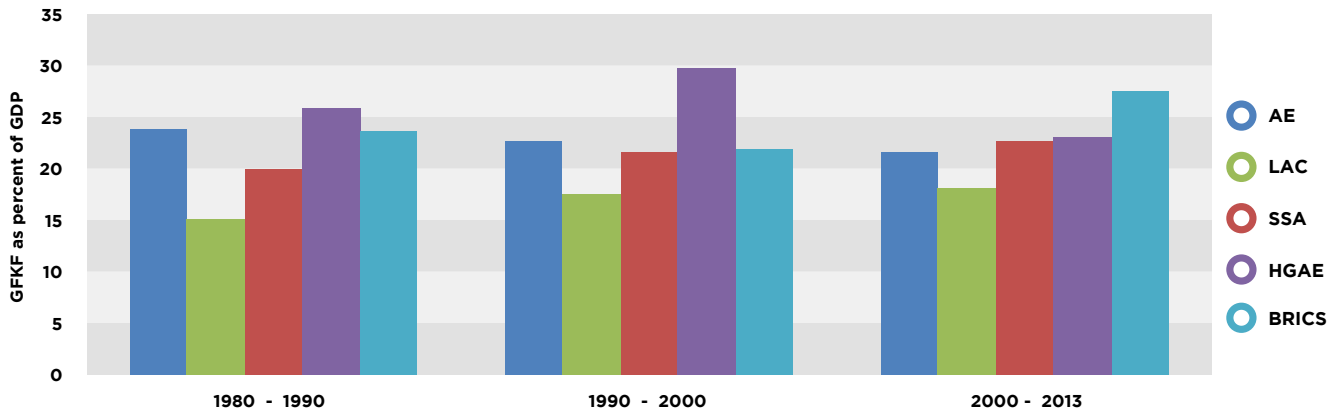
Note: Advanced economies; LAC = Latin America and the Caribbean; SSA = Sub=Saharan Africa; HGAE = High Growth Asian Economies; BRICS = Brazil, Russia, India, China and South Africa. Table A1 comprises the list of countries included in each group.
Source: Data from World Economic Outlook.

Across LAC subregions, the pattern is remarkably similar, in particular since 1990. In the 1980s the Caribbean had higher levels of gross fixed capital formation than the rest of the region. These differences virtually disappeared after then (Figure 4).

Figure 4 **Average gross fixed capital formation rates in selected country groups, 1980–2013**
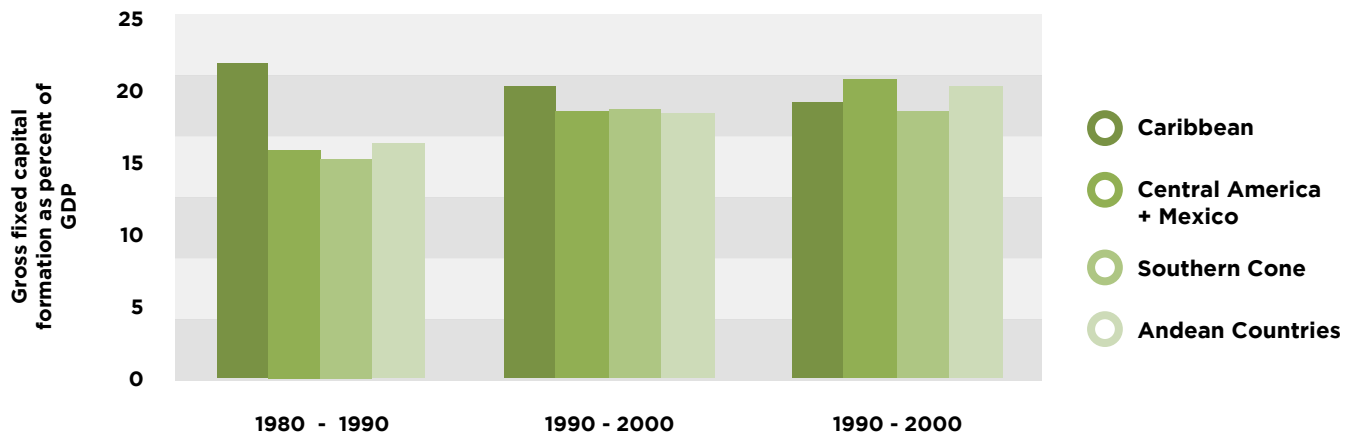
Note: Caribbean: Barbados, Belize, the Dominican Republic, Guyana, Jamaica, Trinidad and Tobago, Venezuela; Central America: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama + Mexico; Southern Cone: Argentina, Brazil, Chile, Paraguay, Uruguay; Andean countries: Bolivia, Colombia, Ecuador, Peru.
Source: Authors, based on data from World Economic Outlook (WEO) and World Bank databases.

There is more heterogeneity at the country level, even within subregions (Figure 5). Countries in Central America are at both ends of the distribution (Honduras had the highest level of investment and El Salvador the lowest between 2000 and 2013). It is worth noting that most countries increased investment in 2000–13 relative to 1980–2000 (exceptions are Belize, Guyana, Paraguay, and Trinidad and Tobago).

Figure 5 — **Average gross fixed capital formation in countries in Latin America and the Caribbean, 1980–2000 and 2000-2013**

Source: Data from World Economic Outlook and World Bank databases.
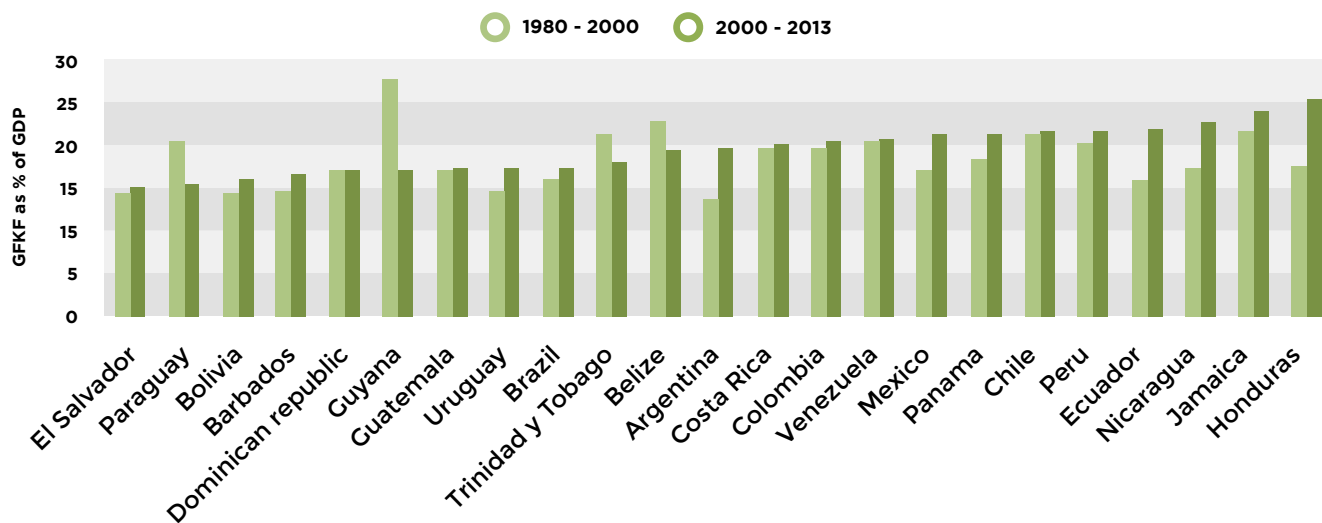
Although GFKF in LAC was low in the last several decades, there were a few episodes of high GFKF. An exercise that looked at 24 LAC countries between 1980 and 2013 identified high investment (defined as more than 25 percent of GDP) in 9 percent of the 736 country-year observations. These cases, however, were concentrated in a few countries. Indeed, six countries (the Bahamas, Belize, Chile, Honduras, Jamaica, and Trinidad and Tobago)—all but one of them small countries in the Caribbean and Central America—accounted for 50 of the 69 cases.

Figure 6 sums up the picture for LAC countries. It shows that 13 of the region's 24 countries invested more than 25 percent of GDP at least once between 1980 and 2013. The Bahamas led, with 11 years, followed by Belize, Jamaica, and Trinidad and Tobago, with 9. The 13 countries include small continental countries (Belize and Honduras), islands (the Bahamas and Jamaica), and larger countries (Colombia and Venezuela).

None of the three largest countries in the region—Argentina, Brazil, and Mexico—had any episodes of high investment. Moreover, episodes of high investment by other countries were isolated and scattered across different years. Among the small number of countries that achieved high investment levels, only seven did so in at least three consecutive years between 1980 and 2013 (see Figure 6). The Bahamas was the only country that maintained a high level of investment more than once (1996–2000, 2006–08, and 2011–13)[5]. In only three cases among the 24 LAC countries and 34 years analyzed in this study was high investment maintained for at least five consecutive years: the Bahamas (1996–2000), Chile (1993–98), and Jamaica (2001–07). The challenge for LAC is to extend these successful experiences to more countries and sustain high investment rates for consecutive years.

Figure 6   **Countries in Latin America and the Caribbean with high investment rates during 1980–2013**

Years of high investment   **At least 3 consecutive years of high investment**
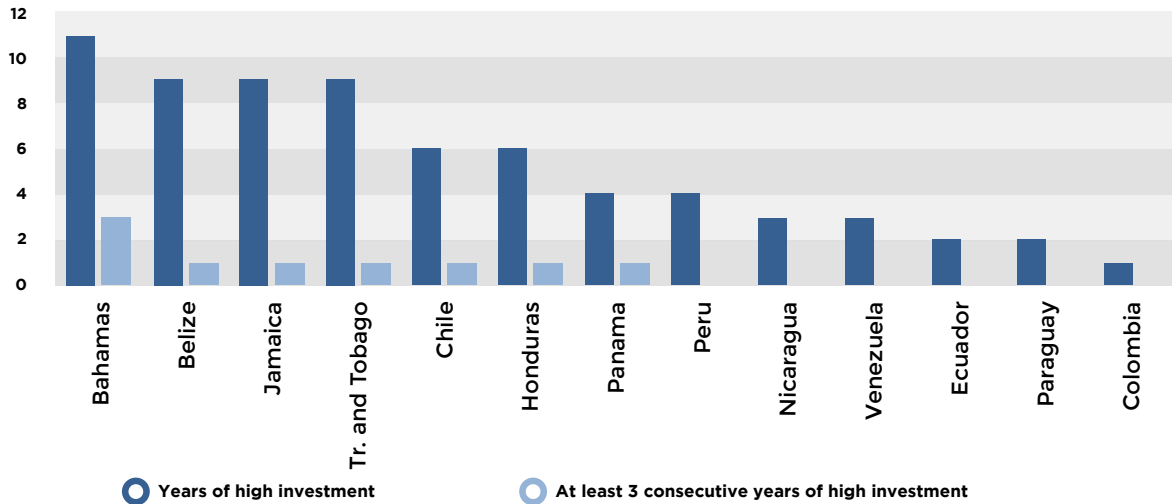
Note: High investment is defined as investment of at least 25 percent of GDP.
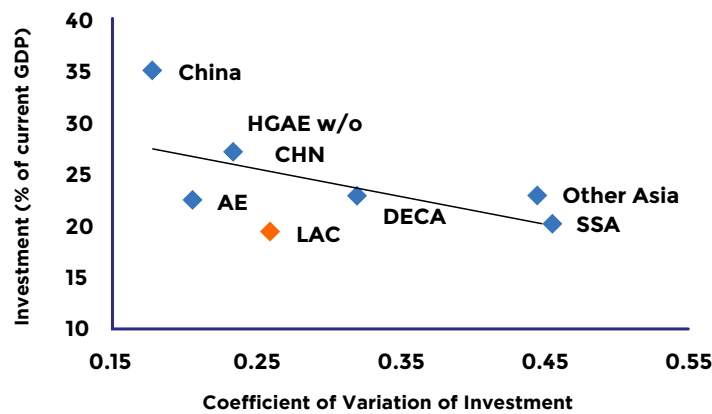*Source:* Data from World Economic Outlook.

Investment in LAC is not just low, it is also volatile. China and the HGAE excluding China have the lowest volatility (measured by the coefficient of variation, the ratio between the standard deviation and the mean of a series).[6] The economies that have the most stable investment (China and the other HGAE) also have the highest levels of investment. Interestingly, the countries and regions that have most stable series of investment

also have the highest levels of investment. In contrast, Sub-Saharan Africa, the most volatile region, is, jointly with LAC, the region that invests the least. The negative relationship between a series and its volatility is not completely novel in macroeconomics. Ramey and Ramey (1995) found that countries that experienced higher GDP volatility grew less than more stable countries.

Figure 7   **Relationship between level and volatility of investment, 1980–2012**

Note: Advanced economies; DECA = developing Europe and Central Asia; HGAE = high-growth Asian economies; LAC = Latin America and the Caribbean; SSA = Sub=Saharan Africa.

Source: Data from World Economic Outlook.

6 The ranking of regions, from least to most volatile, based on the coefficient of variation, is China (0.18), advanced economies (0.21), high-growth Asian economies except China (0.23), LAC (0.26), developing Europe and Central Asia (0.32), other Asian countries (0.44), and Sub-Saharan Africa (0.45).

More rigorous analysis confirms that high volatility affects investment levels. Data from the World Economic Outlook database for 133 countries for which data on gross fixed capital formation are available for at least 25 years between 1980 and 2012 show that for every 0.1 reduction in the coefficient of variation of investment, investment rates grow by 0.7 percent of GDP. This finding means that if LAC could reduce its volatility to the level of the HGAE (excluding China), its investment rate could potentially rise by 2 percent of GDP.

Both public and private investment in LAC are low compared with other regions and country groupings (Figure 8).

Figure 8   **Average gross fixed public and private capital formation, by region, 2000–13**
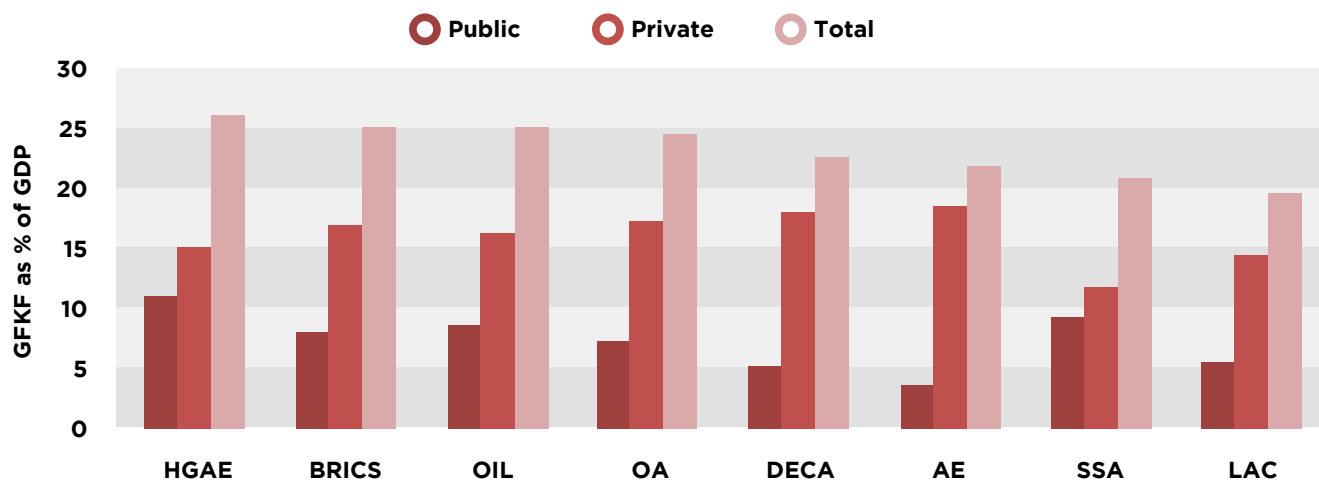
Note: HGAE = high-growth Asian economies; BRICS = Brazil, Russia, India, China, and South Africa; OIL = oil-exporting countries; OA = other Asia; DECA = developing Europe and Central Asia; AE = advanced economies; SSA = Sub-Saharan Africa; LAC = Latin America and the Caribbean.
Source: Data from World Economic Outlook and World Bank databases.

In summary, private investment in LAC is much lower than in the rest of the world; only Sub-Saharan Africa has lower levels of investment. Public investment is also low by international standards. The gap between the region and the rest of the world has existed since the 1980s, and there is no evidence that it is shrinking.

The Commission on Growth and Development attempted to establish a minimum investment level compatible with long-term growth.[7] Its report, completed in 2008, analyses 13 economies that grew at an average rate of at least 7 percent a year for at least 25 years between 1950 and 2005.[8] The sample of countries is diverse: It contains economies from four continents, big and small countries, some of which are rich in natural resources. All of the 13 success stories invested more than 25 percent of GDP during the periods of high growth. The Commission thus concluded that investment of at least 25 percent of GDP appears to be the minimum necessary level compatible with sustained economic growth.

LAC is far from the 25 percent benchmark recommended by the Commission. With the exception of Haiti (a special case because of its heavy reliance on external assistance), no country in the region was close to the benchmark (the regional average for 1980–2013 was less than 20 percent).

7 The Commission on Growth and Development is a group sponsored by four government organizations from Australia, the Netherlands, Sweden and the United Kingdom, plus the William and Flora Hewlett Foundation and the World Bank Group. It consists of 19 policy, government, and business leaders, mostly from the developing world, and two Nobel laureate economists.
8 The economies are Botswana; Brazil; China; Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; Malta; Oman; Singapore; Taiwan, China; and Thailand.

Sources of Saving for Investment

Can LAC afford to finance a jump in investment exclusively with foreign saving? Without increasing national saving, LAC countries would need to increase foreign saving from the current 3.5 percent of GDP to 8.0 percent to reach the 25 percent of GDP investment level, a target value compatible with growth rates of more than 5 percent (Commission on Growth and Development 2008). More than doubling the current foreign saving rates would be extremely difficult: With the exception of Nicaragua and Guyana, no country in the region sustained foreign saving rates above 8 percent of GDP for prolonged periods of time (Figure 9).[9]

Figure 9 — Average investment, national saving, and foreign saving rates in 1980–2013 in Latin America and the Caribbean, by country
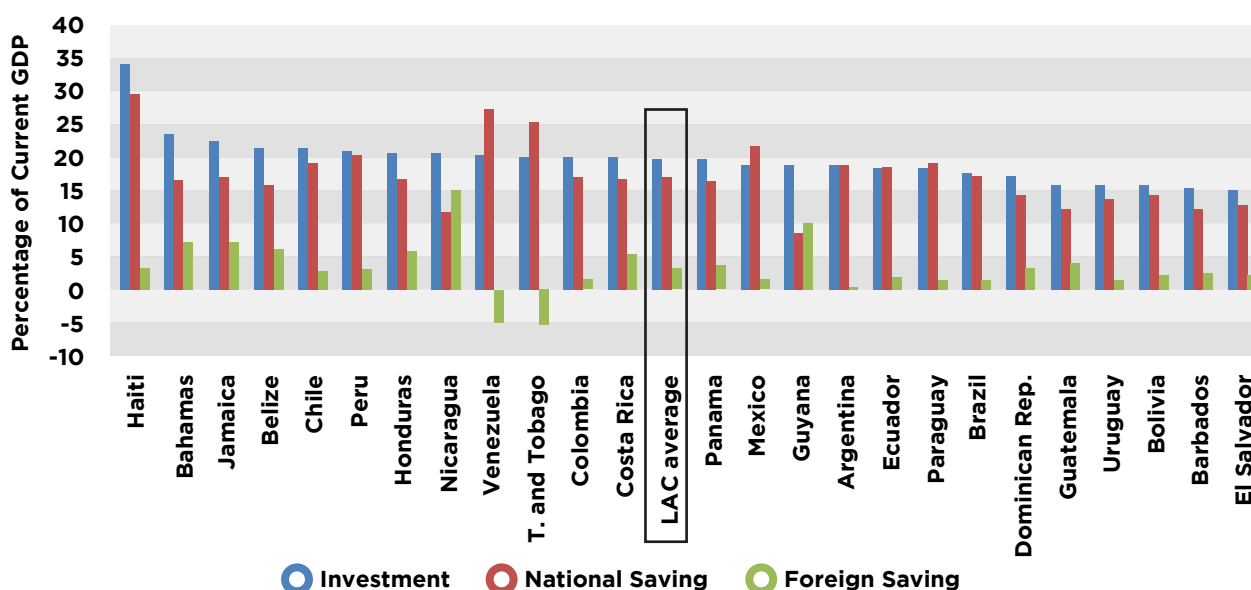
Source: Data from World Economic Outlook.

9 The foreign saving rate is 15 percent of GDP in Nicaragua and 10 percent in Guyana. Other countries have rates close to 8 percent (the Bahamas [7.2 percent], Belize [6.2 percent], and Jamaica [7.4 percent]), but most of them have high rates of remittances. The largest economies in the region had average annual foreign saving rates of less than 3 percent of GDP between 1980 and 2013.

Moreover, even if possible, such a dramatic increase in foreign saving might not be desirable. Countries around the world have taken a cautious approach when relying on foreign saving to finance domestic investment, for various reasons. First, national transaction costs that affect expected returns, the perceived riskiness of assets in foreign currencies, and information asymmetries induce home bias in investing (the tendency of local investors to invest much more in local assets [in national firms or foreign firms with local presence] than in foreign markets [Coeurdacier and Rey 2013; Ke, Ng, and Wang 2010]). Second, foreign capital flows tend to be volatile and prone to sudden stops (Calvo, Izquierdo, and Loo-Kung 2006); lower reliance on foreign saving thus reduces vulnerability to crisis provoked by turbulent international financial markets. Third, relying only on foreign saving makes it is difficult to maintain current account deficits of the magnitude required to close the investment gap for prolonged periods of time without experiencing abrupt reversals or creating external indebtedness problems (IDB 2013).

Provided foreign saving will not be able to finance the much needed additional investment in LAC, the region will have to increase national saving. In a fully integrated world economy, the origin of saving is irrelevant, as profitable domestic investment opportunities find financing, either locally or from the rest of the world. There is thus no reason to expect high correlations between national saving and domestic investment.

Do the data confirm the decoupling of investment and the source of saving? A seminal paper by Feldstein and Horioka (1980) finds otherwise. For a sample of 16 countries in the Organisation for Economic Co-operation and Development (OECD) from 1960 to 1974, they show that increases in national saving were matched by equal increases in domestic investment.[10] They conclude that international capital was not perfectly mobile; hence an economy that needs to increase investment needs to rely on additional domestic capital (saving) to finance it. Empirical research on LAC by Cavallo and Pedemonte (2015) confirms that investment and national savings are not decoupled but closely linked. Cavallo and Pedemonte (2015) finds that for every 1 percentage point increase in national saving in 1980–2012, domestic investment increased by almost 0.4 percentage points.

High investment paths have not occurred without high domestic saving (Commission on Growth and Development 2008): The countries that invest most finance the majority of their investments with national saving (Figure 10). Data from the World Economic Outlook database covering 134 countries from 1980 to 2013 show that 30 countries invest 25 percent or more of their GDP and 50 countries invest 20 percent or less. Differences in national saving rates drive differences in investment rates. On average the 30 countries that invest the most save 26 percent of GDP, whereas the 50 countries that invest the least save 14.5 percent of GDP. Foreign saving rates are almost identical (3.4 percent of GDP for the high-saving countries and 3.3 percent for the low-saving countries). In LAC in 1980–2013, the average foreign saving rate was 3.5 percent of GDP, and the average national saving was 17 percent (see Figure 9).

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10 Feldstein and Horioka find that for every 1 percent of GDP increase in national saving, domestic investment increases 0.94 percent.

Figure 10 Correlation between domestic investment and national and foreign saving rates, by country group
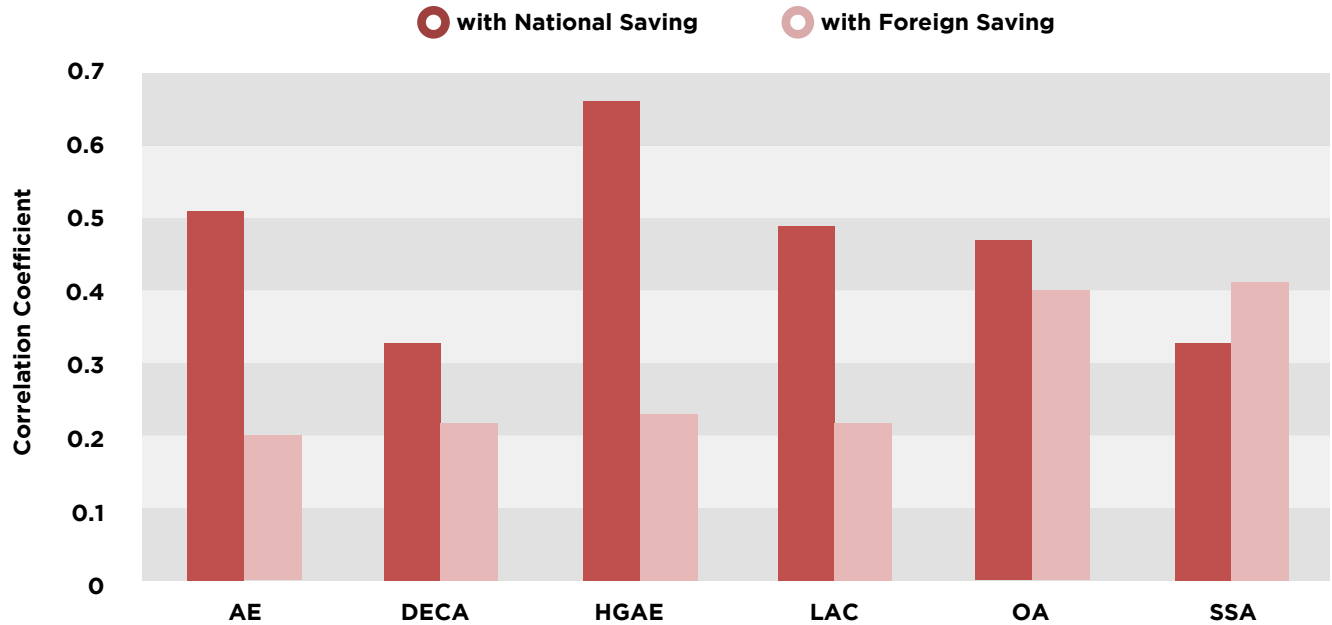
● with National Saving   ○ with Foreign Saving

Note: advanced economies; DECA = developing Europe and Central Asia; HGAE = High Growth Asian Economies; LAC = Latin America and the Caribbean; OA = other Asia; SSA = Sub=Saharan Africa. Figures are based on data for 1980–2013.
Source: Data from World Economic Outlook.

Feldstein and Horioka focus on flows—the relationship between domestic investment rates and national and foreign saving rates. An alternative approach is to look at stocks—the relationship between the domestic capital stock and the stock of national saving (the accumulated sum of past national saving). Stock data confirm the high degree of correlation between investment and national saving. In developing countries, more than 90 percent of the stock of capital is self-financed; foreign saving has not provided a sufficient source for financing domestic capital. This conclusion was reached by calculating self-financing ratios—the stock of tangible capital financed by past national saving relative to the actual stock of capital.

Aizenman, Pinto, and Radziwill (2007) define the self-financing ratio (SFR) as the ratio of discounted past national saving and discounted past domestic investment.[11] They assume that the sum of past national savings is invested locally, contributing to the locally financed stock of capital.

They compare this measure of the locally financed stock of capital with the actual stock of domestic capital (financed either locally or with foreign saving), the sum of observed past domestic investment rates. Intuitively, the SFR tries to capture the proportion of the current domestic capital stock that is financed with past local savings. A ratio of 1 corresponds to an economy in which the entire stock of domestic capital was self-financed. An SFR of less than 1 indicates reliance on foreign saving. An SFR greater than 1 indicates that an economy is a net exporter of capital.

Recent SFR calculations for 1980–2011 using data from the World Economic Outlook database show that SFRs in 2011 were above 0.80 in all regions (the figure for LAC was 0.96) (Figure 11). As expected, Asian economies had the highest ratios (greater than 1. For advanced economies and all other country groupings, the SFRs were very close to 1, indicating that past national saving is the source of most of the domestic capital stock.[12]

[11]The formal definition is $SFR(t) = \frac{\sum_{i=1}^{t} S_{t-i}(1-\alpha)^{i-1}}{\sum_{i=1}^{t} I_{t-i}(1-d)^{i-1}}$, where S is national saving, I is domestic investment, and d is the depreciation rate. The formula calculates the current

stock of locally financed capital as the sum of past savings minus the (old) depreciated "local" capital. It compares this measure to the sum of past actual investments minus the depreciated actual capital to get the SFR in year t.
[12]The only possible exception is Sub-Saharan Africa, but even there most of the domestic stock of capital has been financed with national saving.

Figure 11 Self-financing ratios by region, 1980–2011
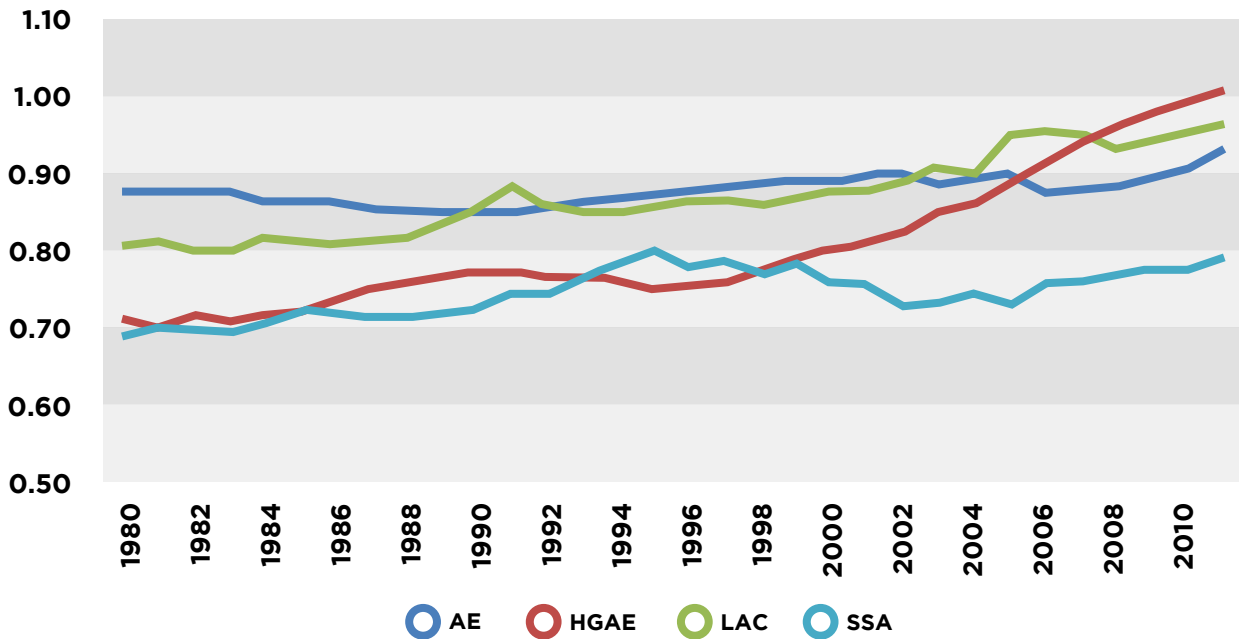
Note: AE = advanced economies; HGAE = high-growth Asian economies; LAC = Latin America and the Caribbean; SSA = Sub-Saharan Africa

Source: Data from World Economic Outlook.

SFRs are growing in all regions, particularly in developing regions. Between 1980 and 2010, these ratios rose from 81 percent to 96 percent in LAC, from 69 percent to 79 in Sub-Saharan Africa, and from 71 percent to 101 percent in the HGAE. These trends confirm that countries rely mostly on national saving to finance domestic capital stocks. All the evidence points in the same direction: National saving is crucial to finance (and increase) domestic investment.

At the firm level, domestic saving, in the form of retained earnings, is the most prevalent investment financing source of firms in LAC. Firms in LAC finance 58 percent of their investments with retained earnings (Kawamura and Rosconi forthcoming). In some countries, such as the Bahamas, Barbados, Panama, Uruguay, and Venezuela, this ratio is above 70 percent.

Why would firms rely on such high levels of internal financing rather than (possibly international) capital markets? Size could be a possible expla-

nation. Smaller firms may face more difficulties accessing international capital markets. But even larger firms rely on retained earnings: LAC firms with more than 100 employees finance 55 percent of their investments with internal funds.

This result is not unique to developing countries; the numbers are similar in advanced economies. Firms in the United States finance 67 percent of their purchases of physical assets with retained earnings; the figure is 55 percent in Germany and 72 percent in the United Kingdom (Mayer 1990).

Thus, firms in both large and small countries use retained earnings as one of their main sources of financing. In the literature, this fact is known as the pecking-order view of capital structure. A main driver of the large share of retained earnings could be high transaction costs of alternative sources, such as debt issuance. Whatever the cause, firms in LAC are relying intensively on their own resources, a component of corporate savings.

Causality: Which Comes First, Saving or Investment?

Will national saving increase endogenously after investment starts to increase, in order to take advantage of higher expected returns, or should national saving be stimulated to generate more investment? The existence of a strong positive correlation between national saving and domestic investment rates is one of the most robust and stable regularities observed in the data across countries and decades (Baxter and Crucini 1993). But opinions are divided over the direction of causality. Studies in several regions and periods yield different results. Attanasio, Picci, and Scorcu (2000) find causality running from saving to investment. Anoruro (2001), Esso and Keho (2010), Sinha (2002), and Tsoukis and Alyousha (2001) find that it runs in the opposite direction or both directions.[13]

Theoretical arguments support causality in both directions: Savings are necessary to finance investment, hence saving must precede investment (see, for example, Feldstein and Horioka 1980 and Feldstein and Bacchetta 1991). At the same time, an increase in the demand for capital goods (as a result of optimistic forecasts about future growth) can generate the savings necessary to accommodate subsequent higher levels of investment (Blomstrom, Lipsey, and Zejan 1996). Alternatively, changes in technological and demographic structures may drive both saving and investment (Baxter and Crucini 1993; Taylor 1994).

Is investment in LAC low because of lack of national saving, or is national saving low because of low investment rates? Arguments support both points of view. Box 1 presents them using a simple model.

BOX 2: A simple model of saving and investment

Consider a simplified economy in which national saving, foreign saving, and domestic investment are determined simultaneously by the following model:

$$I = cI - i.r \qquad (1)$$
$$S = cS + s.r \qquad (2)$$
$$F = f(r - r^*) = cF + f.r \qquad (3)$$

where I represents domestic investment, S national saving, F foreign saving, r the domestic real (risk-adjusted) interest rate, and r* the world interest rate (assumed to be fixed at a level below the domestic interest rate) The coefficients cl,

13 Attanasio, Picci, and Scorcu (2000) draw on a sample of 150 countries for 1960–94. The other studies used regional data. Esso and Keho (2010) find bidirectional causality in most of the seven West African countries they studied from 1965 to 2005. Sinha (2002) analyses Asian economies. The study finds that investment led to saving in Indonesia and Singapore, saving led to investment in the Philippines, and causation worked in both directions in Malaysia and Thailand. Tsoukis and Alyousha (2001) study seven industrial economies from the 1950s to the 1990s. They find that saving preceded investment in Australia and the United Kingdom but that investment preceded saving in Germany.

cS, and cF are the autonomous components of national saving, foreign saving, and domestic investment, respectively; i, s, and f capture the sensitivity of the three variables to the domestic interest rate. All variables are assumed to have an autonomous component and a term that depends on the domestic interest rate. Domestic investment depends negatively on the domestic interest rate, and both national and foreign saving depend positively on the domestic interest rate. The foreign saving supply (equation 3) is 0 when $r < r^*$; s has a positive slope when $r \geq r^*$, which implies that the absorption of foreign saving increases with the interest rate differential.

Figure B.1.1 illustrates how changes in the autonomous components affect national saving and domestic investment in equilibrium. Line I represents the demand for domestic investment; lines S and F represent the national and foreign supply of saving, respectively. The aggregate supply of saving is determined by the sum of F and S. The equilibrium is determined where (F + S) intersects I. In equilibrium, re is the domestic interest rate, the distance OA is foreign saving, AB is national saving, and OB is total domestic investment.

Figure B.1.1 **Basic model of saving and investment**
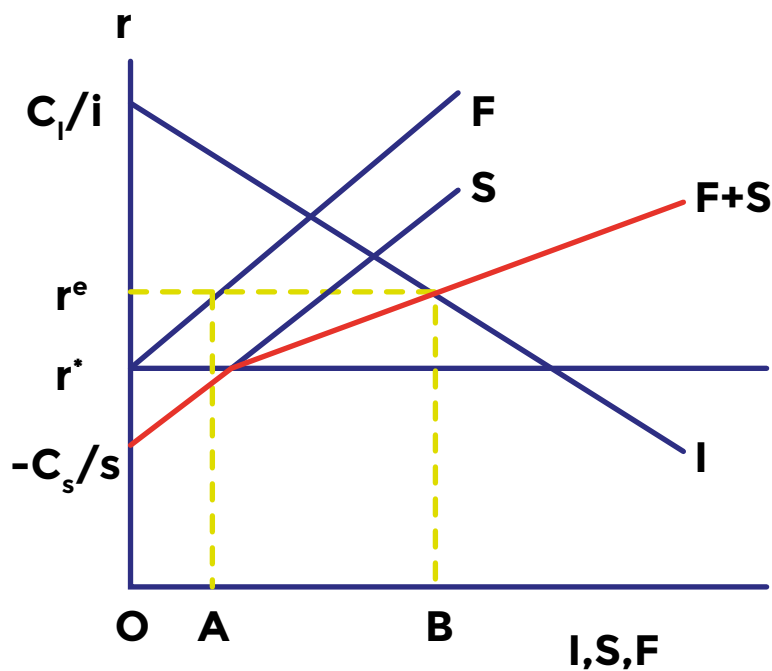
In figure B.1.2, an increase in the autonomous national saving component (increase in cS) shifts the S line to the right and hence the (F +S) line downward to (F+S)'. As a result, total domestic investment increase from OB to OC (for simplicity, lines S and F are not shown). Because the domestic interest rate falls in equilibrium, the absorption of foreign saving also falls, but less than proportionally. The increase in national saving results in higher investment and lower foreign saving. An increase in the autonomous component of national saving (as a result of a higher national propensity to save, for example) increases national saving in equilibrium, which in turn increases domestic investment. Causality runs from saving to investment.

Figure B.1.2   **Increase in autonomous national saving**
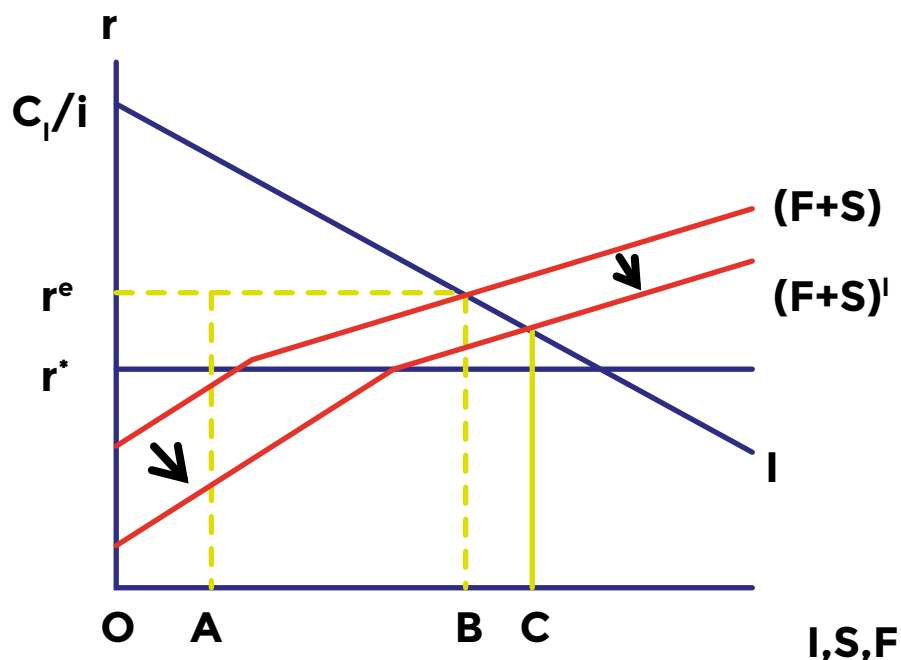
In figure B.1.3, an increase in the autonomous domestic investment component (increase in cI) shifts the I line upward to I'. As a result, total domestic investment increases from OB to OD. Because the domestic interest rate increases, both foreign and national saving increase in equilibrium. An increase in the autonomous component of the domestic investment (for example, because of better opportunities to invest or optimistic expectations about future returns to investment as a result of increases in total factor productivity) increases domestic investment in equilibrium, which in turn increases national saving. Causality runs from investment to saving.

Figure B.1.3 Increase in autonomous domestic investment
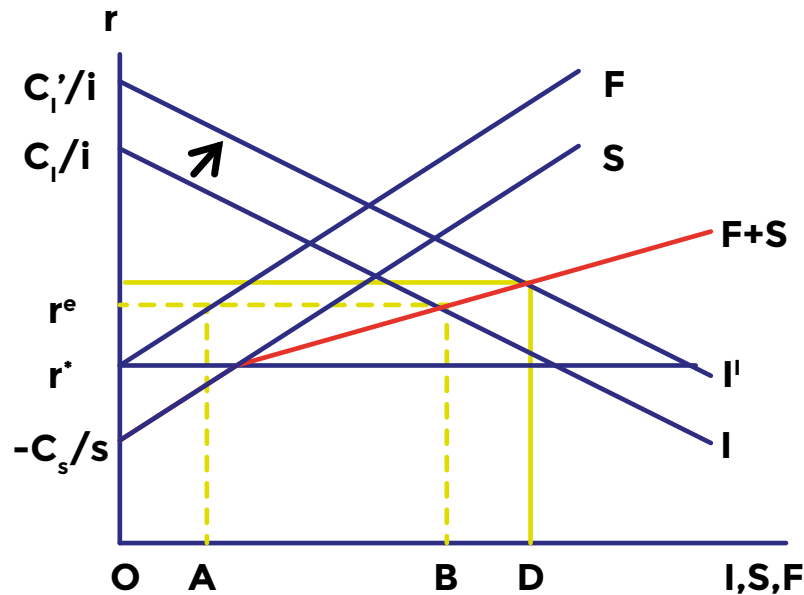
For example, increases in total factor productivity could generate expectations of higher returns on investment and consequently incentivize subsequent increases in saving to take advantage of enhanced opportunities. This argument suggests that saving reacts endogenously to increases in investment that are induced by higher expected returns derived from gains in productivity.

Saving also includes exogenous components, however. Empirical evidence for the world and for LAC shows that national saving precedes investment, not the other way around (see Attanasio, Picci, and Scorcu 2000; IDB forthcoming).[14,15], A 10 percent increase in the past national saving raises current investment 1 percent, whereas an increase in past investment has no significant effect on current saving. This result is robust to the inclusion of indirect channels through which investment and saving could affect each other. For example, current investment might generate growth, which in turn increases future saving. The data show that saving drives investment even considering the indirect effect through growth and that the reverse is not true. In some countries and years, however, causality runs in both directions. In LAC-7 (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela), for example, past saving leads to current investment and past investment leads to current saving (IDB forthcoming).

Bidirectional effects do not invalidate the main policy message, however—that national saving in LAC will have to increase if the region is to foster investment. Higher saving is a necessary, not a sufficient, condition to increase investment; even significant increases in national saving do not necessarily lead to higher investment.[16]

Moving forward, the most important policy recommendation is that policies to promote national saving and policies that promote investment be consistent (see Cavallo and Pedemonte 2015). If pro-saving polices have the unintended consequence of discouraging investment, they will probably ultimately fail. This debate is not merely abstract; some popular pro-saving policies, such as providing incentives for saving locally through tax breaks or mandatory saving vehicles, have backfired when the overall consistency of policies was not taken into account in the policy design. With sound and stable policy frameworks, LAC could increase both investment and national saving simultaneously. Without them, economic agents will probably always find ways to protect the real value of saving— via capital flight, for example—and low national saving will remain a binding constraint on investment and long-term growth.

Conclusions

In order to increase investment, LAC countries need to increase national saving. Investment in the region needs to increase to levels compatible with high, sustainable, long-run GDP growth rates, which international experience shows to be about 25 percent of GDP. Although LAC countries have been increasing investment rates in the past 10 years (the average for the region grew from 18 percent of GDP to 21 percent), it still has a long way to go.

In principle, additional investment could be financed through national or foreign saving. However, empirical evidence shows that foreign saving has been an unreliable source of long-term sustainable financing, for both macroeconomic and microeconomic reasons. Foreign capital flows tend to be volatile and prone to sudden stops; it is difficult for an economy to maintain large current account deficits for long periods of time without abrupt reversals or external indebtedness problems. Moreover, the perceived riskiness of assets in foreign currencies and information asymmetries induces home bias in investing.

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One way forward is to increase national saving. Countries that save more invest more. Rising national saving rates increase the resources available for financing domestic investment in a way that additional foreign saving does not. Some LAC countries achieved high rates of national saving but were not able to maintain them over time. The challenge is to raise saving rates and sustain them, in a larger number of countries.

Increasing national saving is a necessary condition to increase investment, but it will not be enough. In order for the additional saving to have the maximum impact, saving must be channeled to the most productive investment alternatives in an efficient manner.

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