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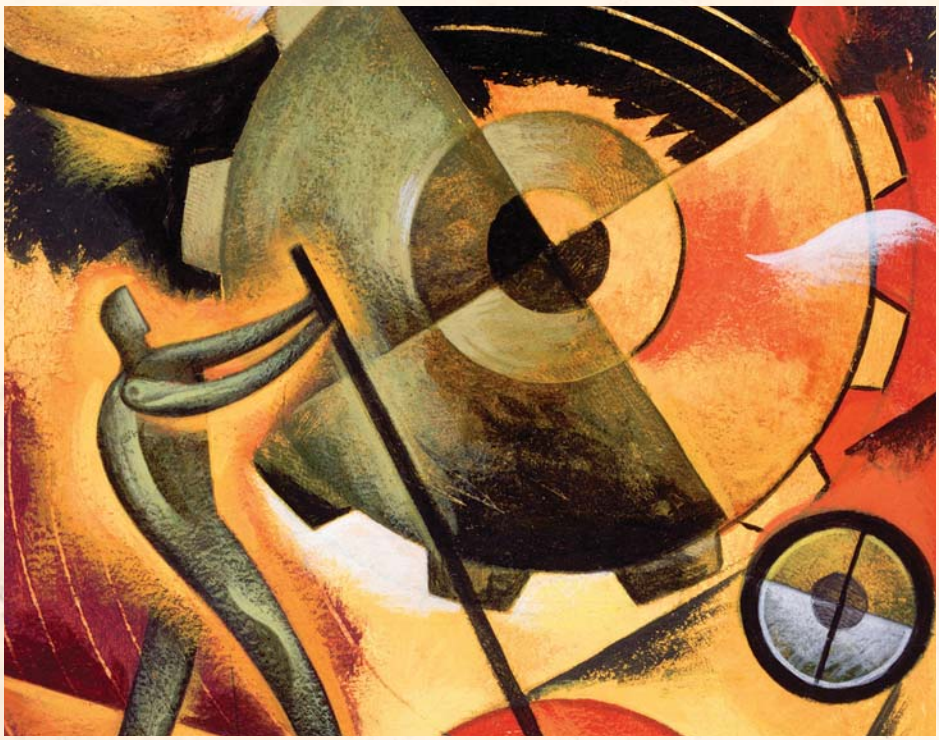
Latin American Entrepreneurs

Many Firms but Little Innovation



Daniel Lederman, Julián Messina,
Samuel Pienknagura, and Jamele Rigolini

Overview

THE WORLD BANK

OVERVIEW

Latin American Entrepreneurs

Many Firms but Little Innovation

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THE WORLD BANK
Washington, D.C.

This booklet contains the Overview of the forthcoming World Bank book, *Latin American Entrepreneurs: Many Firms but Little Innovation*. To order copies of the full-length book, published by the World Bank, use the form at the back of this booklet or order online at www.worldbank.org/publications.

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Foreword

For almost a decade, emerging market economies, including several countries in Latin America and the Caribbean (LAC), were regarded by analysts and investors as new engines of growth. Their growth before the global financial crisis sparked enthusiasm that, after a short pause during the 2008 crisis, was cemented by vigorous recoveries in 2009 and 2010. A new story line seemed to dominate: thanks to deep structural changes, both domestic and global, the potential of emerging market economies had finally arrived.

In the past few months, enthusiasm for emerging markets appears to have soured. A notable slowdown has cast doubts on the sustainability of their high growth rates of the past decade and revived old fears of macroeconomic and financial turbulence. Phrases such as "submerging economies" have become common in financial periodicals.

The truth is that major LAC economies experienced lackluster growth for decades before the boom of the 2000s. At the beginning of the 20th century, a simple average of the region's gross domestic product per capita was about 38 percent that of the United States. By 2012, that ratio was about 35 percent.

The change implies that over 110 years, the large economies of LAC grew at a slower rate than the United States and, more important, were unable to take advantage of their relative underdevelopment by catching up to the United States and other developed economies that became the sources of technologies that are now commonplace around the globe. LAC did not need to invent, just to imitate and adopt technologies, as some economies in East Asia were able to do.

All this is not to say that the recent enthusiasm for LAC's emerging markets was unwarranted. The enthusiasm was justified by the substantial and unprecedented social progress in the region during this recent growth spurt, as documented in a previous regional flagship report, *Economic Mobility and the Rise of the Latin American Middle Class*. That report provided evidence of remarkable progress:

- Nearly 70 million people were lifted out of poverty in the past decade.
- Approximately 50 million people entered the ranks of the middle class between 2003 and 2009.
- Income inequality, as measured by the Gini coefficient, fell steadily, dropping from its peak of 0.58 in 1996 to the lowest level ever recorded in the region, 0.52, in 2011, a decline of more than 10 percent.

- About one-third of the poverty reduction was the result of social policies that transferred incomes to the poor, but labor market income during the boom years accounted for the remaining two-thirds. In other words, growth is required to sustain poverty reduction and middle class expansion.

What makes the productivity challenge pressing is precisely the fact that social progress has been tied to growth. Thanks to current policies, social programs can be maintained in the short term. The risk is that these gains may be lost if growth remains low for too long.

With global tailwinds receding, the region will need to rely on its own devices to spur growth. Those devices have only one name: productivity. With scant domestic savings and receding external capital inflows, income growth can be sustained only by productivity gains.

Leaders in the region are fully aware of the importance of boosting productivity. But what is this battle about? This report argues that it is about establishing an enabling environment in which entrepreneurs can emerge, compete, and innovate. It is about building an innovative entrepreneurial class in which top-notch firms—firms that export goods, services, and even capital—no longer look tepid in contrast to entrepreneurial superstars elsewhere.

Beyond generalities, the main elements of an enabling environment for entrepreneurship and innovation include the following:

- *Building human capital*. The challenge of raising the quality of education remains, but it goes well beyond test scores. For example, LAC has a historic deficit of engineers, dating at least to the early 20th century.
- *Improving logistics and infrastructure*. Modernizing ports, transport, and customs can add a competitive edge to products from the region. The current infrastructure deficit also needs to be addressed in order to end capacity constraints that become evident at low growth rates.
- *Enhancing competition*. Although the region has globalized, many industries remain sheltered from competition. This protection has the dual negative effects of reducing productivity growth in those sectors and handicapping the export sector, which relies on their services and intermediate goods.
- *Improving the contractual environment*. Although intellectual property rights are not the only relevant aspect of domestic institutions that affect productivity, innovation is unlikely to take root without adequate protection.

With LAC's recent social gains, growing demands for access to good-quality services have increased. Middle classes expect not only income gains so that their children will see even more progress in the future but also improved public services for the current generation. With increased productivity, private incomes will rise, increasing public revenues and the state's capacity to invest in service delivery. In time, if we win the productivity battle, we will enter into a virtuous cycle of stronger public sectors, higher growth, and opportunities for all.

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Contents of *Latin American Entrepreneurs: Many Firms but Little Innovation*

Abbreviations

BEEPS	Business Environment and Enterprise Performance Surveys
CAFTA	Central America Free Trade Agreement
CRC	Centro Regional de Competencia para América Latina
EAP4	Indonesia, Malaysia, the Philippines, and Thailand
ECA	Europe and Central Asia
EPA	export promotion agency
FTA	free trade agreement
GDP	gross domestic product
GIPBP	Global Investment Promotion Best Practices
HS	Harmonized System
ICRG	International Country Risk Guide
ICS	Investment Climate Surveys
IPA	investment promotion agency
IPR	intellectual property right
LAC	Latin America and the Caribbean
LAC5	Argentina, Brazil, Chile, Colombia, and Mexico
MNC	multinational corporation
PEVC	private equity and venture capital
PPP	purchasing power parity
R&D	research and development
RCA	revealed comparative advantage
SME	small and medium enterprise
TFP	total factor productivity
USPTO	U.S. Patent and Trademark Office

Overview

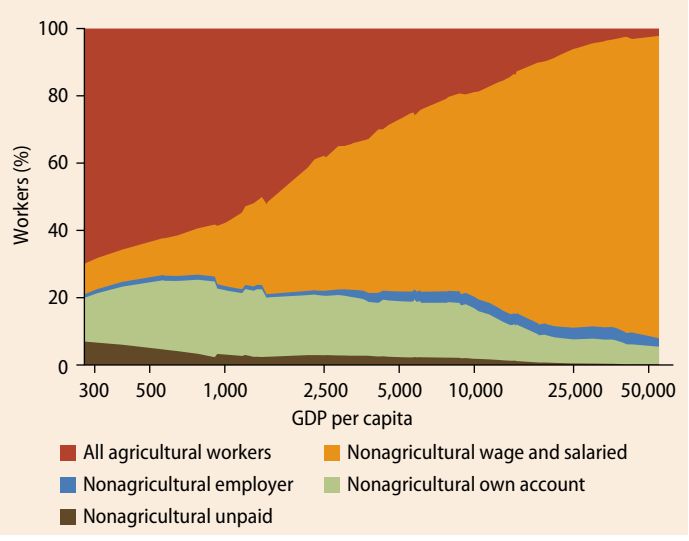
Entrepreneurship is a driver of development

Successful entrepreneurs are individuals who transform ideas into profitable commercial enterprises. This process often requires special talents, including a capacity to innovate, to introduce new products, and to explore new markets. It also requires an ability to manage others, to assign priorities to tasks to increase the efficiency of production, and to make the best use of available resources. But these talents are not enough. Successful entrepreneurs thrive in favorable economic and institutional environments that enhance the expected returns of innovation. When an enabling environment exists, entrepreneurs take risks and invest in innovation, spurring productivity gains through the dynamics of firm entry and exit and innovation by incumbent firms, thus fostering economic development.

Why should policy makers care about entrepreneurs, who tend to be among the better off in the population? The answer is simple: entrepreneurship is a fundamental driver of growth and development. Indeed, the basic premise of this report—one that is shared by most economists since Adam Smith and was greatly strengthened by the seminal work of Joseph Schumpeter—is that creative entrepreneurs are not just byproducts of the development process but important drivers of such a process. Entrepreneurs are key actors in the transformation of low-income societies characterized by low productivity and often subsistence self-employment into dynamic economies characterized by innovation and a rising number of well-remunerated workers. To the extent that causal links from entrepreneurship to productivity growth are at work, there is room for using policy levers to quicken the development process by improving the incentives and supportive institutions that facilitate innovation by entrepreneurs. These analytical and policy issues motivate this report, which explores the challenges faced by potential high-growth, transformational entrepreneurs in Latin America and the Caribbean (LAC).

Figure 1 depicts the transition from self-employment toward wage employment that tends to go hand in hand with economic development. It shows that up to a gross domestic product (GDP) per capita of about $2,000 (adjusted for purchasing power

FIGURE 1 Type of employment, by GDP per capita



Source: Gindling and Newhouse 2012.
Note: Employment shares are calculated based on data from household surveys. GDP = gross domestic product.

parity), agricultural workers make up most of the labor force, followed by the nonagricultural self-employed; wage employment outside agriculture comes only third. The incidence of wage employment rises gradually thereafter, becoming the most important type of employment at a GDP per capita of about $5,000. In countries such as Canada and the United Kingdom, more than 85 percent of employment consists of salaried employees (Gindling and Newhouse 2012).

The transition from self-employment to wage employment is part and parcel of the development process, in which entrepreneurs play a crucial role. Creative entrepreneurs are typically behind the most dynamic and productive firms—the ones that innovate, expand production, and generate jobs at a comparatively rapid pace. These firms not only create employment opportunities, they also create better employment. For a given set of skills, across the world, more productive firms, which tend to be the larger ones, pay higher wages. In LAC, for example, medium firms (with 5–25 employees) pay 20–40 percent higher wages than small firms, and large firms (with more than 25 employees) pay 30–60 percent higher wages.[1] This stylized fact is shared across countries, albeit with less intensity in the more advanced economies. It is not attributable to observable differences in the distribution of workers' skills or education across firms of different sizes.

Medium-size and large firms, which are typically run by the most dynamic entrepreneurs, are also more likely to engage in various forms of innovation. They are more likely to export to foreign markets, obtain patents, invest in research and development (R&D), introduce new products, improve production processes, cooperate on innovation with other firms, import new technologies, and export capital to establish affiliates in foreign markets (figure 2).

Research on entrepreneurship in LAC may deepen our understanding of the region's lagging productivity growth. Although LAC experienced remarkable growth in the first decade of the new millennium—especially compared with its own past and growth in the advanced economies—there are reasons to doubt the long-term sustainability of such high growth rates. A significant part of the recent growth spurt appears to be related to the commodity boom. Productivity growth remains modest (Busso, Madrigal, and Pagés-Serra 2012), particularly in the nontradable services sector (Pagés-Serra 2010), which through the natural process of structural transformation is attracting a growing share of the LAC urban workforce.

Measuring entrepreneurship is not an easy task, however, because it is related to the individual talents and characteristics of a few elite businesspeople. Following Schumpeter (1911), this report adopts a broad definition of entrepreneurship that focuses on what is *new* for the market.[2] Entrepreneurship thus includes firm entry into new or existing markets (both domestic and foreign), the introduction of new products to the market, and organizational improvements that enable firms to improve the quality or price of their products or achieve more efficient modes of production. The report adopts various terms to refer to this type of innovative entrepreneurship, including "high-growth,"

"high-end," and Lerner's and Schoar's (2010) "transformational" entrepreneurship. The important point is to differentiate entrepreneurs with high growth potential from small firms and self-employed individuals with low growth potential.

The report uncovers some bright spots. It finds that LAC is a region of entrepreneurs, as evidenced by the large number of business owners per capita relative to countries with similar incomes per capita. Moreover, the large number of entrepreneurs is not—as often believed—mainly a reflection of a large informal sector in which low-productivity firms are constantly emerging and dying. The share of business owners with formally registered firms is also relatively high in several LAC economies.

At the top end of the entrepreneurial spectrum, LAC experienced impressive export entrepreneurship activity during 2004–09. Stimulated by global tail winds and augmented by comparative advantage, recently implemented trade agreements, and well-targeted export promotion policies, the region saw impressive survival rates by exporters. It also witnessed the emergence of multinational enterprises—*multilatinas*—which are increasingly extending their influence beyond their countries' borders, particularly into neighboring countries.

These bright spots notwithstanding, the report identifies a glaring weakness in LAC's entrepreneurship landscape—namely, the low level of innovation. Firms in the region suffer from a chronic and substantial innovation gap relative to comparator countries and regions. This gap exists not only in terms of R&D and patenting but also in terms of product and process innovation. Innovation gaps are found among small and large firms alike. Indeed, even the region's superstar entrepreneurs—exporters and *multilatinas*—lag in important dimensions of innovation. Entry rates into exporting activities by LAC firms have been particularly low, although incumbent exporters did become more innovative under duress during the global financial crisis of 2008–09. *Multilatinas* are less innovative, less well managed, and less productive than similar multinationals from other regions.

FIGURE 2 Innovation edge of medium and large firms over small firms in Latin America and the Caribbean, 2010

Source: World Bank, based on data from 2010 Enterprise Surveys.
Note: Bars represent the marginal effect of a medium and large dummy variable in a regression controlling for firm, sector, and country characteristics. Small firms have 0–50, medium firms 51–100, and large firms more than 100 employees. Robust standard errors were calculated. Each country has the same weight in the regional average. R&D = research and development.

The rest of this overview is structured as follows. The next section documents the surprising vibrancy of entrepreneurship in the region, as measured by the large number of enterprises. It highlights the crucial distinction between "small" and "young" firms. Businesses that grow rapidly and become employment poles are more likely to be young firms, but they are not necessarily small. The third section documents the acute shortfall in innovation that characterizes LAC entrepreneurship—in product innovation, patents, R&D, and managerial practices. The fourth section examines various stylized facts about export entrepreneurship in the region, including low entry rates coupled with solid survival rates and strong responsiveness to adverse circumstances. The fifth section

examines the performance of *multilatinas* in the broader context of multinational corporations in LAC, with a focus on their low level of innovation. The last section discusses possible links between entrepreneurship, innovation, and structural features of the enabling environment in LAC.

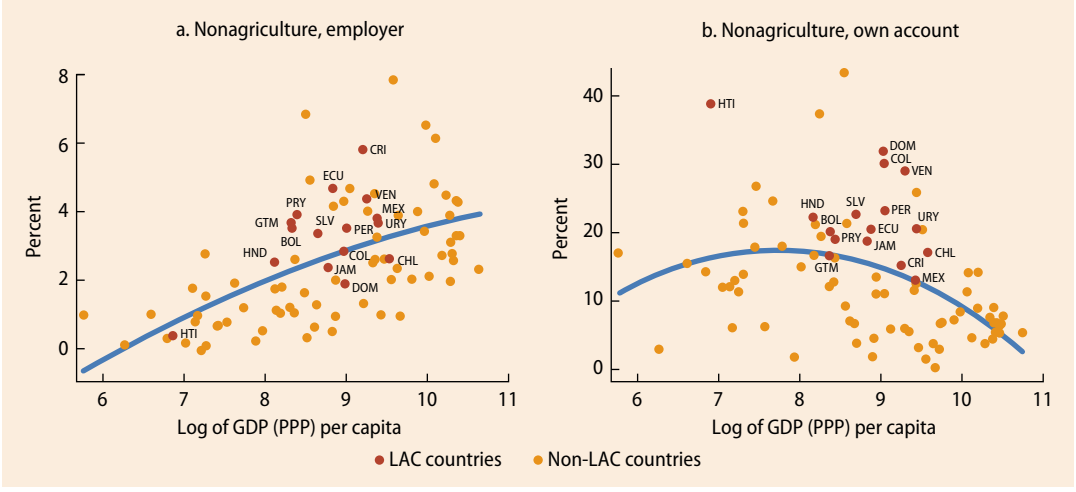
Entrepreneurship is vibrant—but growth is weak

In contrast to commonly held views, LAC is characterized by vibrant entrepreneurship, as measured by the number of firms per capita. The share of entrepreneurs in the population is higher than in comparator countries and regions. Perhaps more surprisingly, the incidence of formal businesses is also high. This fact suggests that the enterprise sector is much more than a large informal sector. However, the region lags in the nature of the businesses created. Firms in LAC tend to be smaller (in terms of the number of employees) at birth than firms in other regions at similar levels of development, and the growth process fails to compensate for the initial gap in employment. Even the largest firms in LAC create fewer jobs than the largest firms in other regions. How to address the gap in firm growth is a fundamental policy question. Addressing it requires a change in policy paradigm from the current emphasis on supporting small firms toward an emphasis on supporting start-ups and young firms.

Figure 3 captures both the vibrancy of the entrepreneurial environment and some of its deficits. It shows that in many countries in the region, the share of (nonagricultural) employers in the population is much larger than in countries at similar levels of economic development (panel a). However, these employers do not generate sufficient wage employment, as the share of own-account workers in the population is also above the expected levels (panel b). This characteristic is linked to the large informal sectors that constitute a developing country hallmark.

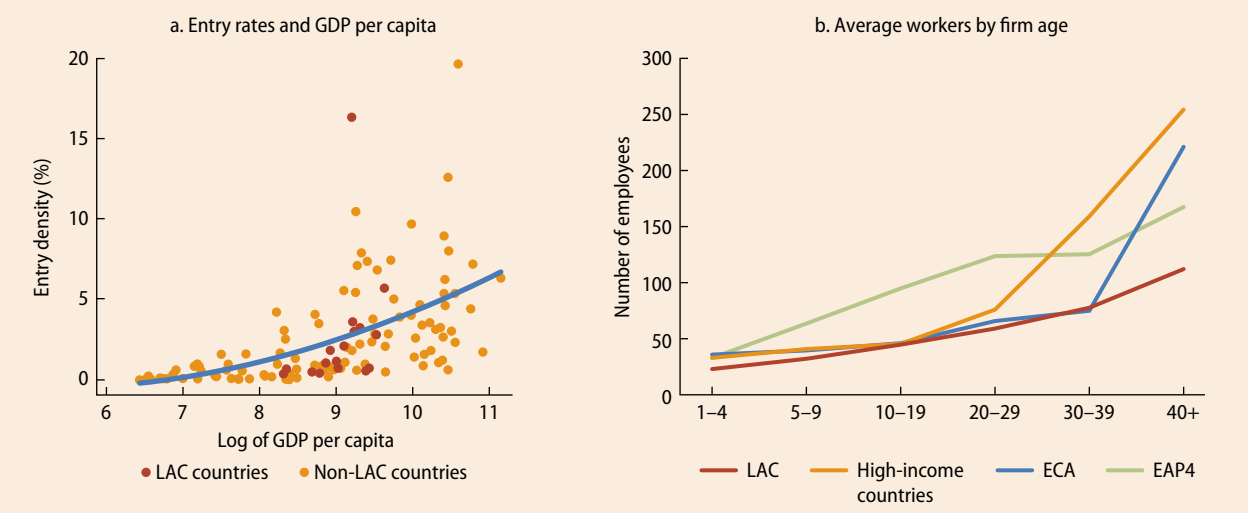
Entry into the higher end of the formal sector, measured by registration of new limited liability firms, remains low in many LAC countries[3] relative to their level of economic development. Figure 4 (panel a) displays the relationship between firm entry (measured by the average annual number of new limited liability firms registered per 1,000 working-age people during 2004–11) and the level of economic development (measured by the average per capita income for the same period) across 129 countries. Entry

FIGURE 3 **Relationship between type of employment and GDP per capita, 2010**



Source: World Bank, based on data from Gindling and Newhouse 2012 and World Development Indicators.
Note: Curves shows quadratic fitted values. GDP = gross domestic product. LAC = Latin America and the Caribbean. PPP = purchasing power parity.

FIGURE 4 Relationship between size and formal firm entry



Sources: Panel a: World Bank, based on data from World Development Indicators and World Bank Group Entrepreneurship Snapshots (WBGES). Panel b: World Bank, based on data from 2006–10 Enterprise Surveys.
Note: Panel a: Each point represents the average between 2004 and 2011. Curve shows quadratic fitted values. GDP = gross domestic product. LAC = Latin America and the Caribbean. Panel b: ECA (Eastern Europe and Central Asia): Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Kazakhstan, Latvia, Lithuania, FYR Macedonia, Moldova, Romania, Russian Federation, Serbia, Turkey, Ukraine, and Uzbekistan. EAP4: Indonesia, Malaysia, the Philippines, and Thailand. High income: Croatia, the Czech Republic, Hungary, Poland, the Slovak Republic, Slovenia, and Spain. LAC: Latin America and the Caribbean. The most recent survey available for each country was used. Each country has the same weight in the regional averages. Size at birth above 10,000 was replaced by "missing."

is positively associated with GDP per capita, and in many LAC countries entry rates are below the expected level. However, there is substantial heterogeneity within the region, with some countries located above the benchmark. The most salient example is Costa Rica, with an entry rate of almost 16 new firms per 1,000 working-age people—four times the international benchmark. Argentina and Mexico, by contrast, exhibit rates of entry substantially below those suggested by their GDP per capita.

The fact that on average LAC displays uninspiring rates of entry of formal limited liability firms has led many observers to single out entry barriers as the main culprit. In the last decade, however, LAC countries made significant progress in reducing such barriers. The burden imposed by red-tape entry-related regulations is still higher in LAC than in comparator regions. But the time to set up a business, for instance, was halved in less than a decade (World Bank 2013).

Moreover, the variance across countries in the number of procedures, length of time, and costs associated with setting up a new business declined steadily in the 2000s. LAC was no exception, exhibiting stronger deregulation among countries that started with the highest levels at the turn of the millennium. However, the significant reduction in entry barriers has not made a visible dent in the region's entry rates of limited liability firms, which lie at the high end of the formal sector. This failure could be interpreted as an indication that the effects of changes in entry barriers come with a considerable lag. A more plausible interpretation may be that either entry barriers are not the most binding constraint to formal entry in LAC or that reducing entry barriers alone, without achieving a critical mass of complementary reforms, is insufficient to spur entry.

Another salient feature of LAC entrepreneurship is that new firms do not grow as much as firms in other regions and thus tend to remain small. Panel b of figure 4 plots the average age of firms against the average number of employees for different regions. It shows that LAC has the smallest new firms (in terms of number of employees) of any region.[4] Even the largest new firms (the

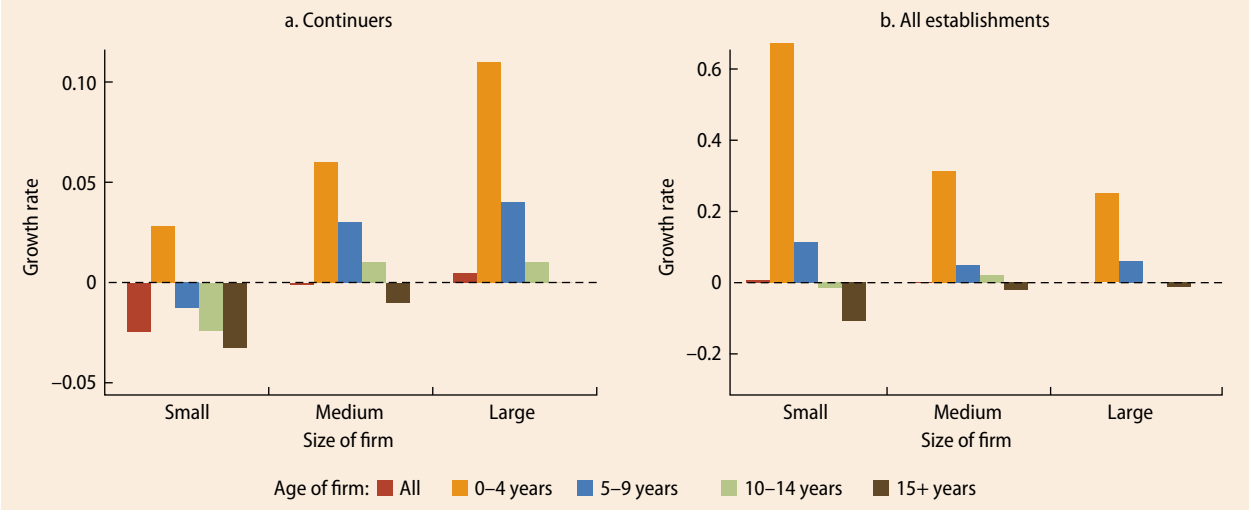
90th percentile of the size distribution of new firms) are about half the size of new firms in other regions.[5] Moreover, differences in size widen as firms age: LAC firms that are 40 or more years old are on average half the size of firms the same age from high-income countries and Eastern Europe and Central Asia (ECA) and one-third the size of firms in the middle-income countries of East Asia and Pacific (EAP4)—Indonesia, Malaysia, the Philippines, and Thailand.

Policy makers in LAC have typically tried to address the lackluster growth of firms by focusing on smallness per se. Together with a concern about employment, this focus has taken the form of a myriad of government-sponsored programs that support small and medium enterprises (SMEs). Eligibility for accessing support depends largely on size, typically measured by the number of employees. The evidence in this report casts doubt on this overemphasis on smallness and points to the need to shift the focus toward young (rather than small) firms. Most young firms are small, but a relatively large share of small firms are not young—a distinction this report highlights as having potentially critical importance for the design and effectiveness of SME support programs.

The empirical basis for emphasizing this distinction is illustrated by a detailed analysis of the dynamics of (formal) manufacturing firms in Colombia by Eslava and Haltiwanger (2013), as well as by research on firm dynamics in the United States. Figure 5 presents some of the results on the importance of firm size versus firm age for the generation of employment in Colombia. Panel a focuses on "continuers" (that is, firms that remained alive throughout the sample period) and therefore abstracts from firm entry and exit. Growth increases with size and declines with age, as stands to reason (that a firm that did not expand quickly during its youth or middle-age years is arguably less likely to enjoy a growth spurt in old age). However, differences in growth rates are much more marked along the age dimension than along the size dimension. Firms of all sizes grow fastest in their early years, especially their first four years.

Even more interesting is the fact that the average growth rates of firms in their early years increase rapidly with size—that is, firms

FIGURE 5 Employment growth in Colombia, by firm size and age



Source: Eslava and Haltiwanger 2013.
Note: Small: fewer than 50 employees; medium: 51–200 employees; large: more than 200 employees. Growth rates are defined as in Davis, Haltiwanger, and Schuh (1996). They are the change in employment between two consecutive periods divided by the average employment between the two periods.

that are young and large grow the most, making the largest contribution to job creation. This fact contradicts the popular belief that most employment generation occurs among small firms. The confusion stems from the failure to distinguish between the stock of firms and their growth dynamics. Even if at any point in time small firms were to account for most of the jobs in the economy, it does not follow that all small firms (independent of age) are equally responsible for employment generation over time. Rather, it appears that job creation comes from young firms, regardless of their size.

When all firms in the Eslava-Haltiwanger sample (not just firms that stayed alive during the sample period but also firms that were created or died during that period) are examined, the picture changes in an important respect (panel b of figure 5). Although young firms continue to be the main contributors to employment growth, the role of size is reversed, with small firms dominating. The average employment growth rate of small firms up to four years old jumps from 4 percent for continuers to 53 percent for all firms. This result stems from the fact that the vast majority of entrants are small, and by construction the growth rates of newly created firms are highest.

Hence, the evidence on firm dynamics in Colombia suggests that young rather than small firms are the main employment creators. This evidence is consistent with recent findings for the United States (Haltiwanger, Jarmin, and Miranda 2013). Further research could determine the role of young firms in employment generation across LAC.

However, increasing the effectiveness of programs aimed at supporting firm (and employment) growth may call not just for a shift of emphasis from small to young firms. A deeper understanding of the characteristics of young firms of all sizes that enable them to survive and thrive in market economies is also necessary. Unfortunately these characteristics of young dynamic firms remain unknown, thus making policy making in this area complicated. Coordinating efforts with the private sector, leveraging the screening abilities of private agents, and using risk-sharing arrangements to align incentives could help governments try to pinpoint firms worthy of public sector support.

The region has many entrepreneurs but little innovation

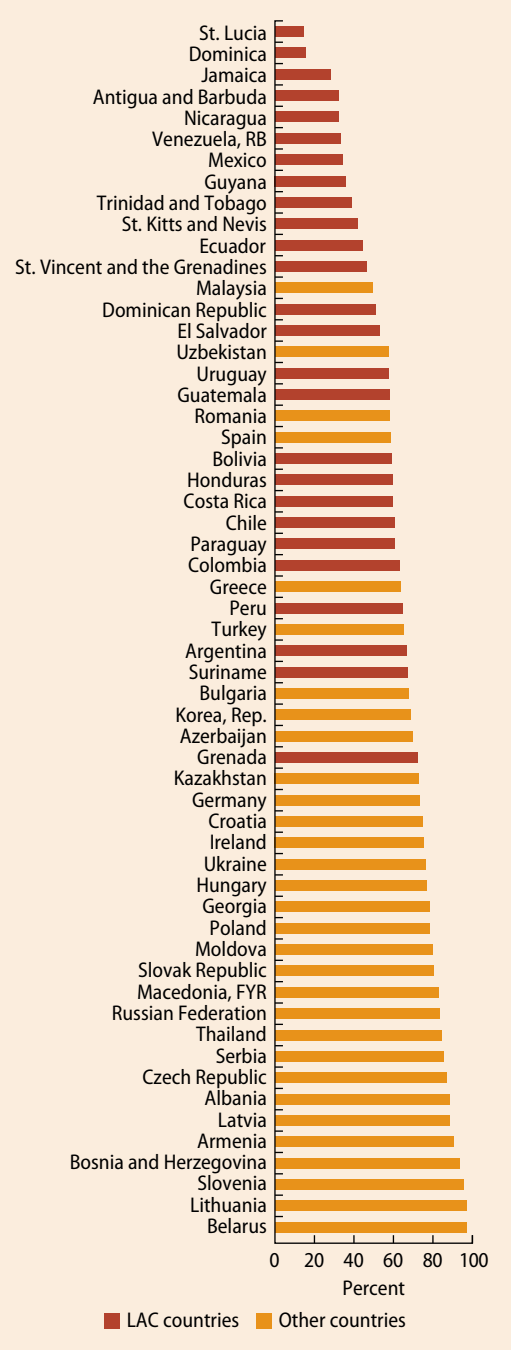
There are many potential reasons why LAC firms grow as slowly as they do. One is the lack of innovation. Entry is just the beginning of the story. In order to grow, or even survive, firms need to continuously innovate.

It is in this domain of entrepreneurship that businesses in LAC score relatively badly. LAC firms introduce new products less frequently than firms in otherwise similar economies, high-end entrepreneurs tend to be far away from global best practices in the management of their enterprises, firms' investment in R&D is low, and patent activity is well below benchmark levels.

Some of the most successful LAC firms have managed to grow out of their national boundaries during the last decade and are now competing on world markets. The success of high-end companies such as Vale, Embraer, and CEMEX notwithstanding, innovation in LAC is limited, with even some of the giant *multilatinas* underperforming their peers from other countries. Many formal firms in the region are engaged in some form of innovation, but the intensity of innovation tends to be low or poorly suited to raise productivity. Figure 6 shows the percentage of firms that developed or introduced a new product (product innovation) in selected countries between 2006 and 2010. The LAC countries are bunched toward the low end of the scale.[6] On average, firms in the region are 20 percent less likely to have introduced a new product than the middle-income countries in ECA—and the picture appears even grimmer for most of the Caribbean, where the likelihood of introducing a new product drops to half that of firms in ECA.

Figure 6 measures the share of firms involved in innovation activities, which is

FIGURE 6 Percentage of firms in selected countries introducing a new product, 2006–10



Source: World Bank, based on data from Seker 2013 and 2006–10 Enterprise Surveys.
Note: LAC = Latin America and the Caribbean.

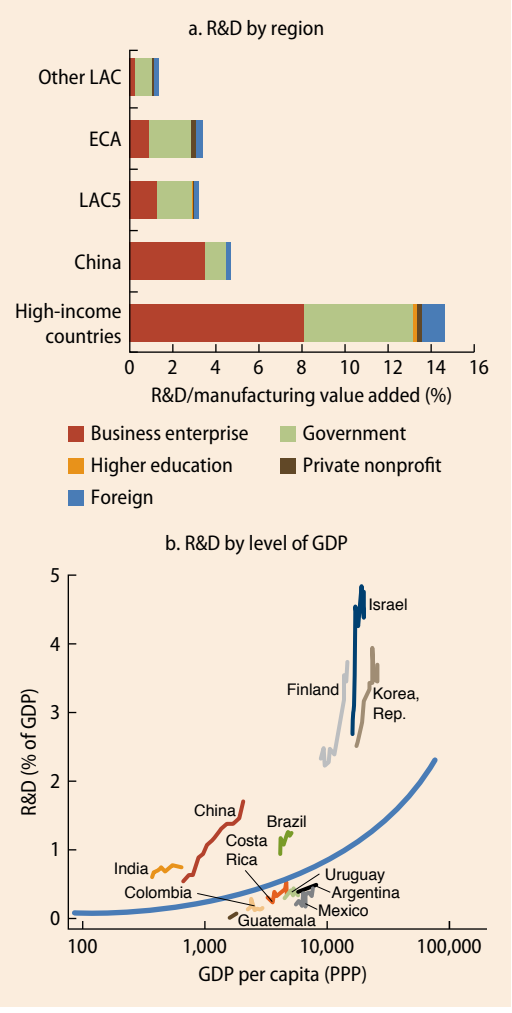
uninformative about the quality and intensity of innovation, two factors strongly associated with high-productivity firms. Datasets exploring these fundamental factors in a comparable way across countries are of poor quality. The few available indicators suggest that the quality of innovation in LAC may be as much of an obstacle to firms' growth and productivity as the quantity.

Figure 7 shows aggregate investment in R&D. Panel a compares regional averages as a percentage of value added in manufacturing (the sector where most R&D takes place). Panel b benchmarks R&D against the average of countries at similar stages of development.[7] Average R&D investment in the five largest LAC economies is two-thirds that of China when expressed as a percentage of manufacturing value added and one-third when expressed as a percentage of GDP. For the remaining LAC countries, R&D investment is about a third that in China when expressed as a percentage of manufacturing value added and a tenth that of China when expressed as a percentage of GDP. These innovation gaps are worrisome.

A second feature that distinguishes LAC from China and high-income countries is the preponderant role the public sector plays in R&D (the public sector also accounts for a large share of R&D in ECA) (Pagés-Serra 2010).[8] This is not to say that the public sector in LAC invests excessively in R&D: as a percentage of GDP, it invests much less than China or high-income countries. The finding rather reflects how little private LAC firms invest in innovation.

The extent to which lower levels of R&D are likely to translate into lower productivity and economic growth is, of course, influenced by many factors. But panel b of figure 7 indicates that economies that experienced periods of sustained growth often had bursts of R&D investments that placed them well above their peers (relative to the blue line). LAC's low levels of R&D, and the fact that little of it is conducted by the private sector, appears to be one of the main culprits behind the region's well-documented history of low productivity growth.

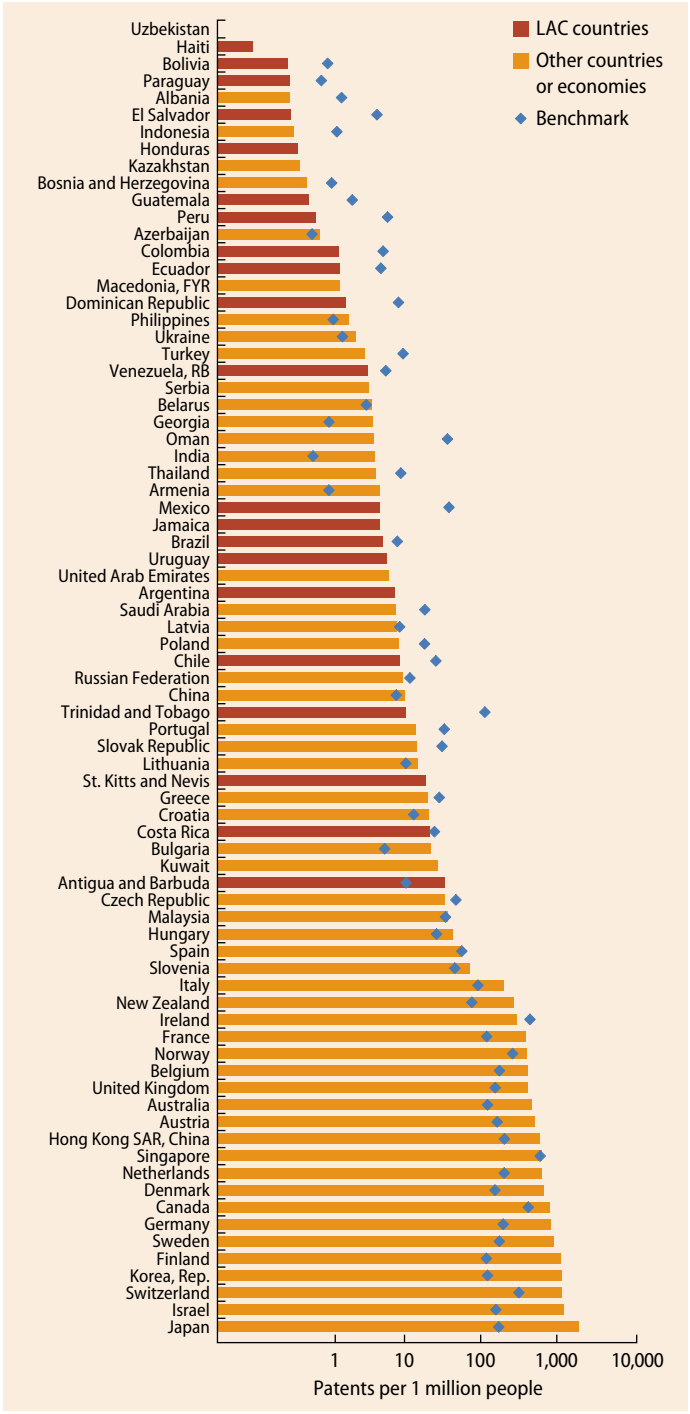
FIGURE 7 Investment in research and development (R&D) in selected country groups, 2008–10



Sources: Panel a: World Bank, based on data from World Development Indicators (WDI) and UNESCO. Panel b: Updated from Lederman and Maloney 2003 using WDI.
Note: For countries and economies included in each group, see note 4. GDP = gross domestic product. PPP = purchase power parity. R&D = research and development. The blue line is a regression-fitted line estimated with data from 1996 to 2011 covering 119 countries.

A similar picture emerges from data on patents. Figure 8 shows the number of patents per million people that inventors from different countries received from the U.S. Patent and Trademark Office (USPTO) between 2006 and 2010. No LAC country exhibits a level of patents that approaches that of high-income countries, and most LAC countries

FIGURE 8 Number of patents per capita granted by U.S. Patent and Trademark Office, actual and benchmarked, by inventor's country or place of residence



Source: World Bank, based on data from USPTO 2012 and World Development Indicators.
Note: Dots represent predictions from a multivariate regression analysis that includes the log of patents per million people on the log of gross domestic product (GDP) (adjusted for purchasing power parity), the log of population, and the log of merchandise exports to the United States. They indicate where each country stands with respect to countries with similar levels of GDP, population, and merchandise exports to the United States. The regression used all countries and economies for which data were available; the figure presents only comparator countries. Data are averages for 2006–10. LAC = Latin America and the Caribbean.

received fewer patents than their middle-income country peers. Brazil, for instance, registered only 5 patents per million people between 2006 and 2010, half the number per capita of China (10) and slightly less than a quarter the number per capita of Bulgaria (22). To be sure, part of these differences can be explained by lower levels of economic development and lower exports to the United States (which imply fewer incentives to apply for patents from the USPTO). But even after controlling for per capita income, population size, and exports to the United States, the patent intensity in most countries in the region remains below their benchmark, including Brazil (figure 8).

R&D and patenting are proxy measures of the intensity and quality of innovation. They indicate only indirectly how firms perform in terms of process innovation. An additional dimension is the quality of management practices, which can be assessed following the methodology developed by Bloom and Van Reenen (2007).

Figure 9 compares management practices of manufacturing firms across different dimensions for a number of high-income and LAC countries as well as China and India (the sample of comparator countries is dictated by countries in which management surveys were conducted). LAC countries other than Mexico score toward the bottom of the distribution, with management practices closer to those of Chinese and Indian firms than to high-income countries. Given that LAC firms face higher labor costs than firms in China and India, poor management practices in the region pose a more severe competitive disadvantage for them.

Part of the LAC "management gap" can be explained by firm characteristics. Firms in high-income countries have a larger share of employees with college degrees, are larger, and are more likely to be multinationals than firms in LAC. These firm characteristics explain at most a third of the management gap between the median firm in LAC and the United States, however. Part of the remaining two-thirds of the gap could be explained by the training and ability of LAC managers and entrepreneurs. Factors external to the firms, such as the business environment and other country characteristics, are also likely to explain the region's deficit in managerial practices and hence process innovation.

Few companies enter export markets

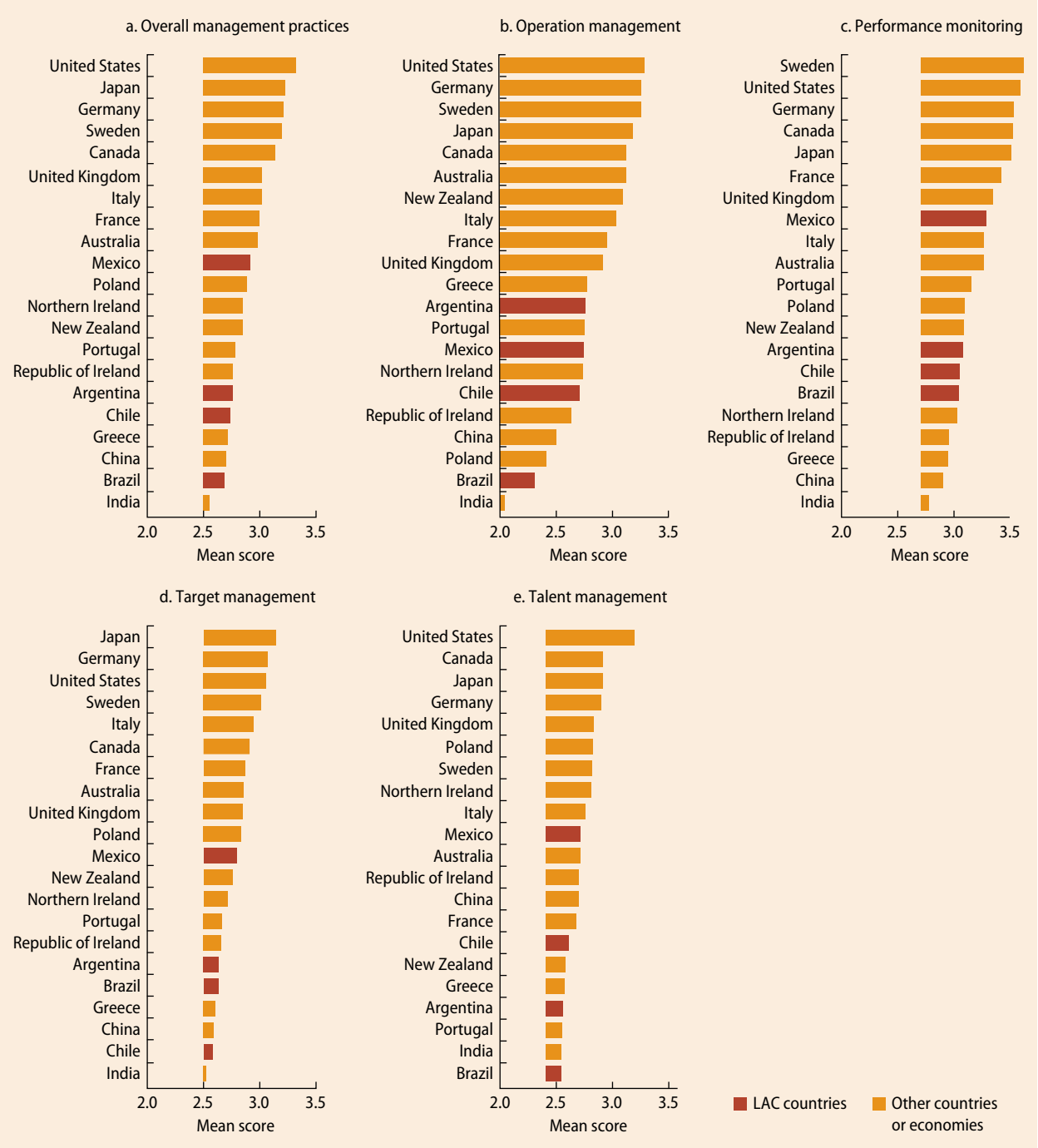
Accessing new markets through trade is arguably a salient manifestation of transformational entrepreneurship. Barring firms that benefit from high rents, only firms with superior performance can thrive in export markets. In fact, most new entrants into export markets do not survive beyond one year.

This report documents a number of stylized facts that characterize LAC exporting firms. In particular, although entry rates into exporting activities remain significantly below those in (poorer) comparator countries, the survival rates of the few firms that attempt to export tend to be at or slightly above benchmark levels. Moreover, analysis of the contraction of foreign demand during 2008–09 suggests that exporting entrepreneurs respond well to pressure: in the face of the crisis, they nimbly opened new exporting firms and developed new export products, in the process penetrating new export markets. Thus, it seems that the old adage "necessity is the mother of invention" applies to export entrepreneurship. The report also provides evidence that export promotion policies that help entrepreneurs surmount certain barriers to entry by providing information about global markets.

Research conducted for this report benchmarked entry and survival rates in the region using a new firm-level database, the World Bank's Exporter Dynamics Database (figure 10).[9]

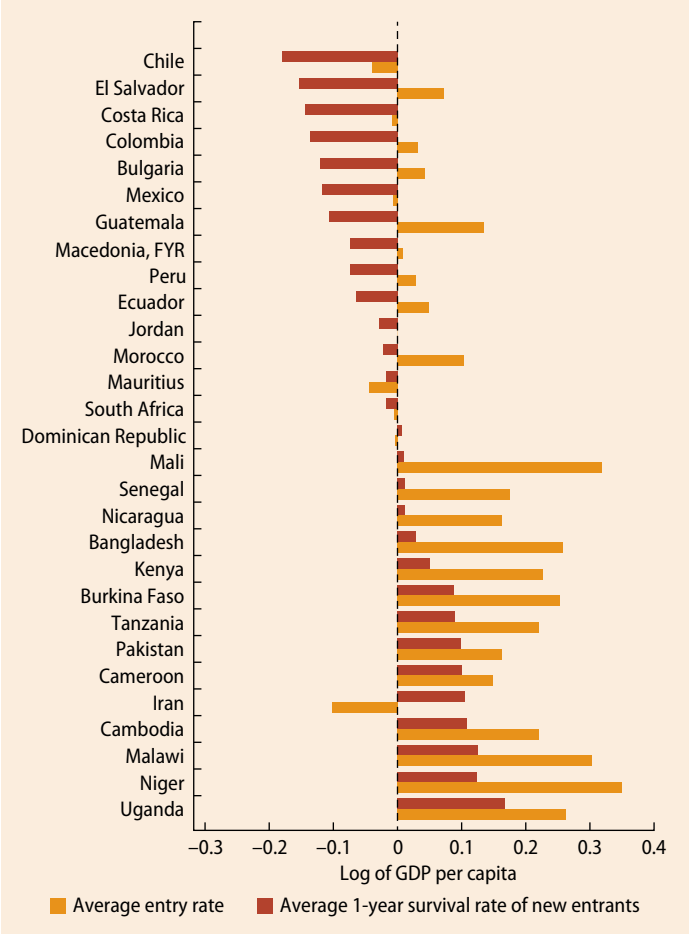
The results are striking: virtually all LAC countries in the sample show export entry rates that are below the benchmark. In contrast, in Asia, the Middle East, and even Africa, entry rates of firms into exporting activities are above the benchmark. LAC

FIGURE 9 **Management practices in selected economies**



Source: Maloney and Sarrias 2012.
Note: Surveys sampled manufacturing firms with 100–5,000 employees recorded in Orbis. LAC = Latin America and the Caribbean.

FIGURE 10 Average entry and one-year survival rates in selected countries (differences with respect to baseline)



Source: Estimations by Ana M. Fernandes and Daniel Lederman (World Bank), based on data from the World Bank's Exporter Dynamics Database, World Development Indicators, and World Integrated Trade Solution (WITS) database.
Note: Figure shows estimates of each country's dummy variable from an econometric model that also includes (the log of) GDP per capita (adjusted for purchasing power parity), the Vollrath (1991) index of revealed comparative advantage at the six-digit level of the Harmonized System (HS) classification, industry dummies, and year dummies. The industry dummies are defined at the two-digit level of the HS. The excluded benchmark country is Albania. Data are for 2005–09.

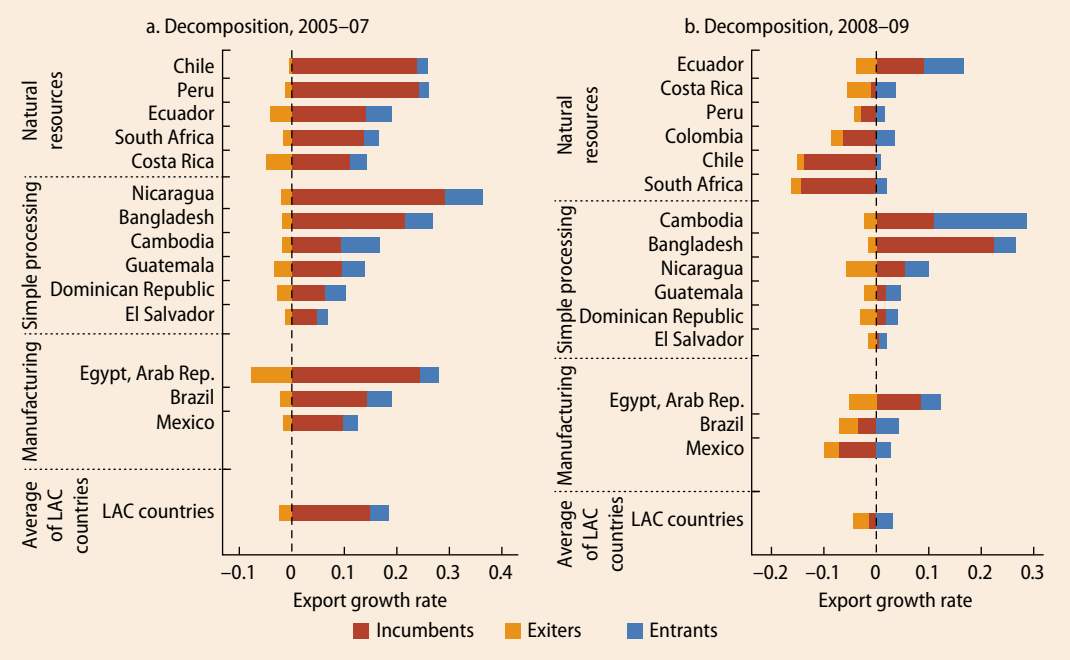
countries fare better in the survival dimension, with survival rates of the (relatively small number of) firms that enter into exporting markets above the benchmark. However, no LAC country appears to be an overachiever on the survival front when compared to most of the other developing countries included in the database, as shown in figure 10, after controlling for GDP per capita.

However, exporting entrepreneurs tend to display a significant capacity to adapt to and cope with adverse circumstances, which suggests that greater competitive pressures could be an antidote to the dearth of innovation among high-end export entrepreneurs in LAC. The agility of incumbent exporters is illustrated by their reactions to the drop in foreign demand in 2008–09. During this period, average LAC export growth by incumbent exporters was negative. But their sales of new products raised exports by 3 percent on average, and their sales to new destinations raised exports by 4 percent (Fernandes, Lederman, and Gutierrez-Rocha 2013). Furthermore, the contribution of new exporters (entrants) to national export growth increased when the global crisis hit in 2008, even though entry rates did not rise. During the steady growth period (2005–07), incumbent exporters played a dominant role in explaining export growth in both LAC and non–LAC countries, among all types of exporters (natural resource based, simple processing, and diversified manufactures) (panel a of figure 11). In contrast, new exporting firms were an important contributor to exports in LAC during 2008–09. Export growth in LAC during the global crisis would have declined more sharply than it did if exports by new entrants had not compensated for the exit of incumbent firms (panel b of figure 11) and incumbent exporters had not found new markets.

Export promotion services also appear to increase entry and survival rates and therefore overall export activity. The economic justification for export promotion is often based on some form of information failure, related to the public good nature of information that leads to its underproduction by private firms. For instance, existing exporters have no incentives to share information about foreign market conditions and opportunities with potential competitors after incurring the costs of discovering how to export profitably (Hausmann and Rodrik 2003).

In research conducted for this report, Lederman, Olarreaga, and Zavala (2013) use firm surveys from seven LAC countries from

FIGURE 11 **Sources of export growth in selected countries, 2005–07 and 2008–09**



Source: Fernandes, Lederman, and Gutierrez-Rocha 2013, based on data from the World Bank's Exporter Dynamics Database.
Note: Figures for Ecuador in panel a are for 2006–07. LAC = Latin America and the Caribbean.

2006 and 2010 to analyze the effectiveness of export promotion services. They find that firms that used export support services have a significantly higher probability of entering and surviving in export markets.

Even large multinational corporations in the region are insufficiently innovative

Under the right business environment and contractual conditions, multinational corporations can be good for the local economy. They tend to be more productive and to use the latest technologies; through their engagement with and support of local suppliers, they can transfer knowledge and better technologies to the local economy, which raise the quality of inputs and the productivity of firms (Moran 2001; Javorcik and Spatareanu 2005).

At the same time, they can have negative impacts: by competing in local product and factor markets, they can drive less efficient local firms to exit, thereby generating transitional dislocations. Although the elimination of inefficient local firms may not ultimately be bad for a country's economy, in the short term it may adversely affect workers and create social and political tensions.

This report provides evidence that multinational corporations have had significant net positive impact in LAC economies in recent years: the positive impacts from technology transfers, knowledge spillovers, and linkages have overwhelmingly dominated the negative impacts from greater competition in product and factor markets. The full potential of multinational corporations has not been fully realized, however, because multinational affiliates in LAC behave like local firms, investing very little in innovation. Thus, either LAC is not attracting the most innovative multinationals or the obstacles that local firms face to innovate also act as barriers to innovation for foreign firms operating in the region.

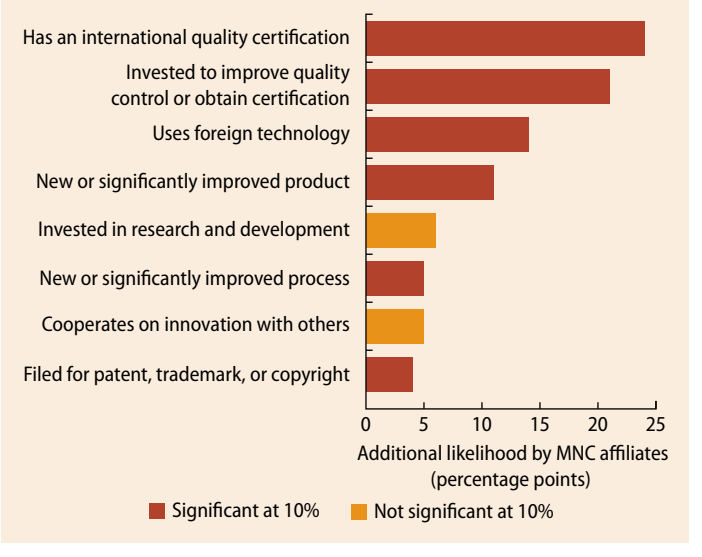
The recent emergence of *multilatinas* has not changed this picture. On average,

multilatinas conduct less research than their peers from other regions. The large majority of their business is concentrated in Brazil, Mexico, and Chile. They therefore miss the opportunities presented by greater integration, both regionally and globally. When *multilatinas* expand abroad, typically to neighboring countries, their affiliates often operate in the same sector as the parent company, suggesting that these firms are driven by the search for larger markets and the desire to diversify country risk rather than the desire to establish linkages and clusters, thereby deepening their involvement in productive networks and global value chains.

The higher productivity and more innovative behavior of multinational corporations relative to local firms in LAC are reflected in many dimensions. Everything else equal, the probability that a firm introduces a new product is about 11 percentage points higher for a foreign-owned firm operating in LAC than for domestic firms, and the probability of introducing a new process is about 5 percentage points higher (figure 12). Multinationals are also more likely than local firms to apply for a patent, trademark, or copyright; collaborate for innovation purposes with other institutions; invest in R&D; and adopt foreign technologies. The differences are even larger for efforts to improve the quality of products. Multinational corporations are 21 percentage points more likely to engage in quality-improving investments and 25 percentage points more likely to have international quality certifications than local firms, perhaps because they are more likely to export.

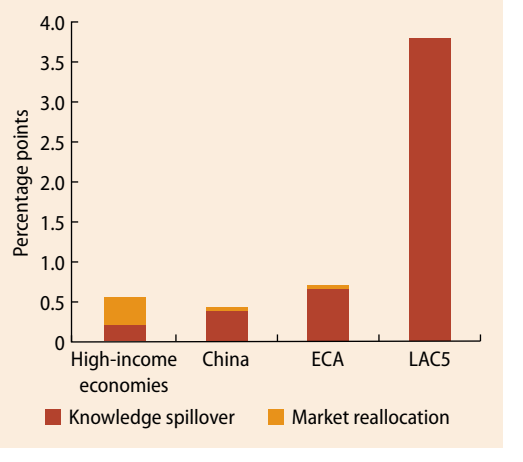
Figure 13 quantifies the relative importance of the competition and knowledge transfer channels, in order to assess the impact of the entry of multinational corporations on firm-level and aggregate productivity. The estimations use a sample of manufacturing firms from 60 countries, 5 of which are in LAC (Argentina, Brazil, Chile, Colombia, and Mexico). The results are striking: other things equal, doubling the number of multinational corporations in LAC would increase aggregate productivity

FIGURE 12 Innovation edge of foreign multinational corporations over local firms in Latin America and the Caribbean



Source: World Bank, based on data from 2010 Enterprise Surveys.
Note: Figures are for the manufacturing sector only. Bars are the coefficients of a dummy variable taking the value 1 if the firm is foreign owned in a regression of innovation variables. Additional controls include country and industry fixed effects. Standard errors are clustered at the industry level. MNC = multinational corporations.

FIGURE 13 Predicted productivity gains from entry of new multinational corporations in selected country groups, countries, and economies



Source: Alfaro and Chen 2013.
Note: Figures are for the manufacturing sector only. Bars represent total productivity gains from doubling the probability of multinational corporation entry, estimated though a structural model. For countries and economies included in each group, see note 4.

by 3.8 percent. This number is six times higher than in ECA or high-income economies and seven times higher than in China. Moreover, in contrast with other regions, knowledge spillovers run the entire show in LAC: they explain almost all the estimated aggregate productivity gains from entry of multinational corporations.

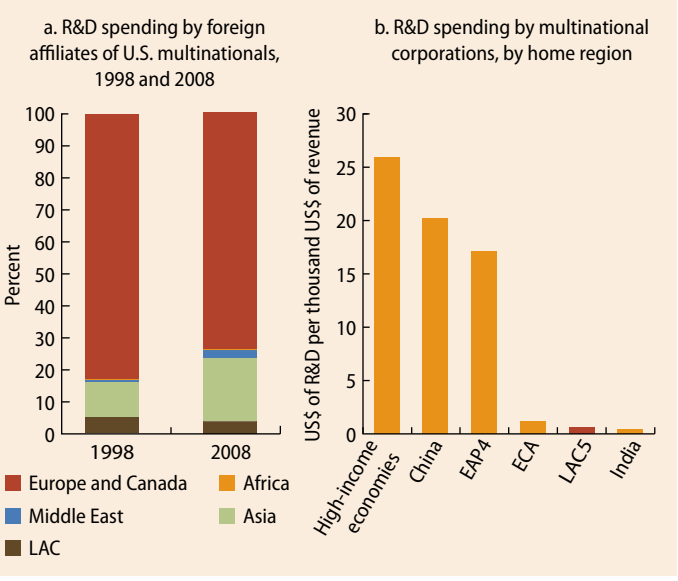
Alas, the full potential of productivity gains from knowledge spillovers from multinational corporations in LAC is not being fully realized, in part because of very low levels of R&D by foreign companies operating in LAC and *multilatinas*. The share of R&D in LAC accounted for by U.S. multinational corporations, for instance, is only about one-fifth the share of R&D done by the same companies operating in Asia. Moreover, trends are not encouraging: the share of R&D performed by U.S. multinational corporations in LAC fell 1.2 percentage points, to just 3.9 percent of total R&D, between 1998 and 2008 (panel a of figure 14).

The emergence of *multilatinas*, welcome as it is, has not fundamentally changed the innovation picture. To be sure, the number of *multilatinas* is still small, and they are concentrated in three countries (Brazil, Chile, and Mexico). But despite towering over other LAC companies in size, they are not sufficiently innovative. On average, *multilatinas* from the manufacturing sector invest only $0.06 per $1,000 of revenue on R&D (panel b of figure 14). This figure stands in sharp contrast with R&D intensity in high-income economies and even China and the four economies of EAP4. For example, multinationals from EAP4 invest $1.70 in R&D for every $1,000 of revenue—almost 30 times the R&D investment of the average *multilatina*.

A partial explanation for the low level of innovation of *multilatinas* may be found in their motives for sending capital abroad. *Multilatinas* appear to set up operations abroad mainly to expand the markets in which they sell and to diversify country risk rather than to integrate into global value chains.

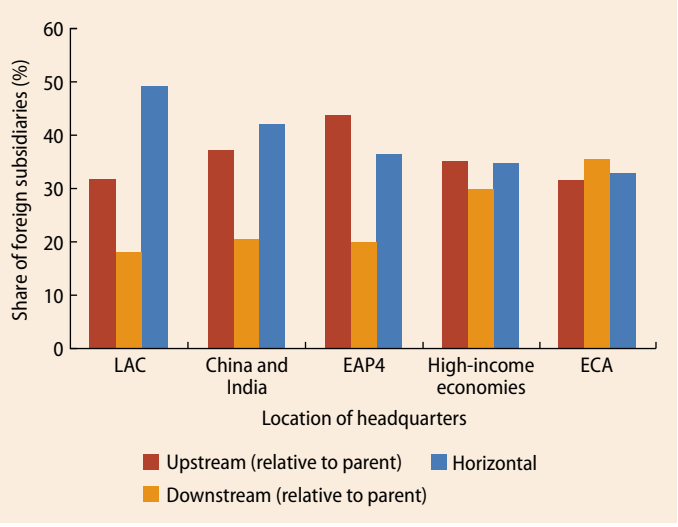
Figure 15 divides the subsidiaries of multinational corporations from different regions

FIGURE 14 Spending on research and development (R&D) in Latin America and the Caribbean



Sources: Panel a: National Science Board 2012; panel b: World Bank, based on data from Orbis.
Note: Panel a covers only the manufacturing sector. For countries and economies included in each group in panel b, see note 4.

FIGURE 15 Sectoral position of foreign subsidiaries relative to headquarters in selected country groups, countries, and economies, 2010–11



Source: World Bank, based on data from Orbis.
Note: The sectoral position was calculated using the input-output matrix for the United States. A subsidiary is defined as downstream if the parent company's sector is a net supplier of the subsidiary's sector. A subsidiary is defined as upstream if the subsidiary's sector is a net supplier of the parent company's sector. For countries and economies included in each group, see note 4. LAC = Latin America and the Caribbean.

into three groups: companies operating in the same sectors as headquarters (horizontal activity), companies providing inputs to headquarters (upstream activity), and companies obtaining inputs from headquarters (downstream activity). Almost half of foreign subsidiaries of *multilatinas* operate in the same sector as their headquarters compared with 30–40 percent for other regions. Subsidiaries of multinational corporations from other regions are thus more likely to establish vertical (upstream and downstream) linkages with their headquarters. The implication is that many *multilatinas* fail to transfer knowledge to the home economy through their involvement in global value chains. This lack of integration may be exacerbated by the fact that most of the cross-border activity of *multilatinas* takes place in large countries in the region (Brazil, Chile, and Mexico jointly account for 70 percent of total *multilatinas*' revenues); less than 15 percent of *multilatinas*' revenues comes from outside LAC.

How can policy enable innovative entrepreneurs?

In a tribute to innovation as the key to growth, Yale University's Robert Shiller (2013) recently asserted that "capitalism is culture. To sustain it, laws and institutions are important, but the most fundamental role is played by the basic human spirit of independence and initiative." But where should policy makers look for remedies to cure the low growth and low innovation of LAC enterprises if not in the laws and institutions that shape the enabling environment for entrepreneurs? The answer surely lies well beyond the traditional concern with laws and regulations that impose barriers to entry per se.

The main policy challenges seem to be related to deeper structural features of the enabling environment for innovative entrepreneurship, including not only laws and institutions but also endowments such as infrastructure and the quantity and quality of human capital. These elements of the enabling environment are likely to be even more important for growth as LAC continues to consolidate their hard-earned achievements on the macroeconomic and financial stabilization fronts.

Pinpointing the enablers of innovative entrepreneurship is complex, however, because of the intricate interactions and interdependencies between the various dimensions of the enabling environment that matter for innovation. These components include the clarity and reliability of legal rights (including intellectual property rights) and the judicial process, the quality of information disclosure and accounting standards, regulations and policies (including procompetition policy) that affect industry and commerce, access to suitable financial services, the quality of human capital (education and skills), and programs and policies that promote or support business development or R&D. Complexity also arises because both entrepreneurial innovation and its possible determinants may be affected by common factors and hence jointly determined. For instance, an economy's contractual environment may simultaneously affect both access to credit and innovation.

Some areas where policy action may be most fruitful can nevertheless be identified by highlighting some of the dimensions of the enabling environment that are vital to innovation and on which LAC countries significantly underperform.

Competition is a first and highly plausible candidate. To be sure, the relationship between competition and innovation may follow an inverted *U*-shape, as Aghion and others (2005) compellingly argue: too much competition may weaken the incentives to innovate for firms that lack basic capabilities and are far from the technological frontier, whereas too little competition may not provide sufficient incentives to invest in innovation. The evidence suggests, however, that LAC suffers from too little rather than too much competition, particularly in the markets for inputs and nontradable services. This lack of competition undermines the incentives to innovate, as enterprises can remain profitable by dint of their market power rather than their innovative efforts. Without a perceived necessity to innovate, the private sector may not give birth to invention.

Figure 16 benchmarks LAC countries in terms of revealed market concentration in industries that are arguably not subject to international competition.[10] Most LAC countries appear at the upper end of the distribution of the (nontradable) market concentration index, and all but two (Colombia and Brazil) exhibit average levels of market concentration well above their international benchmarks. Hence, competition should remain at the top of the policy agenda in most LAC economies.

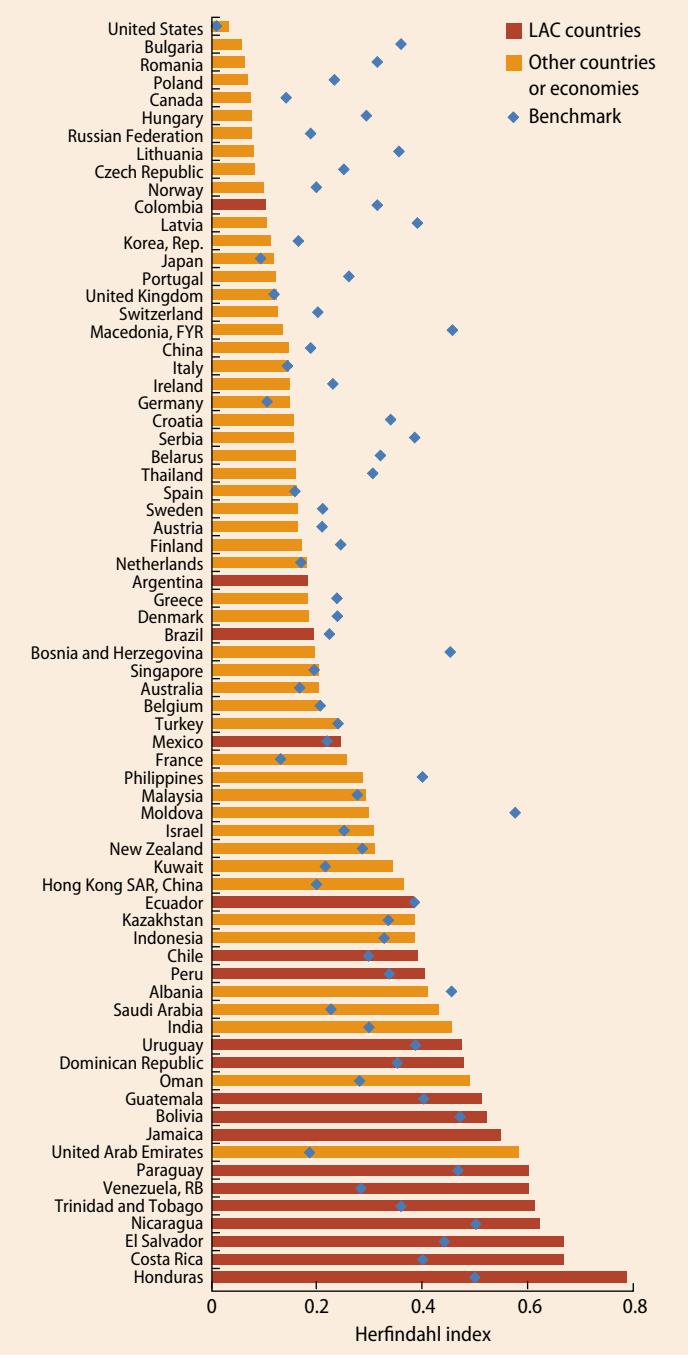
A second fundamental factor behind the lack of innovation in LAC seems to be its human capital gap, particularly in the education quality dimension. The region lacks the type of human capital—engineers and scientists—that is likely to produce innovative entrepreneurs. A country's stock of human capital is often measured by average years of schooling of the labor force and by the quality of education, assessed through standardized scholastic test scores. LAC countries underperform international comparators on both measures, especially quality (Ferreira and others 2013). However, human capital for entrepreneurship and innovation only partially overlaps with general curricula and is probably badly captured by general schooling attainment or achievements. Hence, it is worth also examining the region's chronic shortage of scientific and engineering training.

LAC has long suffered from a dearth of engineers: despite higher income per capita, Argentina, Chile, and Mexico all had lower densities of engineers than Spain and Portugal in 1900 (figure 17). Such historical gaps appear to be important. Maloney and Valencia Caicedo (2012) find a positive association between engineering density in the 1900s and per capita income in the 2000s.

LAC countries still have fewer engineers than the median country and fewer than would be expected given their current level of development (figure 18). Even the larger and more advanced countries in the region (Brazil, Chile, Colombia, and Mexico) have relatively few engineers.

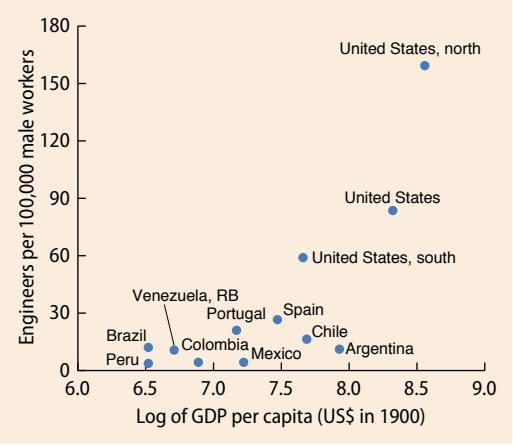
LAC students may be inclined toward nonscientific studies for at least two potential

FIGURE 16 Actual and benchmarked index of competition in 17 nontradable industries in selected countries or economies



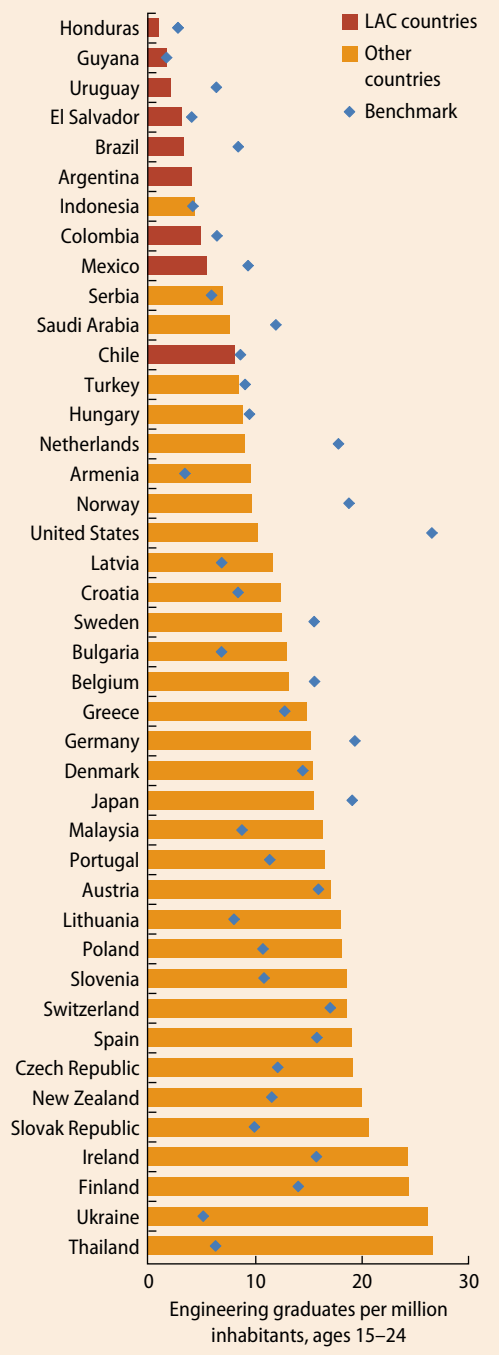
Source: World Bank, based on data from World Development Indicators and firm-level data from Orbis.
Note: Bars show the average Herfindahl index of concentration of revenues across a selection of two-digit nonfinancial services sectors for which data were available for more than 80 countries. A value of 1 represents a market captured entirely by a single firm (the highest level of concentration); lower values indicate less concentration. Revenues were averaged across 2007–10. Dots represent a benchmark predicted value from a regression for each sector with (log of) population and GDP (adjusted for purchasing power parity) as explanatory variables. The regression model was estimated for each of 17 sectors separately; the dots are the averages of all sectors. The regression used all available countries. The figure presents only comparator countries. LAC = Latin America and the Caribbean.

FIGURE 17 Income and engineering density in selected economies, 1900



Source: Maloney and Valencia Caicedo 2012.
Note: GDP = gross domestic product.

FIGURE 18 Number of engineers per million people in selected countries



Source: World Bank, based on data from World Development Indicators and UNESCO 2013.
Note: Bars show average number of engineering graduates per million people ages 15–24. Dots are a benchmark predicted by a regression with (the log of) population and GDP (adjusted for purchasing power parity) as the explanatory variables. The regression uses all the available countries. The figure presents only comparator countries. Data are averages for 2008–10. LAC = Latin America and the Caribbean.

reasons. First, for historical reasons, LAC universities have long emphasized the humanities; law; and social, economic, and political fields of study, possibly constraining their ability to educate more engineers and scientists. Switching their emphasis would require very aggressive public policy, such as the United States adopted when it developed mining and engineering studies in the early 20th century. Second, young people may be attracted to fields of studies that are relevant to pressing problems faced by their societies, which may explain why LAC may have formed many sociologists and more macro than micro economists. Given the progress the region has made in taming macro instability, there may be more incentives for students to embark on scientific careers. That said, a big push to expand engineering and scientific education at the secondary and tertiary levels may be required to accompany rising demand for such careers.

Factors that affect firms' economic performance may also adversely affect innovative entrepreneurship, although the nexus may not be as straightforward as often believed. Despite substantial reform, business regulations may still hamper innovative behavior. Which specific regulations bite and how much damage they cause, however, remain questions for future research.

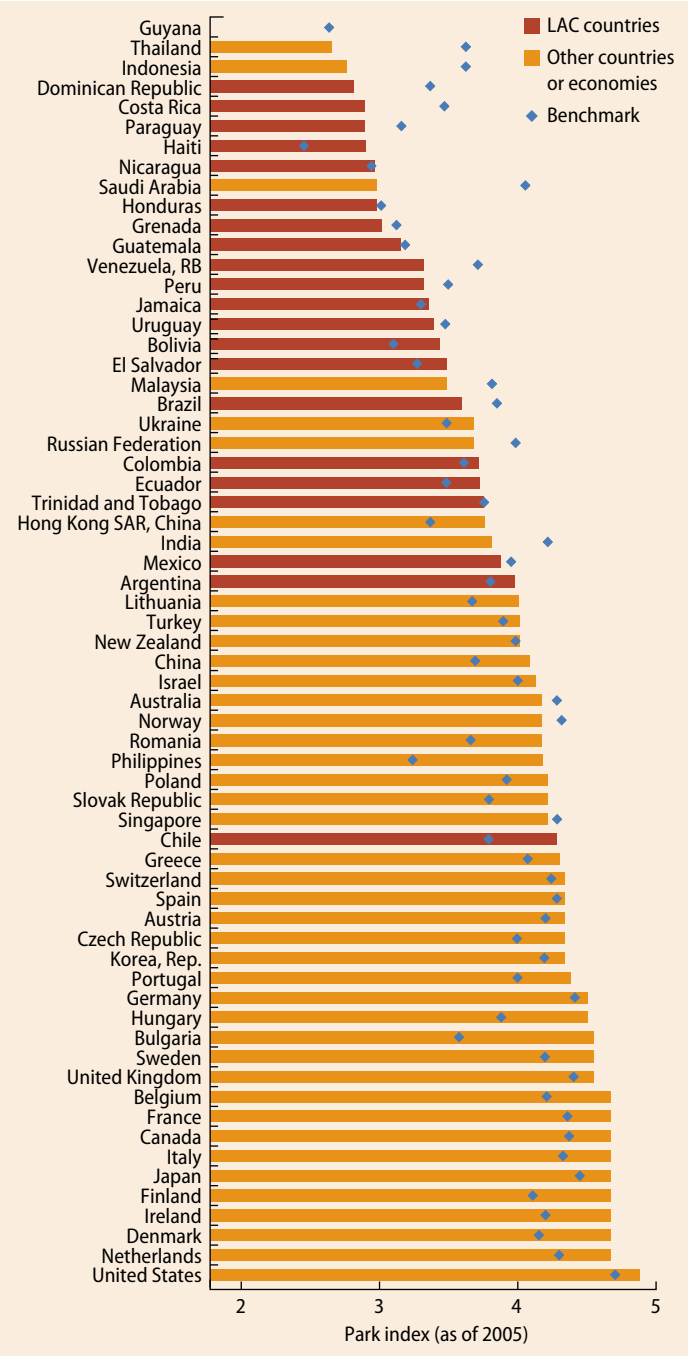
Although the region underperforms in terms of financial services, such as long-term credit and venture capital, young firms in LAC are not necessarily more credit constrained than young firms in other regions. This potential link requires careful research, but prima facie, it is difficult to categorically state that lack of access to finance is a significant cause of the region's innovation gap. To be sure, as documented in the report on *Financial Development in LAC* (de la Torre, Ize, and Schmukler 2012), the region's gap in bank credit is significant and has been growing over the past 15 years. However, much of this gap appears to be explained by LAC's turbulent macro and financial history and by the shortage of promising productive projects (that is, a shortage of innovation) rather than by credit rationing and credit supply-side constraints per se. Moreover, the constraint that seems to be most relevant for bank credit supply in LAC is weaknesses in the contractual (rather than the informational) environment, which can undermine both credit supply and entrepreneurial innovation.

The role of the contract enforcement environment in the region's innovation deficit is also nuanced. Insufficient intellectual property rights may be an issue (figure 19), and other weaknesses in the contractual environment may also hinder innovation. But indexes of contract viability and the risk of expropriation do not indicate that LAC countries systematically underperform relative to comparators in other regions. More research is therefore needed to understand the subtleties of, and complex interactions and interdependencies between, the fundamental underpinnings of LAC's peculiar combination of many entrepreneurs and little innovation.

Notes

1. World Bank calculations based on data from 2010 household surveys from 15 LAC countries.
2. Schumpeter (1911) defines entrepreneurship as "(1) The introduction of a new good … or of a new quality good. (2) The introduction of a new method of production…. (3) The opening of a new market…. (4) The conquest of a new source of supply of raw materials or

FIGURE 19 Actual and benchmarked index of intellectual property rights in selected countries or economies, 2005



Source: World Bank, based on data from World Development Indicators and Park 2008.
Note: The Park index is the sum of five components: coverage of patents in eight industries; participation in five international property rights (IPR) treaties; duration of protection (relative to a global standard, such as 15–20 years for patents); the existence of up to three enforcement mechanisms; and the existence of up to three types of restrictions on patent rights. Bars show the 2005 Park index for each country. Dots show the predicted percentage of firms from a regression that includes (the log of) population and GDP (adjusted for purchasing power parity) as explanatory variables. The regression used all available countries. The figure presents only comparator countries. LAC = Latin America and the Caribbean.

half-manufactured goods…. (5) The carrying out of the new organization of any industry….”

3. The LAC region comprises the following countries: Antigua and Barbuda, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, and República Bolivariana de Venezuela.
4. Throughout this overview we use the following groups of economies unless otherwise noted: *LAC5* includes Argentina, Brazil, Chile, Colombia, and Mexico. *Other LAC* includes Bolivia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Paraguay, Peru, Uruguay, and República Bolivariana de Venezuela. *Caribbean* includes Antigua and Barbuda, Cuba, Dominica, Grenada, Guyana, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, and Trinidad and Tobago. *ECA* (Eastern Europe and Central Asia) includes Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Kazakhstan, Latvia, Lithuania, FYR Macedonia, Moldova, Romania, the Russian Federation, Serbia, Turkey, Turkmenistan, Ukraine, and Uzbekistan. *EAP4* includes Indonesia, Malaysia, the Philippines, and Thailand. *High-income economies* includes Australia; Canada; Hong Kong SAR, China; Israel; Japan; the Republic of Korea; Kuwait; New Zealand; Oman; Saudi Arabia, Singapore; Switzerland; the United Arab Emirates; the United States; and all countries in the European Union not included in ECA. The set of economies from each group used in figures throughout this overview varies according to data availability.
5. The typical LAC firm at the 90th percentile has fewer than 25 employees, as opposed to 40 in ECA and high-income countries and almost 55 in East Asia and the Pacific (EAP4).
6. Grenada is a regional outlier. Its performance reflects the small number of firms rather than the high incidence of new products.
7. The OECD (2002) *Frascati Manual* on R&D statistics, which is used around the world, excludes investments in soil analysis and mineral exploration from R&D activities. Consequently investments in innovation in agriculture and mining tend to be underreported.
8. R&D data are classified as “productive-sector” R&D when financing comes from a company that participates in the market. Companies can be publicly owned, blurring the distinction between “private” and “public” R&D. In this report, as in others, such as Pagés-Serra (2010), the term *private* is used to characterize “productive-sector” R&D.
9. This exercise took into consideration cross-country differences in GDP per capita, sectoral composition, and year-specific effects (such as the global recession of 2008–09).
10. The distinction between tradables and nontradables is important. Domestic market concentration could be high in the sense that few domestic firms participate in an industry, but if domestic firms compete with imports, domestic market concentration would be a poor proxy for competition.

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