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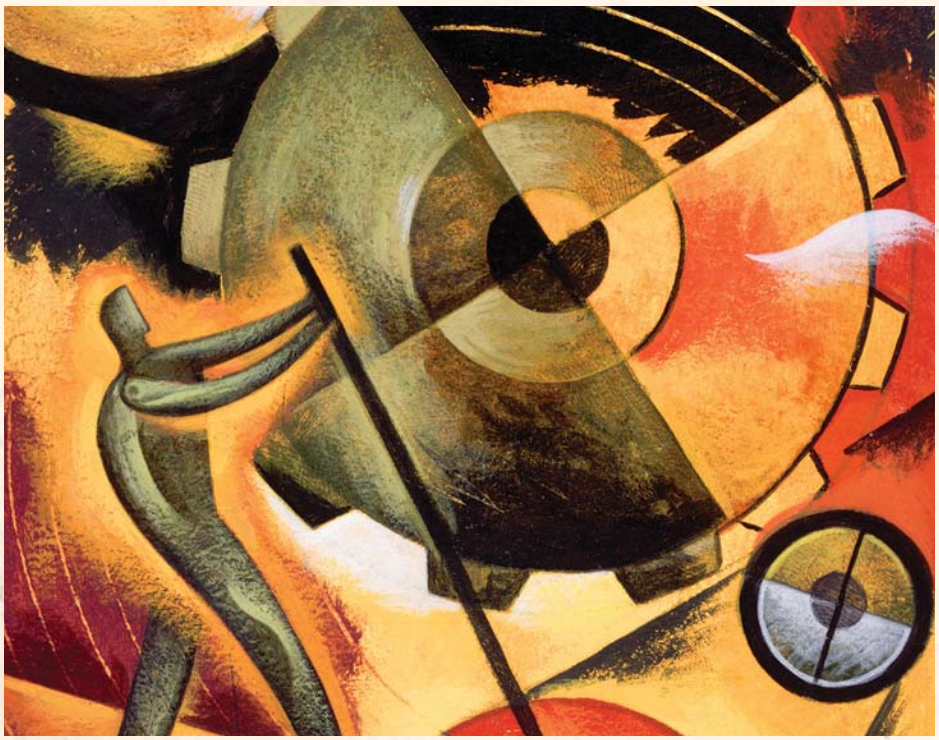
Latin American Entrepreneurs

Many Firms but Little Innovation



Daniel Lederman, Julián Messina,
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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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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
IPRs	intellectual property rights
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
TPF	total factor productivity
USPTO	U.S. Patent and Trademark Office

Overview 1

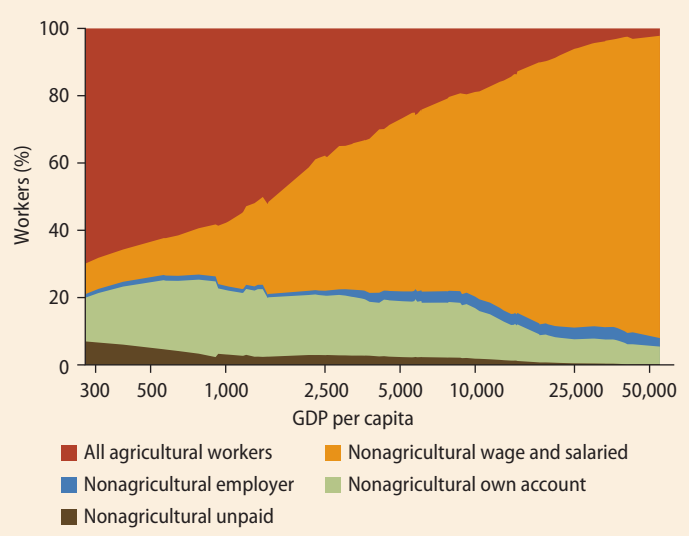
Entrepreneurship is a driver of development

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 1.1 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 1.1 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 1.2).

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 1.2 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.

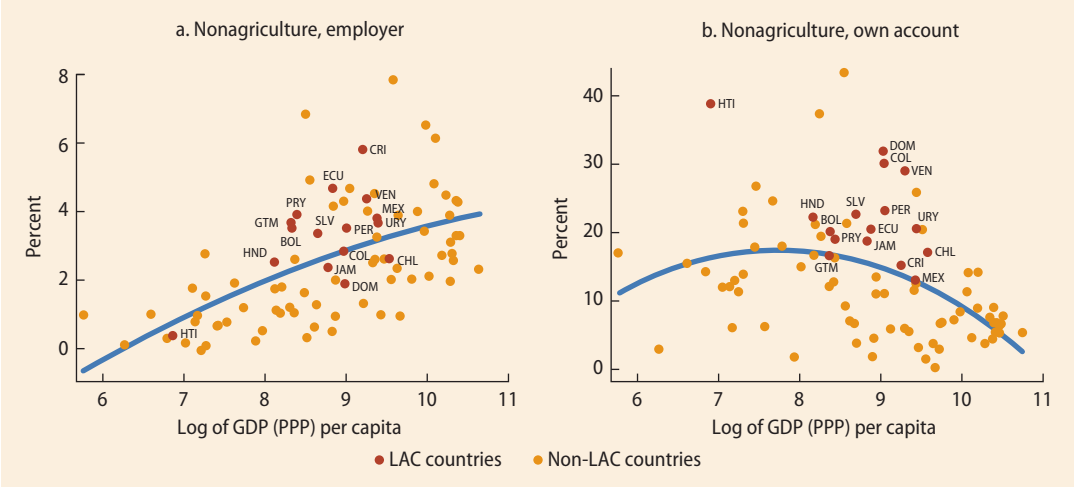
Entrepreneurship is vibrant—but growth is weak

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 1.3 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.

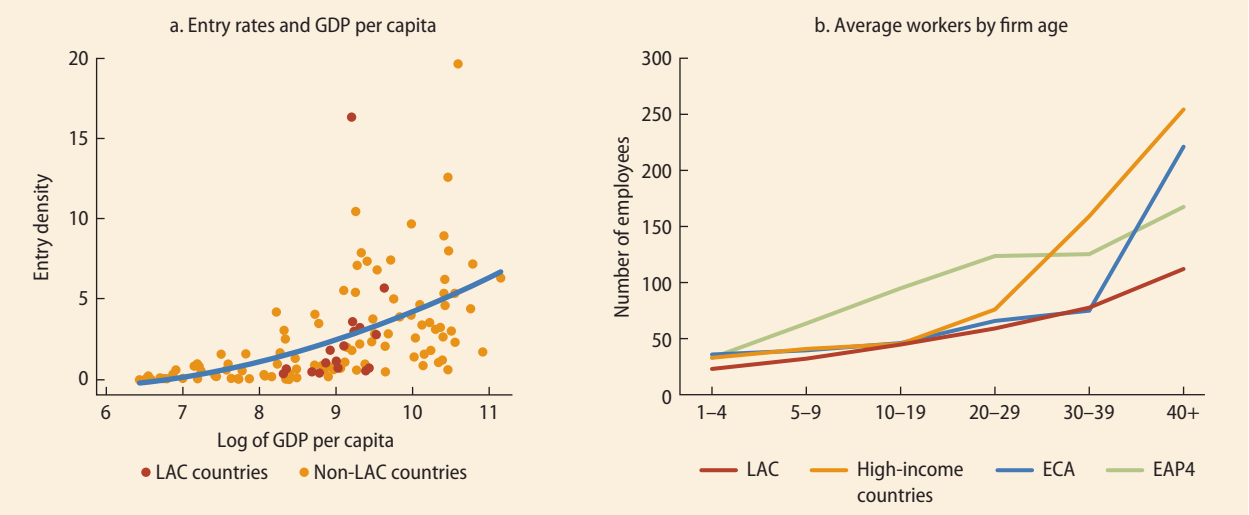
Entry into the higher end of the formal sector, measured by registration of new limited liability firms, remains low in many LAC countries[3] relative to their level of economic development. Figure 1.4 (panel a) displays the relationship between firm entry (measured by the average annual number of new 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 1.3 **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 1.4 **Firm dynamics: entry, age, and size**



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 1.4 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

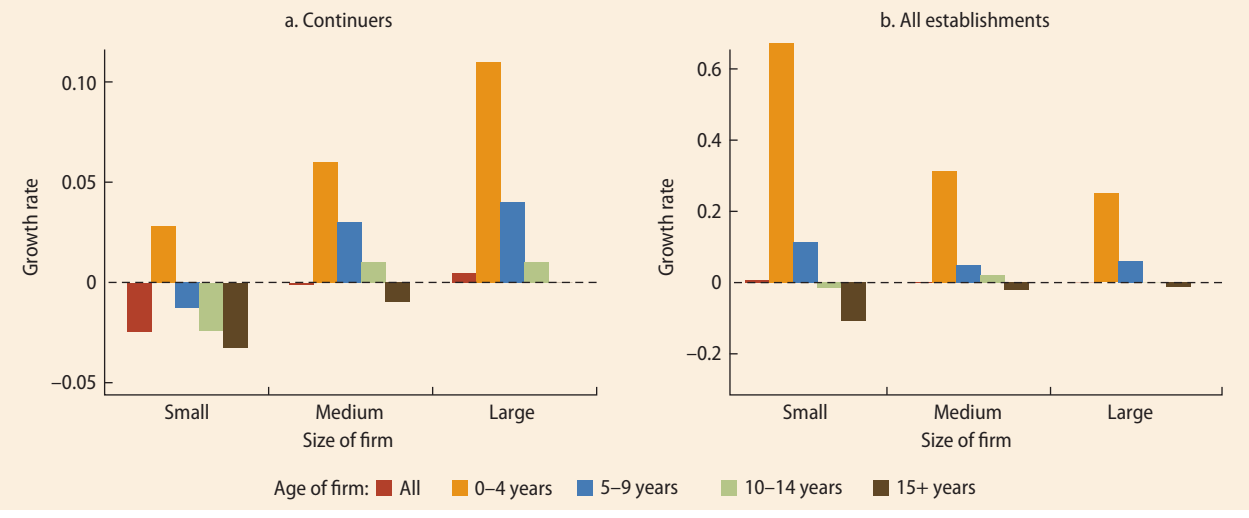
90th percentile of the size distribution of new firms) are about half the size of new firms in other regions.[5] Moreover, differences in size widen as firms age: LAC firms that are 40 or more years old are on average half the size of firms the same age from high-income countries and Eastern Europe and 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 1.5 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 1.5 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 1.5). 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

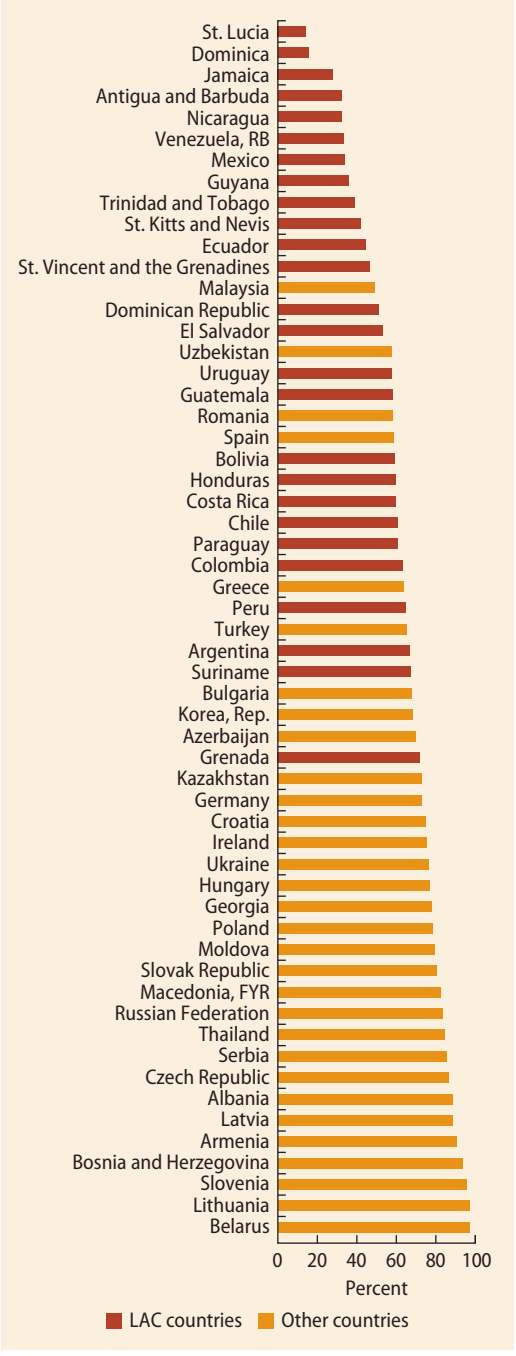
There are many potential reasons why LAC firms grow as slowly as they do. One is the lack of innovation. Entry is just the beginning of the story. In order to grow, or even survive, firms need to continuously innovate.

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 1.6 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 1.6 measures the share of firms involved in innovation activities, which is

FIGURE 1.6 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.

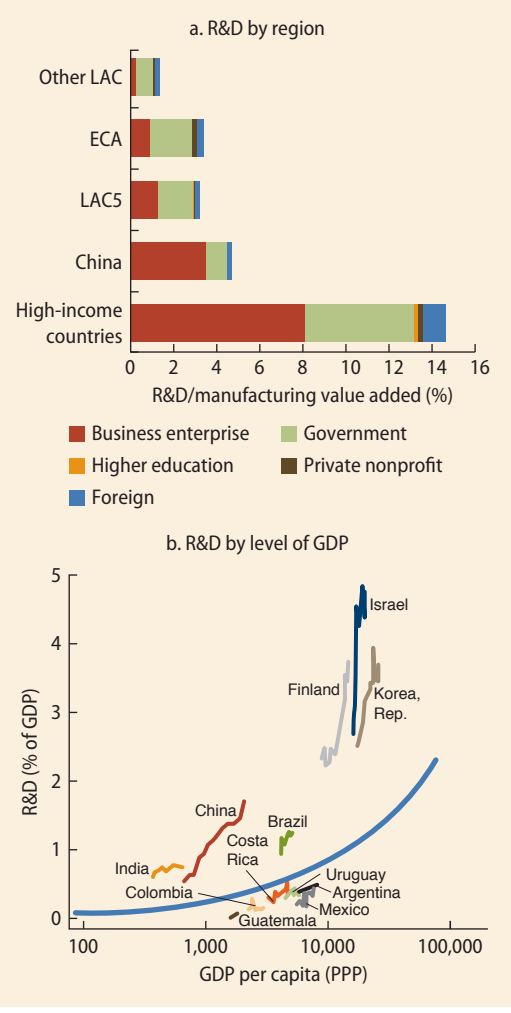
uninformative about the quality and intensity of innovation, two factors strongly associated with high-productivity firms. Datasets exploring these fundamental factors in a comparable way across countries are of poor quality. The few available indicators suggest that the quality of innovation in LAC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

Figure 1.7 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 1.7 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.

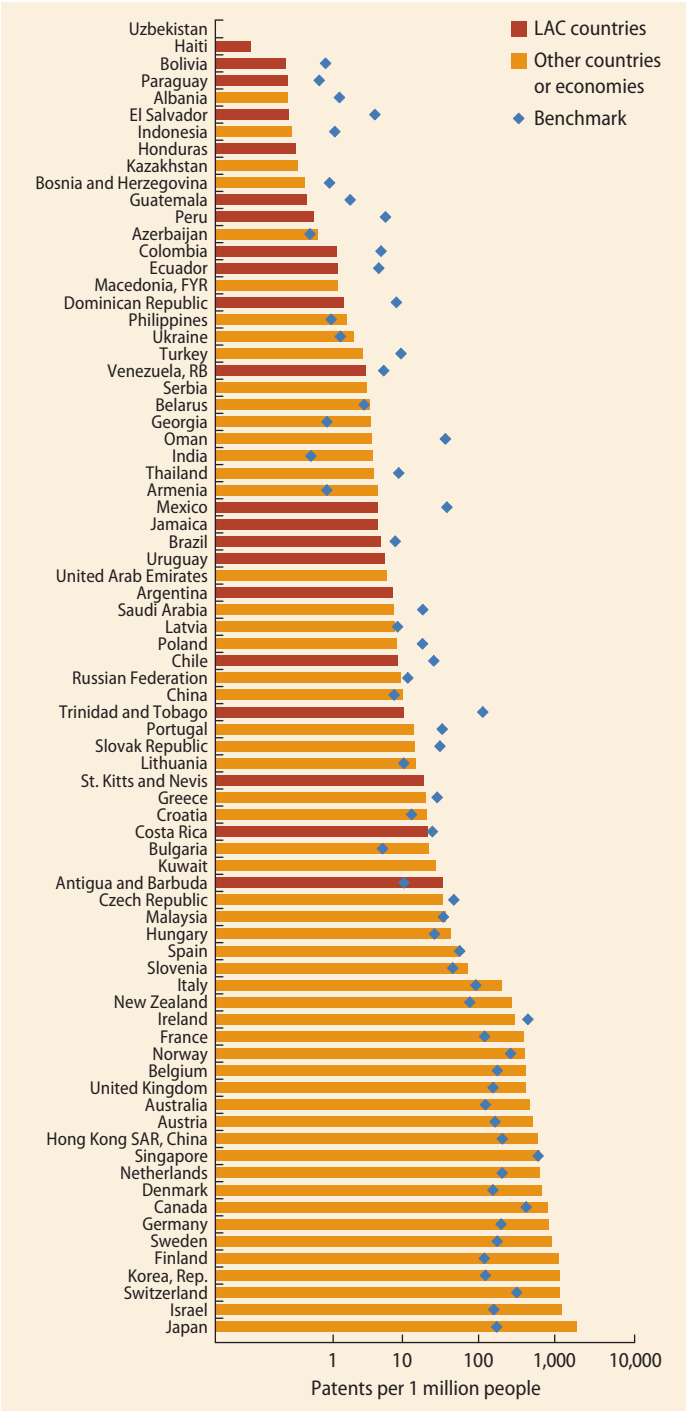
FIGURE 1.7 Investment in research and development (R&D) in selected country groups, 2008–10



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 1.8 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 1.8 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 1.8).

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 1.9 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

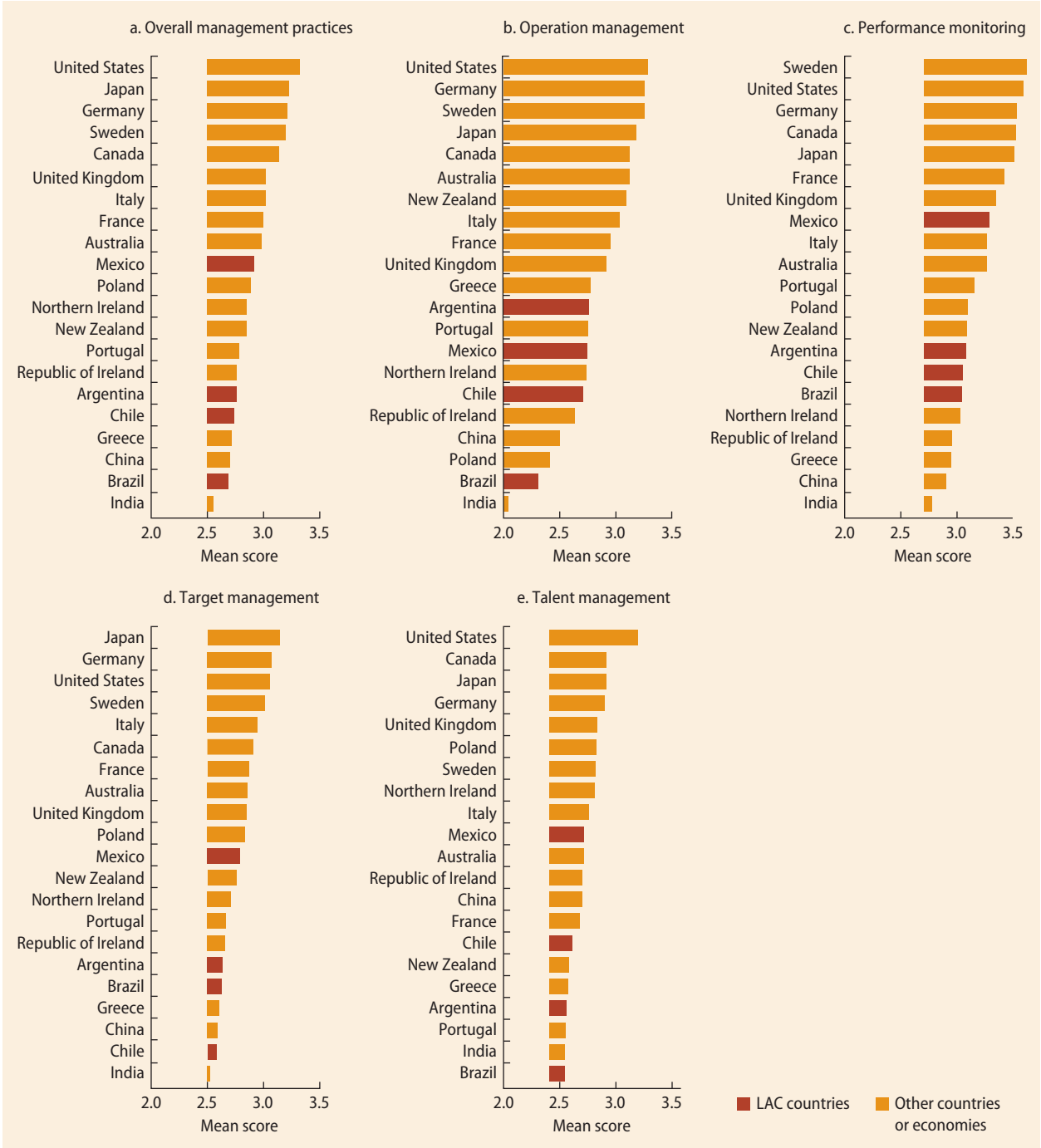
Accessing new markets through trade is arguably a salient manifestation of transformational entrepreneurship. Barring firms that benefit from high rents, only firms with superior performance can thrive in export markets. In fact, most new entrants into export markets do not survive beyond one year.

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 1.10).[9]

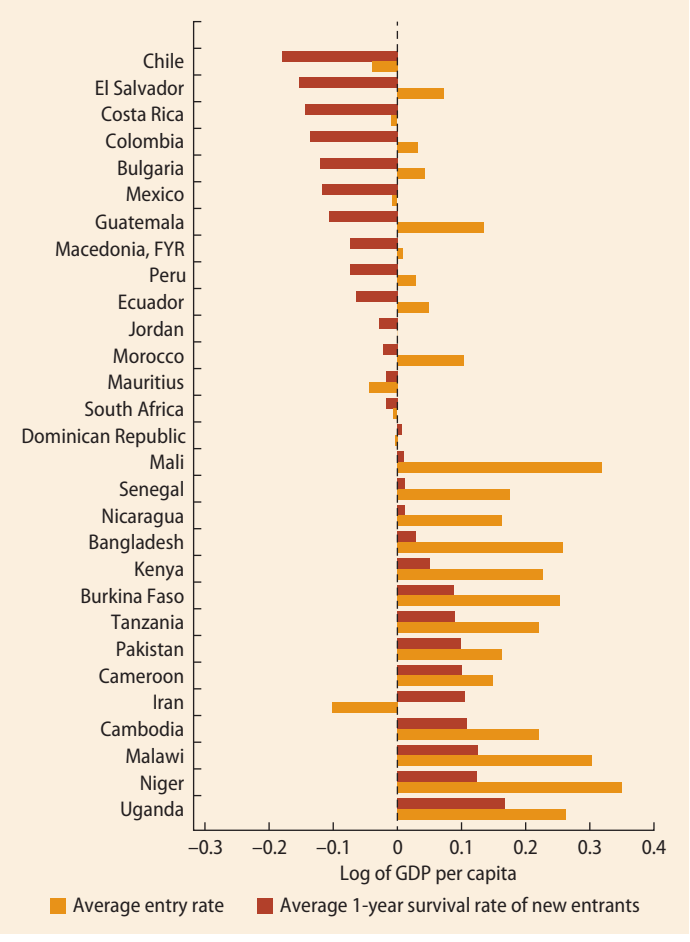
The results are striking: virtually all LAC countries in the sample show export entry rates that are below the benchmark. In contrast, in Asia, the Middle East, and even Africa, entry rates of firms into exporting activities are above the benchmark. LAC countries fare better in the survival

FIGURE 1.9 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 1.10 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.

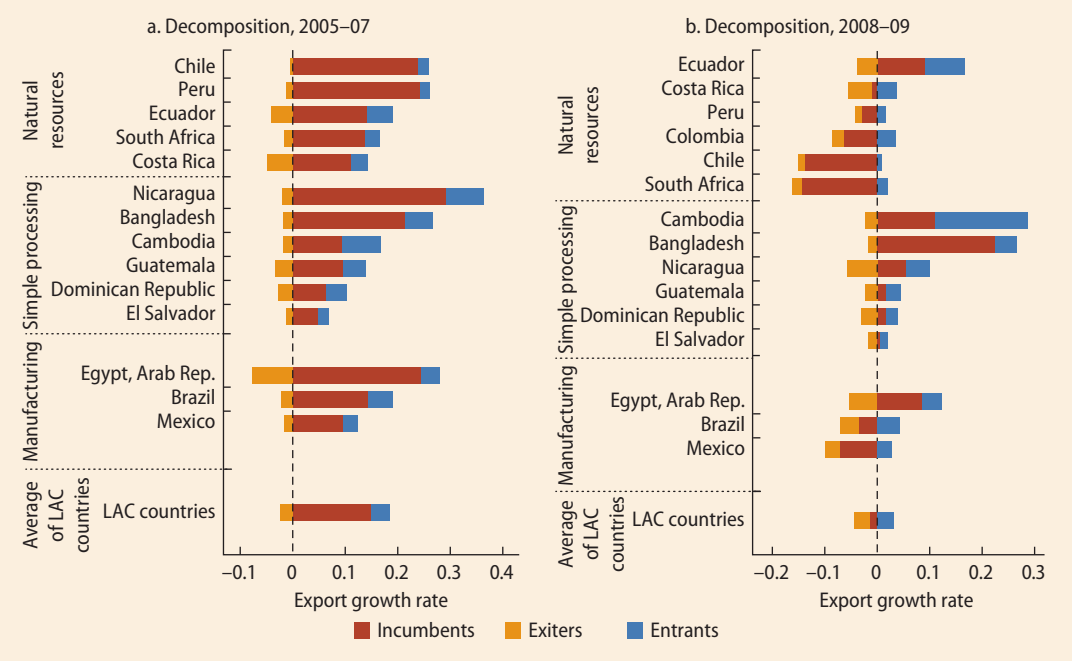
dimension, with survival rates of the (relatively small number of) firms that enter into exporting markets above the benchmark. However, no LAC country appears to be an overachiever on the survival front when compared to most of the other developing countries included in the database, as shown in figure 1.10, 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 1.11). 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 1.11) 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 1.11 **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.

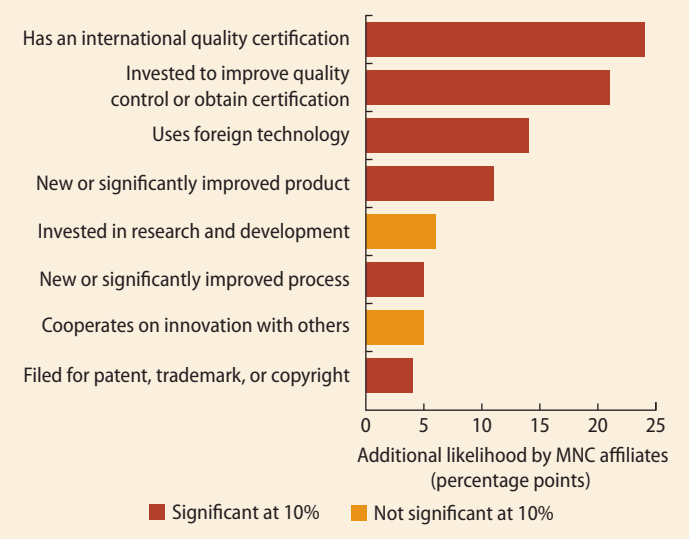
The recent emergence of *multilatinas* has not changed this picture. On average,

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 1.12). 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.

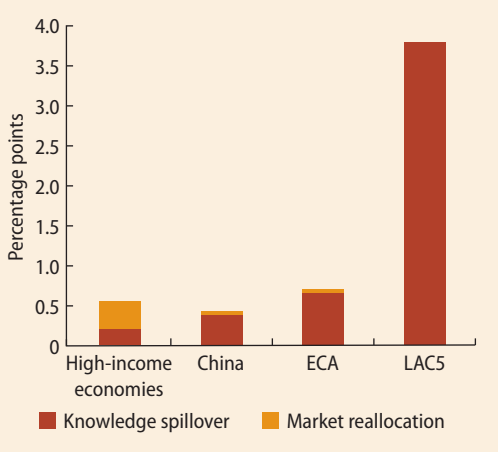
Figure 1.13 quantifies the relative importance of the competition and knowledge transfer channels, in order to assess the impact of the entry of multinational corporations on firm-level and aggregate productivity. The estimations use a sample of manufacturing firms from 60 countries, 5 of which are in 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 1.12 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 1.13 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.

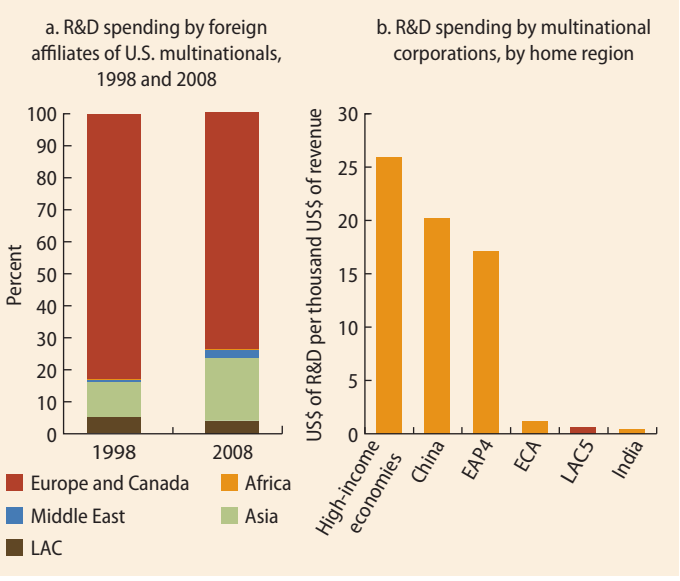
Alas, the full potential of productivity gains from knowledge spillovers from multinational corporations in LAC is not being fully realized, in part because of very low levels of R&D by foreign companies operating in LAC and *multilatinas*. The share of R&D in LAC accounted for by U.S. multinational 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 1.14).

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 1.14). 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.

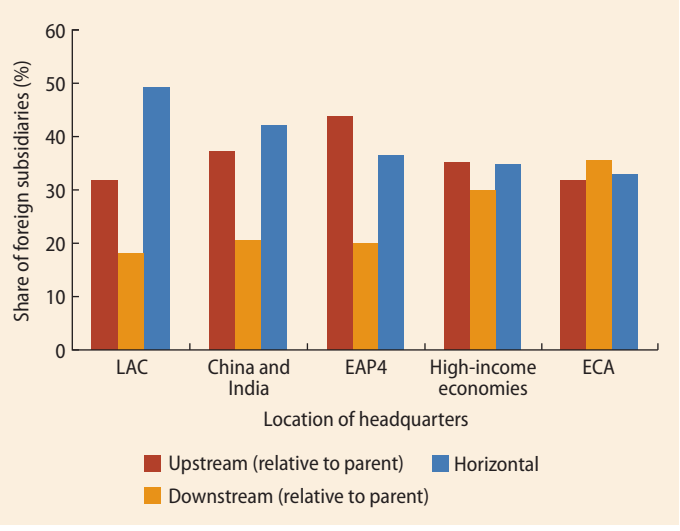
Figure 1.15 divides the subsidiaries of multinational corporations from different regions

FIGURE 1.14 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 1.15 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.

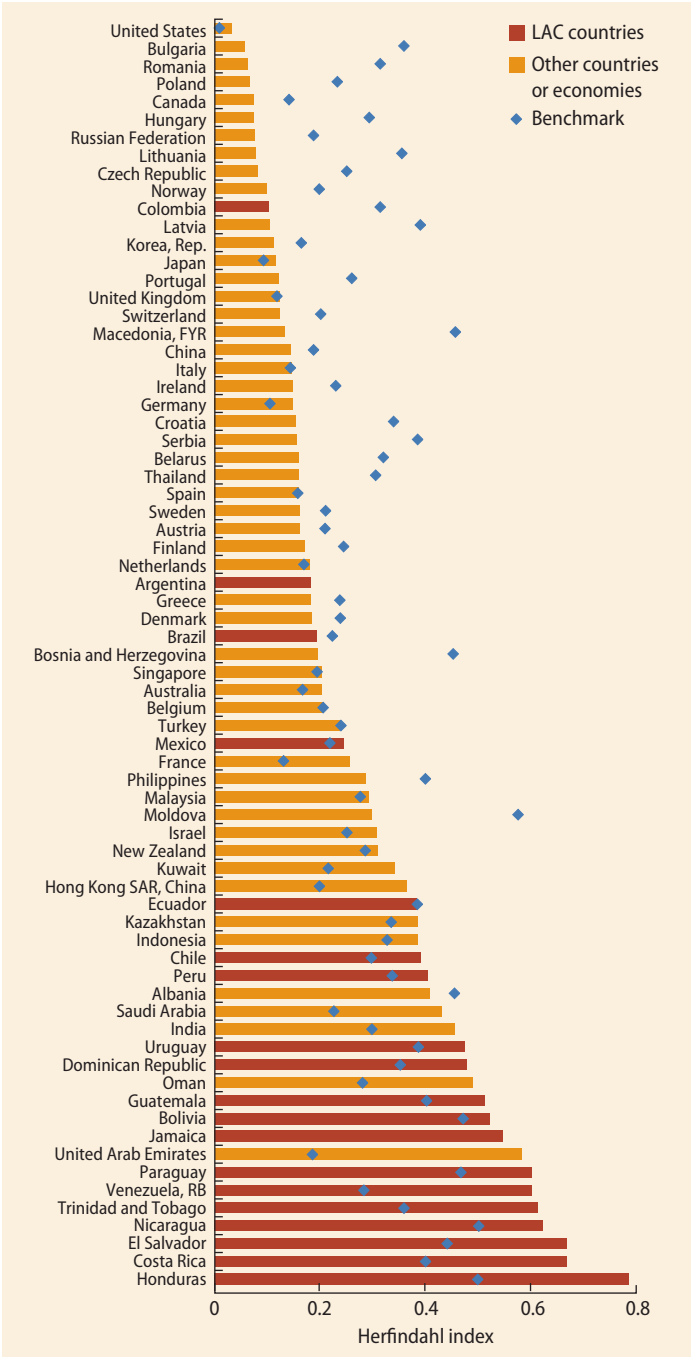
Figure 1.16 benchmarks LAC countries in terms of revealed market concentration in industries that are arguably not subject to international competition.[10] Most LAC countries appear at the upper end of the distribution of the (nontradable) market concentration index, and all but two (Colombia and Brazil) 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 1.17). 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.

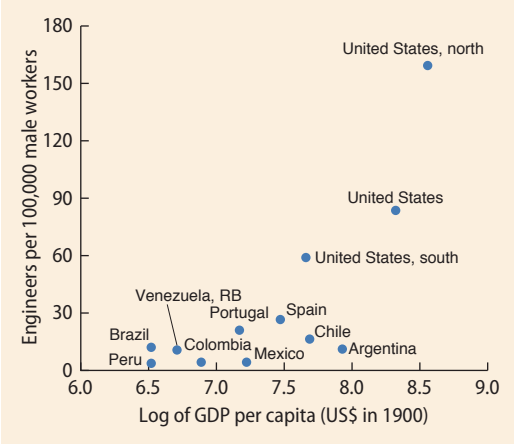
LAC countries still have fewer engineers than the median country and fewer than would be expected given their current level

FIGURE 1.16 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 1.17 Income and engineering density in selected economies, 1900

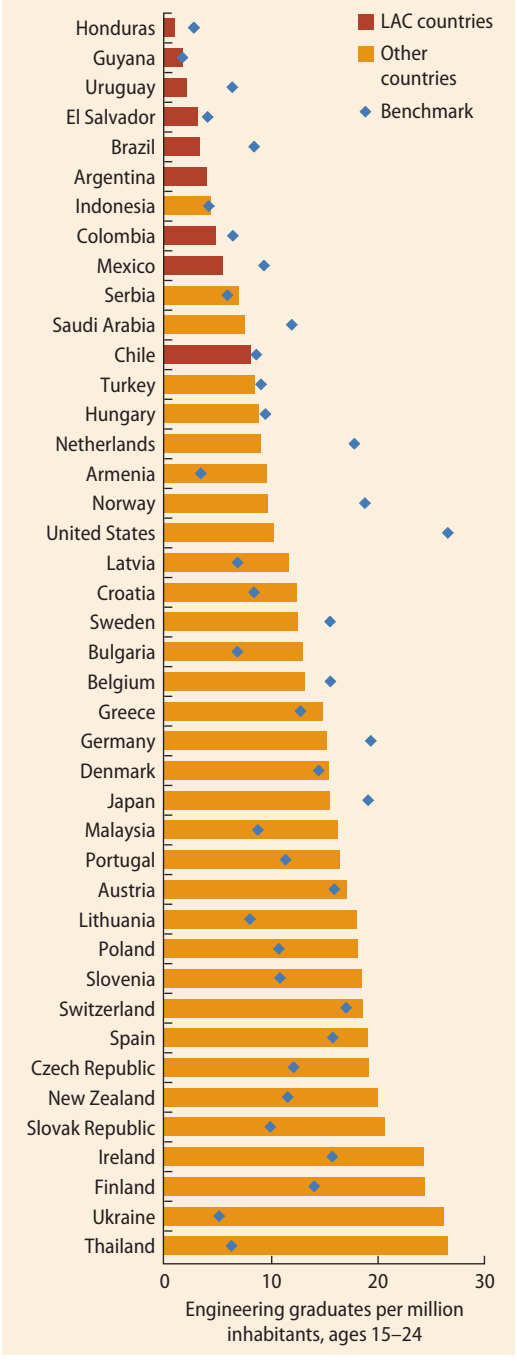


Source: Maloney and Valencia Caicedo 2012.
Note: GDP = gross domestic product.

of development (figure 1.18). 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 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.

FIGURE 1.18 Number of engineers per million people in selected countries



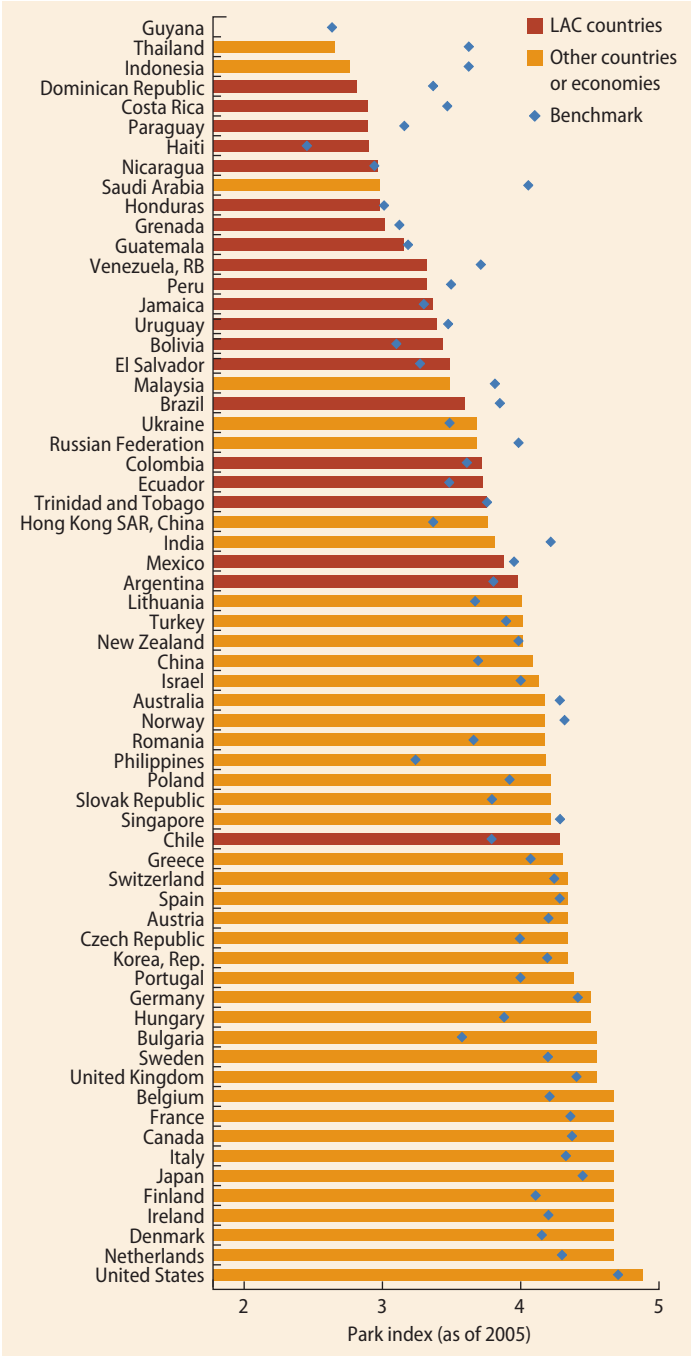
Source: World Bank, based on data from World Development Indicators and UNESCO 2013.
Note: Bars show average number of engineering graduates per million people ages 15–24. Dots are a benchmark predicted by a regression with (the log of) population and GDP (adjusted for purchasing power parity) as the 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.

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 1.19), 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.

FIGURE 1.19 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.

Structure of the report

The report uses a fictional story to illustrate the characteristics of entrepreneurs and the complex tradeoffs they face. Javier Vizzi, a young man from Mendoza, Argentina, had a comfortable middle-class upbringing. His parents provided him with a decent education, and he did not waste the opportunity. After graduating from a local university, he found his first job with a local winemaker and rapidly moved up the ranks. After directing the Buenos Aires branch of the winery for a few years, Javier started his own company. He wanted to produce higher-quality wines with potentially higher profit margins. This endeavor required extensive experimentation, which his previous employer was unwilling to undertake. Javier took risks and engaged in activities that were uncommon in his region. He hired international consultants to teach him the latest techniques in wine-making and marketing experts to find the best ways to sell his wines. A few years after opening, the winery had 50 employees and exported a small selection of bottles to the United States.

The rest of the report comprises five chapters that track the difficult choices that entrepreneurs like Javier typically face at home and abroad. Chapter 2 discusses the creation of new firms and firm dynamics in LAC. It pays particular attention to the nature of the business being created, distinguishing between formal and informal and small and large enterprises. The chapter sets the scene for the rest of the report by elaborating on the key distinction between transformational and low-growth entrepreneurs.

Chapter 3 focuses on barriers to innovation faced by survivors (incumbent firms) along both the product and process dimensions. It also discusses the policy areas governments can explore to enhance innovative entrepreneurship.

Chapter 4 examines a different form of entrepreneurship, namely, the exploration of new markets through exports. The message is loud and clear: the key to success in export markets is survival, which tends to increase when conditions are favorable. LAC countries appear to underperform poorer countries in terms of both entry and survival rates.

Chapter 5 studies the role of foreign direct investment and multinational corporations in fostering a more entrepreneurial LAC. It first analyzes how foreign-owned firms operating in LAC generate positive aggregate and firm-level spillovers. It then turns to the emergence of multinational corporations from LAC (*multilatinas*) and their impact on LAC's entrepreneurial potential.

Chapter 6 concludes by mapping the elements of an enabling environment in LAC, in an attempt to explain the region's innovation gap. Its brief review of empirical benchmarking exercises indicates a few priority policy areas.

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 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 chapter 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* include 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 chapter 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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2

Entrepreneurship, Entry, and the Life Cycle of Firms in Latin America and the Caribbean: Are All Forms of Firm Creation Entrepreneurial?

Contrary to popular perception, Latin America and the Caribbean has a vibrant entrepreneurial sector. Indeed, the share of entrepreneurs, employers, and formal businesses is larger than in other middle-income regions. Firms are smaller than in other regions at similar levels of development, however, with even the largest firms creating fewer jobs than their counterparts in other regions. These patterns are reproduced in other environments. After long periods in the United States, migrants from the region are about as likely as natives to own small businesses, but few of them own large, employment-generating firms.

Entrepreneurship is multifaceted; simple definitions fail to capture the heterogeneity of innovative acts included under this umbrella. Most definitions view the creation of new firms as a critical dimension of the entrepreneurial process. Indeed, entry has been considered central to the complex process of entrepreneurship since the seminal work of Schumpeter (1934). However, not all entry is the same: simply working for oneself or creating an enterprise is not the same as engaging in job-creating entrepreneurship.

Some business owners create their firms very much in the Schumpeterian tradition, with the goal of creating something new to bring to the market, revolutionizing the economy, and creating jobs. Others create their firms in response to grim employment prospects, as a mean of subsisting rather than creating a new product or entering a new market. The two extremes are inversely related. If there are many dynamic entrepreneurs in the economy, there will be an abundance of good jobs, reducing the incentives for start-ups with low growth potential. Conversely, too few innovative entrepreneurs will generate few employment opportunities, pushing some workers who may not have an innate ability or interest in running their own business to accept employment opportunities with low growth potential. Although both types of entrepreneurs are found in all countries, the lack of good jobs in developing countries suggests that low-growth entrepreneurship may be more prevalent at low levels of development.

Not surprisingly, this tremendous heterogeneity in entry motives translates into a no less heterogeneous picture in the distribution of incumbent firms. As in a forest, where small and large trees coexist, large and small

firms compete even within very narrowly defined sectors. Large firms are the largest employers in every sector. In the United States, for instance, the largest 5 percent of firms accounted for more than 75 percent of employment by the end of the 2000s; in Mexico, the largest 10 percent of firms accounted for 70 percent of employment (Bartelsman, Haltiwanger, and Scarpetta 2009). At the same time, the vast majority of firms are small. In high-income countries, about 70 percent of firms had fewer than five employees in 2010 (Klapper and Randall 2012). In Argentina, Brazil, Chile, Colombia, and Mexico (LAC5), 9 of every 10 firms have fewer than five employees. Indeed, slightly more than 60 percent of business owners in the Latin American region report having no paid employees (Klapper and Randall 2012).

This chapter has a double purpose. First, it examines the process of business creation in Latin America and the Caribbean (LAC), benchmarking its performance against that of other regions and characterizing the nature of entry across countries. Second, it studies the life cycle of firms in the region, the frequency with which they grow, and differences in the process across countries and type of firm. The chapter does not provide an in-depth analysis of the behavior of incumbent firms, the subject underlying most of the following chapters. Instead, it provides an overview of business dynamics in the region, leaving the discussion of the determinants of these dynamics for the rest of the report.

The chapter shows that there is substantial creation of new firms in LAC countries, at both the low and high ends of the entrepreneurial spectrum. Indeed, in the formal sector, the process of creation (and destruction) does not differ much from that found in other regions at similar levels of development and even shares some characteristics found in more advanced countries. However, the vast majority of new businesses in LAC are microfirms that will remain tiny throughout their life span. Even firms that grow rapidly never catch up in size with firms the same age in other parts of the world. This strong bias toward smaller firms generates insufficient formal employment opportunities. In the absence of better employment prospects, many people end up working for themselves, fueling a vicious cycle of small size and few good jobs for future job seekers.

The chapter ends by investigating whether the behavior of entrepreneurs in LAC is linked to the environment in which they operate or has deeper causes, perhaps linked to cultural roots or human capital characteristics. It finds that historically, people in the region have not been predisposed to become entrepreneurs who transform the business environment. Most large firms in the region at the beginning of the 20th century were foreign owned. Even in the United States—in an environment that is more conducive to entrepreneurship—people from LAC are less entrepreneurial than migrants from other regions of the world. But there is some room for optimism. Migrants from LAC slowly adapt to the new business environment. After long periods in the United States, they catch up with natives and migrants from other regions in ownership of small-scale firms. They continue to lag in ownership of large companies, however.

Low-level entrepreneurs, high-level entrepreneurs, and employees

The story of a fictional family of Italian immigrants illustrates the different motivations that may trigger the creation of new firms. The Vizzis settled in Mendoza, Argentina, at the beginning of the 20th century to work in the fields. The eldest of their three children, Maria, had no opportunity to go to school. As soon as she learned to read and write, her parents asked her to help with the crops. Her brothers, Lucio and Javier, were luckier. By the time they reached school age, Maria was 15 and contributing to the household income, so their parents could pay for their studies. The boys did not waste their opportunities, finishing high school and enrolling in college. Their parents were very

proud to see their sons become economists (although they never quite understood what economists exactly did).

The three siblings saw few opportunities for progress in the fields; as soon as they could, they went to the province's capital to look for jobs. Being hard workers, they soon found themselves with their first paid jobs. Maria worked in a restaurant at the train station. Lucio and Javier started as clerks. Lucio found a job as an accountant for the local government. Javier found a job at Vinos Torreón, a family firm that produced and sold one of the soon to be well-known wines from the area. Life was good. Wages were not spectacular, but they were enough to allow all three siblings to save some money and send some cash to their parents every other month.

Life was soon to change for them all. In 1979, passenger service between Mendoza and Chile was terminated. Business at the restaurant fell steadily, and by the end of 1980, Maria found herself searching for a new job.

At first Maria was optimistic. During her time at the restaurant, she learned how to cook, which she thought would give her plenty of opportunities in the many restaurants in the city. But the 1981 recession had hit hard. As a result, she was able to find only temporary jobs, which provided no job stability and did not allow her to use her recently acquired cooking skills.

After six months, money was starting to become a serious concern. One day Maria was walking down the street after another failed attempt to see a chef when she stopped at the gate of a school to watch a group of children playing football. When the bell rang, the kids ran to the exit, briefly greeting the parents waiting at the gates before scrambling toward a little trolley from which a man was selling *alfajores de maizena,* Argentina's sweet biscuits. In that second Maria saw the light: "I could do this!" she thought out loud. Soon enough, she put her passion and the skills acquired at the restaurant into a new venture. She asked her brothers for a small loan, bought a trolley, and in a matter of weeks was selling *alfajores* on the streets of Mendoza. She had no intentions to grow her business, preferring to stay below the radar screen of the government. Hence, she never formally registered her business.

Lucio and Javier were luckier with the recession. Lucio worked in the public sector, where wages and jobs were relatively insulated from business cycle fluctuations. He was happy with his job, which was not very challenging but paid a good salary and provided him with a lot of free time. He was not ambitious. He accepted a promotion as a manager, but after a few stressful months returned to his old job. All he wanted was to enjoy a quiet life, perhaps raising a couple of children one day.

The 1981 recession hit the winery, but Javier had no trouble keeping his job. He had the rare ability to create an affable and relaxed work environment where co-workers were happy, becoming more reliable and more committed to their job. Javier enjoyed the process and knew he was good at it. His bosses also recognized his talent. Hence, it came as no surprise when his company asked him to run the small office the company was planning to open in Buenos Aires.

The Buenos Aires office was a success. Javier learned a lot about the wine business and developed a wide network of clients. Buenos Aires exposed him to the great French, Italian, and Spanish wines, which he learned to love. He had talked with wine experts around the world and had the conviction that conditions in Mendoza were right for producing top-quality wines, not just decent table wines like Vinos Torreón. Prospects were promising, but every time he tried to convince the company's owners of the need to move upward in the value-added chain, they looked at him with incredulity. Feeling increasingly frustrated, he decided the time had come to move on, perhaps to start his own business.

Javier quit his job in 1987 and went back to Mendoza. After talking to more than 100 local farmers, he found the right hill on which

to plant his grapes. The soil was perfect and the orientation ideal. Now he needed money. Obtaining it proved more difficult than Javier had expected. Local bankers in Mendoza did not understand his business plan. Why waste all that money bringing oak barrels from France when local barrels worked just fine? They thought he was a visionary enthusiast. In Buenos Aires it was not much easier, but in the end he managed to convince a banker of the merits of his project. Once money was secured, he bought the land, registered the new business with the relevant authorities, hired a small group of laborers, and planted the first grapes. In 1990, he produced his first wine; by 1993, he employed 50 workers.

This story highlights some of the features of entrepreneurism in every economy in the world. All three siblings started as wage earners; two of them decided to become entrepreneurs, albeit for different reasons and with different sets of skills. Maria and Javier have different education levels, which are typically associated with different levels of ability to transform a raw idea into a business project. On average, transformational entrepreneurs like Javier have more years of schooling than low-growth-potential entrepreneurs like Maria. The nature of the business they created is also different. Maria adopted a well-established business model. Her prospects for growth are probably low. In contrast, Javier created something new by introducing high-quality wines in an area specialized in table wines.

Education is clearly related to the type of business created. As shown later in this chapter, formal business owners are much more likely to have attended college than informal business owners. On average, across countries in LAC, 21 percent of people with a tertiary degree own a business. About 15 percent registered their business; 6 percent did not. Among people with only primary education the pattern is reversed: about 9 percent own an informal business and 5 percent own a formal enterprise. Education is not the only determinant of entrepreneurship, as the contrast between Javier and Lucio shows. Javier and Lucio went to the same schools, had similar teachers and peers, but they have different abilities and ambitions. Javier has the rare ability to motivate others. He can make everyone more productive by identifying people's relative strengths and combining them effectively. Lucio does not have this ability. Although he is a good worker, he is not motivated by the challenge of change, and he finds management stressful. He will never be interested in running his own business. (These entrepreneurial skills are studied in detail in CAF 2013.)

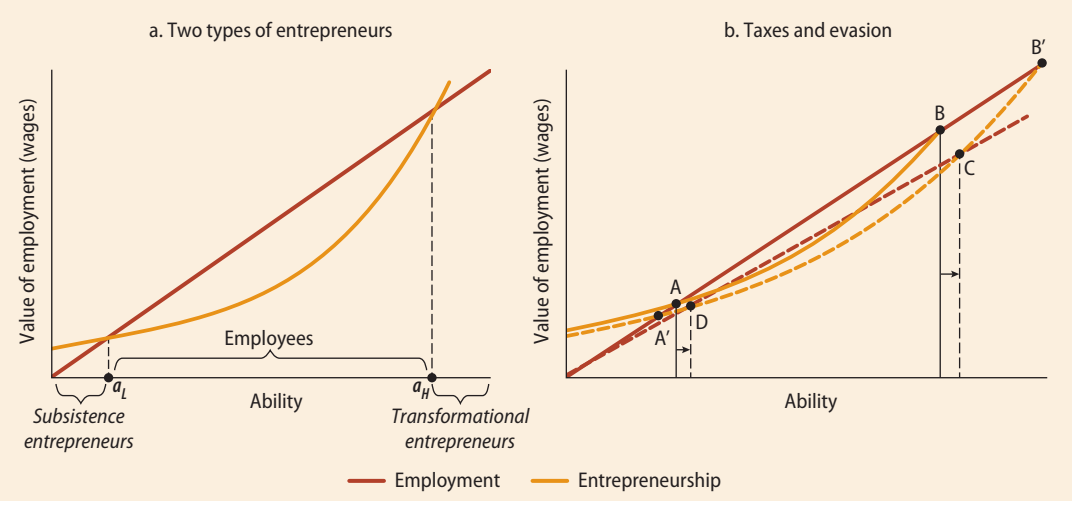
Entrepreneurs like Maria are abundant. On average, 28.8 percent of income earners in LAC are self-employed or small employers.[1] Few of them ever hire workers. In Colombia, for example, only 0.3 percent of the self-employed became employers in a three-year period (Mondragón and Peña 2010). In contrast, high-growth entrepreneurs like Javier are extremely rare: less than 0.4 percent of income earners in LAC own a business employing 50 workers or more.[2] However, their contribution to employment is huge: some 45 percent of employees in LAC work for medium-size and large firms (firms employing 50 workers or more). Wage employees like Lucio represent the most common type of worker in the region, accounting for the remaining 70.8 percent.

Theoretical framework

Most of this report focuses on the different entrepreneurial activities that innovators like Javier put in place. Before focusing on Javier-type entrepreneurs, this chapter starts by comparing the differences between the three siblings highlighted in the story in a more formal setting.

The main ingredients of this fictional story can be built into a simple theoretical framework following Poschke (2013a). Consider a population that is heterogeneous in "ability," as proxied, for example, by educational attainment. Workers with different abilities can choose to work for themselves (that is, to become entrepreneurs) or for someone else (that is, to work as wage employees). The value of dependent employment can be

FIGURE 2.1 Model of entrepreneurship



Source: Poschke 2013a.

thought of as a linear function of ability: the more able an individual is, the higher the value of becoming an employee (for simplicity, measured by wages), as shown by the red lines in figure 2.1.

What is the value of entrepreneurship? In contrast with wage employment, the value of entrepreneurship does not need to be linear in ability. At the high end of the ability spectrum, the value of entrepreneurship is high, because the value of a great entrepreneurial idea or great management skills can be spread across inputs used in the firm, augmenting these inputs. The idea that an entrepreneur's ability multiplies the value of inputs in the production process goes back to the seminal work of Lucas (1978). Hence, for very high-ability individuals, becoming an entrepreneur is more lucrative than being an employee. These individuals are "transformational entrepreneurs" (following Schoar 2010), high-ability entrepreneurs, or high-growth-potential entrepreneurs.

Entrepreneurship is also more valuable than employment at the low end of the ability distribution, for a variety of reasons. Self-employment may serve as an alternative to dependent employment after job loss, when finding a job takes a long time. This motivation is important in developing countries. In some cases, entrepreneurship serves as a buffer before workers find better employment opportunities. In others, where the income obtained from the small business is higher than the wage offered by the market, low-end entrepreneurship becomes permanent. These low-ability entrepreneurs are labeled low-growth-potential entrepreneurs or, for simplicity, low-growth entrepreneurs.

Hence, the value of entrepreneurship is a convex function of individual talent (and education), as depicted by the orange curves in figure 2.1.[3] The payoff functions for wage employment and entrepreneurship intersect twice, at a_L and a_H. Individuals with $a < a_L$ or $a > a_H$ become entrepreneurs; individuals with intermediate skills (for example, Lucio in our fictional story) become employees. High-ability individuals like Javier become entrepreneurs because their ability allows them to expand the marginal product of the firm's inputs. Low-ability individuals like Maria become entrepreneurs because the expected payoff from entrepreneurship is higher than the payoff from wage employment, a finding that is very much in line with the evidence reported by Maloney (2004). Thus, there is no market segmentation in the model. High-ability entrepreneurs are likely to run larger, more complex firms than their

low-ability counterparts—a prediction confirmed by the data analyzed in this chapter.

To be sure, ability and the relative payoffs of entrepreneurship versus paid employment are not the only factors determining an individual's occupational choice. Some individuals with a natural talent for entrepreneurship may dislike the risk involved in entrepreneurism. Alternatively, employees with no particular talent for entrepreneurism may want to be their own bosses. They may prefer opening their own business even if the monetary value of dependent employment is higher. If such preferences are uncorrelated with ability, the main insights of this simplified theoretical framework remain valid. In the presence of preference heterogeneity, it would still be true that the average ability of high-end entrepreneurs is higher than that of employees and low-end entrepreneurs.

One of the important insights of the theoretical discussion here is that it helps us understand that, in general equilibrium, factors affecting firm profits also affect wages, and thus may alter both the value of entrepreneurship and that of employment. An excellent example is the effect of changes in firm size–related taxes. Many rules and regulations apply only to firms above a certain size or are enforced more strictly for larger firms. In many high-income countries, for example, small firms are exempted from employment protection and severance payments.[4] In low- and middle-income countries, where tax evasion is pervasive, taxation is expected to fall more than proportionally on larger firms. Larger firms also face stricter enforcement of payment of nonwage benefits to workers, as Almeida and Carneiro (2011) show for Brazil.

Panel b of figure 2.1 shows the impact of an increase in firm size–contingent taxes on entrepreneurship. The increase in taxes reduces firms' profits, muting the incentives to become a high-ability entrepreneur. The threshold for high-ability entrepreneurs shifts to the right, from point B to C. At the low end of the ability distribution, the general equilibrium effects become fundamental for occupational choice. If wages were fixed, the share of low-ability entrepreneurs would also fall, as the threshold for low-ability entrepreneurship moves to the left, from A to A′. However, the reduction in the number of high-ability entrepreneurs reduces the number of large firms hiring workers, reducing the wage rate, as illustrated by the movement to the right of the wage schedule. Low-ability workers who previously found it advantageous to work as employees now find dependent employment less valuable, opting for entrepreneurship. In the new equilibrium, the number of low-ability entrepreneurs increases, as depicted by point D. Thus, when taxes fall more than proportionally on large firms, rising taxation reduces employment in larger firms and, through lower wages, stimulates the creation of small enterprises.

In the real world, the distinction between low- and high-ability entrepreneurs is blurred; it is probably better approximated by a bimodal distribution with a concentration of entrepreneurs at the low and high ends of the ability distribution but a continuum across the ability spectrum.[5] The heterogeneity of real world experiences is captured in a very rough manner in the data.

This chapter uses several proxies for the two types of entrepreneurs that help approximate the heterogeneous nature of entrepreneurship around the world in general and in LAC in particular. Depending on the data, low-ability entrepreneurs are self-employed, own unregistered businesses, have no employees, and were pushed into entrepreneurship by lack of opportunity in the formal sector. High-ability entrepreneurs are employers, own registered businesses, and were pulled into entrepreneurship because they had a great idea or saw a good business opportunity.

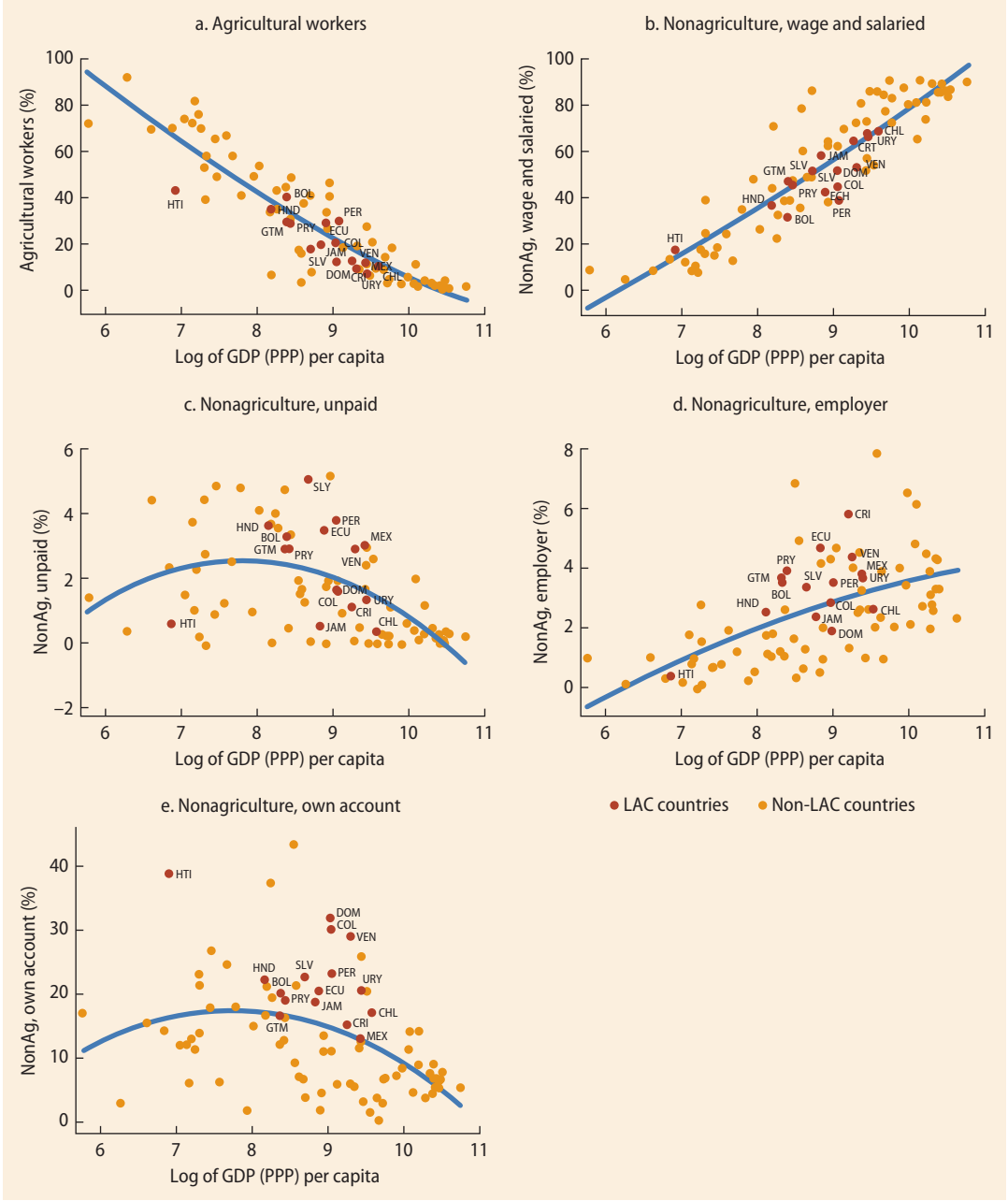
Employers, employees, and the self-employed

One fundamental distinction is the ability or willingness of the entrepreneur to hire workers. Our framework predicts that transformational entrepreneurs will run larger firms than low-growth entrepreneurs, because their comparative advantage lies precisely in organizing the working environment. A rough empirical counterpart of this distinction that

is easily found in household surveys around the world is the separation between employers and self-employed.[6]

Following Gindling and Newhouse (2012), figure 2.2 examines the correlation of occupation shares—including agricultural workers, self-employed, employers, wage employees, and nonpaid employees (in general family members who work in the family business without a regular wage)—with gross

FIGURE 2.2 Occupational choice and GDP per capita, 2010



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

domestic product (GDP) per capita across 74 countries.[7] At very low levels of GDP per capita, the vast majority of workers are involved in primary activities or, if they work outside agriculture, unpaid labor. As GDP per capita rises, the share of workers in agriculture declines and self-employment increases. This pattern is consistent with a move to cities, where a new form of informal employment, nonagricultural self-employment, is common. As GDP per capita continues rising, the shares of self-employed and unpaid family workers decline, hand in hand with monotonic increases in the shares of employers and paid employees.[8] Although these patterns are obtained from a cross-section of countries, they are very consistent with the evolution of self-employment over time that takes place as countries develop.[9]

They are also consistent with our simple theoretical framework if technological change more than proportionally benefits high-ability individuals. In this scenario, a pattern that is the reverse of that shown in figure 2.1 (panel b) emerges. Technological advances push high-ability individuals into entrepreneurship. At the other end of the spectrum, better technologies provide incentives for low-ability individuals to enter entrepreneurship, but higher wages induced by technical change more than outweigh the direct effect of technology on occupational choice. Thus, technical change reduces the share of low-ability workers moving into self-employment.

Considering its level of development, LAC stands out as a fairly entrepreneurial region when benchmarked against the rest of the world. Its share of employers is well above the share predicted by GDP per capita (panel d in figure 2.2). However, these employers do not generate sufficient wage or salaried employment, as the share of own-account workers is also above expected levels (panel e in figure 2.2). These data suggest that there is something in the nature of the firms created in LAC that prevents them from generating sufficient paid employment for the working-age population. This report tries to provide some answers as to why this is the case.

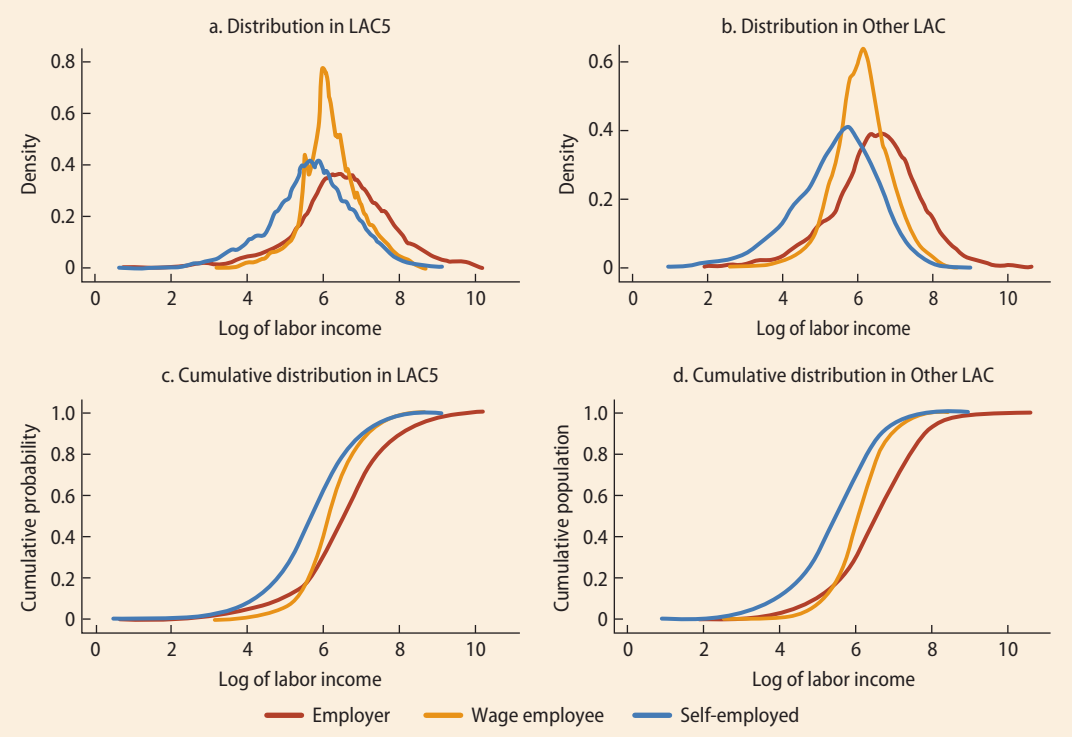
The simple theoretical framework also generates an implicit distribution of income, in which low-growth entrepreneurs earn less than wage employees, who in turn earn less than transformational entrepreneurs. Individual heterogeneity with regard to preferences for entrepreneurship would widen the distribution of income within each group, but it should still be the case that on average the income of the transformational entrepreneurs exceeds that of employees, which exceeds the income of the self-employed. In seeking empirical support for this prediction of the framework, we continue with the parallel between self-employed and low-growth-potential entrepreneurs, as well as employers and high-growth entrepreneurs, studying their distribution of income together with that of wage employees in LAC countries using data from household surveys.[10]

Figure 2.3 shows the distribution of annual income across the three groups for the LAC5 countries as a group and for 11 other countries in the region for which comparable data is available ("Other LAC").[11] In both groupings, the differences in the distributions confirm the predictions of the theory. On average, employers dominate the income distribution of employees, and the lowest paid workers are own-account workers.

There is an important exception to this rule. Panels c and d present the cumulative distribution functions of the three groups. The horizontal differences are informative about the income distances between each group at each percentile of the income distribution. In both LAC5 and Other LAC, employers are better off than paid employees only after the 20th percentile; the bottom 20 percent of paid employees do better than the bottom 20 percent of employers.

A second important stylized fact is that the distributions of entrepreneurs (both low-end and high-end) have higher variances than the distribution for employees. This pattern may indicate the ex post realization of one important dimension of entrepreneurship not discussed so far: risk.[12] High- and low-ability entrepreneurs appear to face higher ex ante risk than paid employees.

FIGURE 2.3 **Income distribution in Latin America and the Caribbean by type of occupation, circa 2011**



Source: Socio-Economic Database for Latin America and the Caribbean (SEDLAC).
Note: Distribution includes people ages 25–65 years with positive income. Distribution is weighted so that each country has the same importance. Outliers (points in the top or bottom 0.5 percent for each country and category) are excluded. For countries included in each group, see note 11.

Low-growth and high-growth entrepreneurs

Self-employment may provide a rough proxy for low-growth entrepreneurs, but the group is highly heterogeneous. Professionals, including doctors, architects, lawyers, and journalists, often work as freelancers and are consequently self-employed, even if they do not necessarily own a business. The distinction between self-employed workers and business owners is blurred and not easily identifiable from household surveys. However, the Gallup World Poll Survey (described in box 2.1) separates the two. People who responded affirmatively to the question "Do you currently own a business?" were classified as business owners. Adults were classified as self-employed if they worked even minimally in the last seven days for themselves, as a freelancer, performing contract work, or for their own or their family's business. Respondents who answered "yes" to being self-employed but "no" to being a business owner were classified as self-employed and not considered as business owners in this analysis (Klapper and Randall 2012).

On average, 15 percent of adults in LAC report owning a business. This figure is exactly in line with the average in the rest of the developing world. It hides substantial within-group heterogeneity, however: ownership ranges from less than 10 percent in Uruguay and Panama to more than 20 percent in Bolivia, Colombia, Ecuador, and Haiti. An additional 12 percent of adults in LAC report being self-employed but not owning a business.

A follow-up question was added in the Gallup World Poll Survey to investigate the importance of formal versus informal

BOX 2.1 Main databases used in the study

Exporter Dynamics Database

The Exporter Dynamics Database covers measures of exports growth and selected characteristics of exporters in 38 developing and 7 developed countries. The firm-level information, collected directly from customs information, is available primarily for the period 2003–10. Information includes basic characteristics of exporters (numbers, size, growth); their concentration and degree of diversification in products and markets; their dynamics (entry, exit, and survival); and the average unit prices of the products they trade. More information is available at http://econ.worldbank.org/exporter-dynamics-database.

Gallup World Poll Survey

The Gallup World Poll Survey surveyed more than 150,000 adults in 148 economies in 2011. The survey is representative of the adult population in each country. The core questionnaire includes detailed information on demographics (gender, age, marital status, education); income; well-being and life/job satisfaction; trust in institutions, family, and strangers; and jobs. The World Bank and the Bill & Melinda Gates Foundation recently partnered to include information on the use of formal and informal payments, savings, credit, and insurance. More information is available at http://www.worldbank.org/globalfindex and http://www.gallup.com/strategicconsulting/en-us/worldpoll.aspx.

Orbis

Orbis is a commercial database compiled by the Bureau Van Dijk. It contains standardized financial accounting information on companies worldwide, with an emphasis on private sector firms. It contains information on more than 100 million listed and unlisted companies, including 50 million in Europe, 30 million in the Americas, and 15 million in the Asia-Pacific region. The database covers 2002–11, but the availability of information varies greatly depending on the country. Orbis does not follow a particular sampling strategy, which poses serious questions on the extent of the data's representativeness. Listed firms present the most complete level of information. More information is available at http://www.bvdinfo.com/Products/Company-Information/International/Orbis-(1).

SEDLAC

The Socio-Economic Database for Latin America and the Caribbean (SEDLAC) compiles the microdata from the main household surveys carried out in LAC countries. Great effort is made to standardize the data to allow cross-country comparability. The database includes information from more than 200 household surveys carried out in 25 countries (Argentina, the Bahamas, Belize, Bolivia, Brazil, Colombia, Costa Rica, Chile, Dominica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, and República Bolivariana de Venezuela). In each period, the sample of countries represents more than 97 percent of the total population. The database mainly covers the 1990s and 2000s, although it also has information for previous decades on a few countries. More information is available at http://sedlac.econo.unlp.edu.ar/eng/.

World Bank Enterprise Surveys

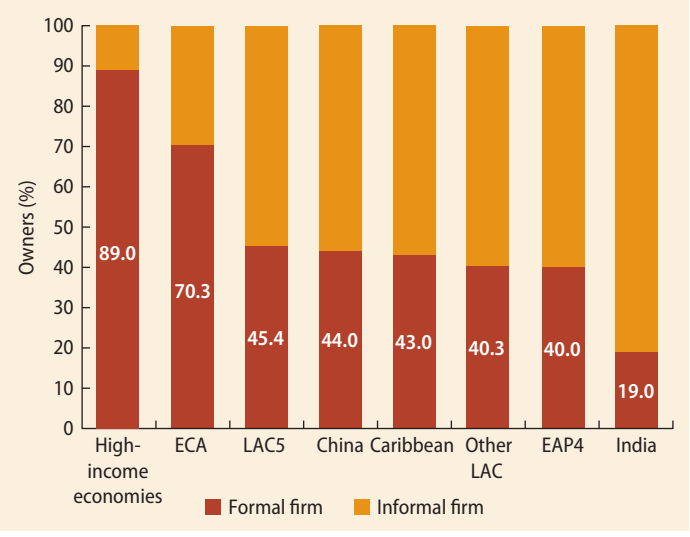
The World Bank's Enterprise Surveys database includes firm-level information on a representative sample of registered firms in the nonagricultural formal private sector. The surveys cover a broad range of business environment topics, including corruption, infrastructure, crime, competition, access to finance, and performance measures. The World Bank collects these data through face-to-face interviews with top managers at and owners of more than 130,000 companies in more than 135 economies. The database includes about 187 surveys from about 100 countries. Typically, 1,200–1,800 interviews are conducted in larger economies, 360 interviews in medium-size economies, and 150 in smaller economies (for example, the survey for The Gambia in 2006 included 33 firms, the one in Ecuador in 2010 included 366 firms, and the one Brazil in 2009 included 1,802 firms). In LAC, firms with five or more employees are included, and firms owned 100 percent by the state are excluded. Two different surveys are conducted, one for service industry firms and another for the manufacturing sector; both surveys contain a common core set of questions. The last and most complete wave of data are for 2009–10. More information is available at http://data.worldbank.org/data-catalog/enterprise-surveys.

business ownerships. People identified as business owners were asked: "Have you formally registered your business?"[13] Respondents who answered "yes" were classified as formal business owners; respondents who answered "no" were classified as informal business owners.

More than half of the businesses owned in LAC are not formally registered, a share similar to China (56 percent) and the EAP4 countries (Indonesia, Malaysia, the Philippines, and Thailand) in East Asia and Pacific (60 percent) but much higher than in Eastern Europe and Central Asia (ECA) (30 percent) and high-income economies, where only 1 in every 10 businesses is not formally registered (figure 2.4). Within LAC, Chile, Ecuador, Panama, Paraguay, and Uruguay stand out as the countries with the highest rate of business formality. More than half of business owners in these countries formally registered their businesses. In contrast, less than 30 percent of business owners in the Dominican Republic, El Salvador, Guatemala, and Haiti reported doing so.

Do business owners of formal and informal firms look alike? The propensity of people to engage in different forms of entrepreneurial activities—and job creation—naturally depends on social and individual characteristics, such as gender, culture, and religion (Iyer and Schoar 2010; Ardagna and Lusardi 2010; Djankov and others 2005). The typical formal and informal business owner has very different socioeconomic characteristics (table 2.1). Compared with the general population, formal business owners tend to be older, male, urban, and well educated, with an income in the upper level of the within-country income distributions. Informal business owners are also older and more likely to be men, but there is no clear relationship with income, and they are likely to be less educated than the average worker. In LAC5, for example, about 9 percent of adults with elementary education as their highest educational credential own an informal business, as opposed to some 6 percent of adults with tertiary education. In contrast, among formal business owners, 15 percent have tertiary education and just 5 percent have only elementary education. Similar patterns are found in the other country groups.

FIGURE 2.4 Rate of formal business ownership in selected country groups, countries, and economies, 2011



Source: Klapper and Randall 2012, based on data from Gallup World Poll Survey.
Note: The sample includes only the working-age population. Each country or economy has the same weight in the regional average. For countries and economies included in each group, see note 11.

The gender gap is consistent across the two types of business owners but differs greatly in magnitude and across country groups. The difference between men and women is larger for formal business ownership. In LAC5, for instance, 8.8 percent of men own a formal business, compared with 5 percent of women; 9.4 percent of men and 7.2 percent of women own informal firms. Similar differences are found in the other middle-income regions, with China and India standing out at the two extremes of the distribution. Chinese women are almost as likely as men to be formal entrepreneurs, and India has the largest gender entrepreneurship gap.

One of the striking features of businesses in LAC is their small size. Indeed, the most common firm in LAC has no employees, according to survey respondents who own an establishment. Such bias toward micro establishments is evident among formal firms; it is even more marked among informal ones. In Caribbean countries, more than 70 percent of unregistered business establishments have no employees, according to business owners. This

TABLE 2.1 **Socioeconomic characteristics of business owners in selected country groups, countries, and economies**
(business owners as percentage of working-age population)

	LAC5		Other LAC		Caribbean		High Income		ECA		EAP4		China		India	
	Formal %	Informal %	Formal %	Informal %	Formal %	Informal %	Formal %	Informal %	Formal %	Informal %	Formal %	Informal %	Formal %	Informal %	Formal %	Informal %
% of business owners	7.0	8.0	7.0	9.8	6.3	9.3	8.0	0.9	3.7	2.8	7.0	12.5	7.0	9.0	3.0	11.0
Gender																
Male	8.8	9.4	8.5	10.6	7.0	9.7	10.7	1.1	4.9	3.5	8.3	12.8	8.0	11.0	5.0	18.0
Female	5.0	7.2	5.8	9.3	6.0	9.3	5.5	0.6	2.4	2.0	5.5	12.5	7.0	7.0	1.0	4.0
Education																
Elementary	5.6	9.2	4.7	11.2	4.7	9.3	4.9	0.5	1.0	3.2	4.5	13.0	7.0	10.0	2.0	11.0
Secondary	6.4	7.8	7.0	9.2	6.7	9.7	8.0	1.0	3.5	2.5	7.3	13.8	10.0	8.0	5.0	11.0
Tertiary	15.0	5.8	16.3	7.7	23.3	8.7	11.0	0.9	7.1	1.6	12.0	10.0	6.0	3.0	5.0	10.0
Age																
15–24	2.4	3.4	2.6	3.6	3.7	4.3	1.8	0.5	1.2	2.1	2.5	5.0	6.0	6.0	1.0	7.0
25–64	8.2	10.4	9.3	12.9	8.7	12.3	10.3	1.0	4.9	3.2	8.5	15.5	8.0	11.0	4.0	13.0
65+	7.6	3.8	5.2	9.2	2.3	6.0	4.8	0.7	0.8	1.7	6.5	11.0	2.0	1.0	1.0	6.0
Setting																
Urban	7.6	8.0	8.0	10.0	7.7	10.3	7.3	0.8	4.0	2.0	7.3	14.0	9.0	9.0	3.0	11.0
Rural	6.0	8.4	6.2	9.5	6.0	9.3	9.4	1.0	3.2	3.4	6.3	12.0	7.0	9.0	3.0	11.0
Income quintile																
1 (top)	2.2	8.6	3.8	9.9	4.0	9.0	4.6	0.9	1.3	2.9	3.0	8.0	3.0	5.0	1.0	8.0
2	5.2	9.0	4.8	9.3	7.7	9.0	6.3	0.8	2.2	2.3	3.8	13.0	6.0	6.0	2.0	12.0
3	5.2	6.4	5.5	9.8	6.3	11.7	6.6	0.9	2.7	2.9	6.8	13.5	7.0	11.0	3.0	12.0
4	8.2	8.6	8.8	10.2	4.7	9.0	9.7	0.8	4.3	2.6	9.3	13.5	7.0	10.0	5.0	10.0
5 (bottom)	14.0	8.2	13.3	10.2	10.3	8.0	13.8	1.1	7.5	3.1	13.3	15.3	13.0	14.0	5.0	14.0

Source: Klapper and Randall 2012, based on data from Gallup World Poll Survey.
Note: Each country or economy has the same weight in the regional average. For countries and economies included in each group, see note 11.

percentage is very similar to that observed in LAC5 and Other LAC. In contrast, the figures are 56 percent in EAP4 and 35 percent in Europe and Central Asia (figure 2.5). As expected, informal businesses tend to be smaller, but even among formal businesses in LAC, almost half have no employees. Grouping formal and informal businesses together makes the bias toward microfirms in LAC even more striking (figure 2.6). Although the share of firms with more than five employees reaches 20 percent in high-income economies, it barely reaches 3 percent in LAC.

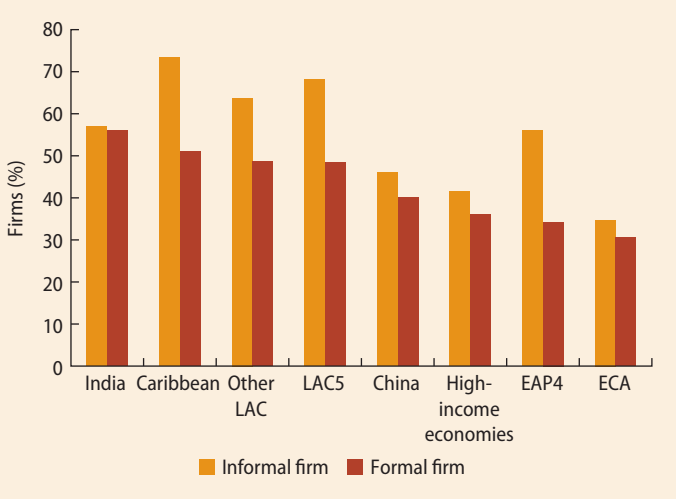
Push versus pull factors

Economists have long tried to understand the determinants of business creation. Following Vivarelli (2013), the traditional view gives the expected level of profit a prominent role (Orr 1974; Khemani and Shapiro 1986). More recent studies in this stream of literature highlight not only profit expectations but also other pull factors, such as economic growth and high innovative potential (see Acs and Audretsch 1989a, 1989b; Geroski 1995).

Authors such as Knight (1921); Schumpeter (1934, 1939); and Oxenfeldt (1943) drew attention to the characteristics of the founder of a new firm, highlighting the importance of individual heterogeneity and the desire to innovate and put new ideas into practice as drivers of entrepreneurial spirit. Potential entrepreneurs seem to be strongly influenced by specific psychological attitudes, such as the desire to be independent, the need for autonomy in the workplace, an aspiration to fully exploit previous job experience and acquired ability, and the desire to be socially useful and to acquire social status (see Creedy and Johnson 1983; Evans and Leighton 1990; Vivarelli 1991, 2004; Blanchflower and Meyer 1994; Blanchflower and Oswald 1998; Zacharakis, Bygrave, and Shepherd 2000). Pursuit of these goals—in the form of profitability, growth, or simply the desire to put in place original ideas—is associated with a view of entrepreneurship in which the entrepreneur is pulled into business creation.

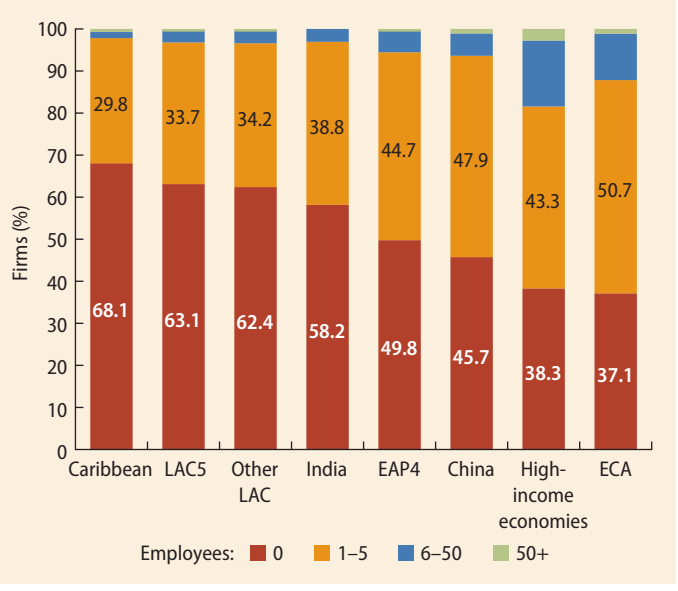
In the occupational choice model outlined at the beginning of this chapter, the foundation of a new firm is not fostered by absolute profitability but by the difference between expected profits and current local wages in the same sector, taking into account

FIGURE 2.5 Share of firms with no employees in selected country groups, countries, and economies, 2011



Source: Klapper and Randall 2012, based on data from Gallup World Poll Survey.
Note: Each country or economy has the same weight in the regional average. For countries and economies included in each group, see note 11.

FIGURE 2.6 Distribution of firm size in selected country groups, countries, and economies, 2011



Source: Klapper and Randall 2012, based on data from Gallup World Poll Survey.
Note: Each country or economy has the same weight in the regional average. For countries and economies included in each group, see note 11.

the surrounding environmental conditions. The introduction of relative considerations opens the door to examine entrepreneurs who are pushed into entrepreneurship rather than pulled by absolute profits. One can easily extend the relative approach to consider the risk differential between the two occupational alternatives (Kihlstrom and Laffont 1979; Parker 1997; Cressy 2006).

The implication of comparing the relative virtues of self-employment versus dependent employment means that entry may have a countercyclical component. It is in periods of slow growth and profit prospects that many small firms are created, simply as an alternative to the prospects of dependent employment, which become less attractive (see Highfield and Smiley 1987; Hamilton 2000). Pushing this argument further, founding a new firm may be an alternative to uncertain future career prospects or represent an escape from unemployment (see Oxenfeldt 1943; Evans and Leighton 1990; Storey 1991, 1994). The empirical evidence suggesting the important role of job losses in fostering entry is indeed quite robust (see Storey and Jones 1987; Santarelli, Carree, and Verheul 2009).

A complication in identifying the push factor is related to the fact that in general, times of low job finding rates are usually recessions, which may also imply lower expected profits from self-employment. The contemporaneous presence of these two channels has made it hard to identify unemployment push entrepreneurship in the data. The use of micro data has helped researchers overcome this problem. Using data from the National Longitudinal Survey of Youth, Rissman (2007) documents the presence of push entrepreneurship among young men in the United States. Millán (2012) finds a similar pattern in several European countries, using data from the European Community Household panel.

Thus, in some situations, a business owner may be pushed rather than pulled into entrepreneurship. When unemployment and the risk of failure of entrepreneurial projects are incorporated, push factors will more than proportionally discourage entrepreneurship by high-ability individuals (Poschke 2013c).

A third explanation for entrepreneurship may simply be "entry mistakes" (Cabral 1997; Geroski and Mazzucato 2001). Such mistakes are likely to result in early failure, turbulence, and churning. Mistakes may occur if potential entrepreneurs are overconfident (Dosi and Lovallo 1998; for an experimental economics exercise, see Camerer and Lovallo 1999). Parker (2006) discusses both the psychology literature, which gives reasons for expecting entrepreneurs to be especially prone to overoptimism, and previous empirical evidence showing that optimism is significantly and positively associated with the propensity to be an entrepreneur (de Meza 2002; Åstebro 2003; Coelho, de Meza, and Reyniers 2004).

A set of questions in the Gallup World Poll Survey sheds some light on the importance of pull versus push factors in LAC (see Klapper and Randall 2012 for details). The poll asked business owners if each of the following reasons was a very important reason why they started their business, allowing for multiple responses:

A. You could not find a suitable job.
B. You were afraid of losing your job.
C. You saw an opportunity to make more money.
D. You wanted to be your own boss.
E. You had a great idea for a business.

Factors A and B are clearly associated with push motives for entrepreneurship; factors D and E are more likely to be pull motives, although they may also constitute an additional incentive to entrepreneurship among people who were pushed. Factor C can be associated with both push and pull factors; it is harder to interpret. For instance, in our framework, all potential entrepreneurs compare expected profits with expected wages; making money is thus always a motive for starting a business. For this reason, response C (to which more than 70 percent of respondents answered affirmatively) was disregarded in the analysis.

Entrepreneurs who were pushed into entrepreneurship are those who answered positively to questions A or B. Pulled entrepreneurs are defined as survey respondents

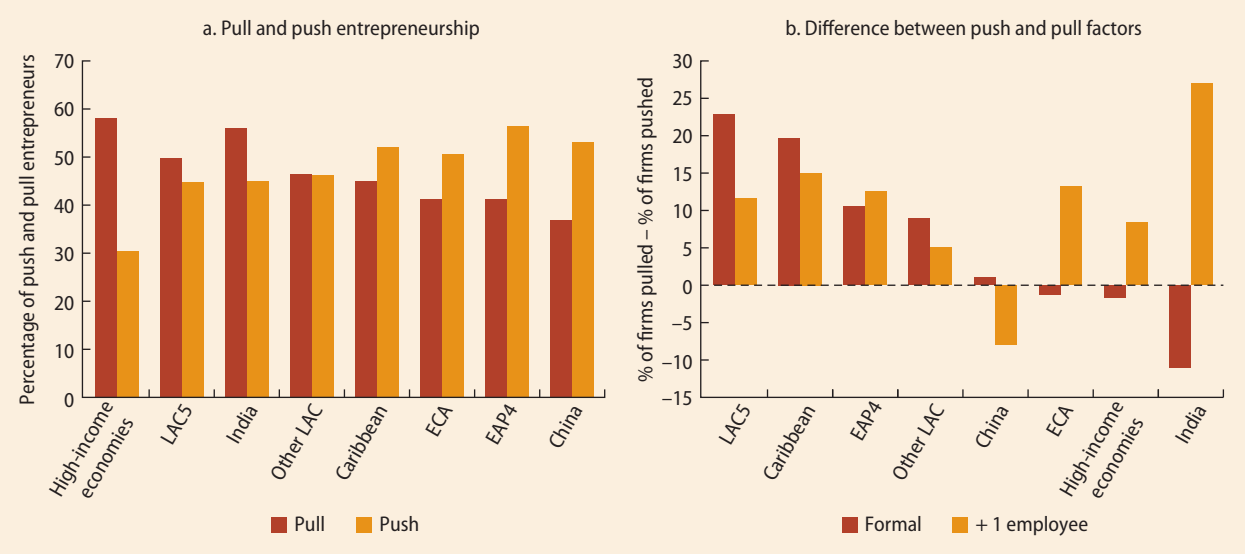
who answered "no" to A and B and "yes" to D or E. A residual category, which covers some 8 percent of the business owners, was neither pulled nor pushed; it is ignored in the analysis.

One in every two business owners in LAC is pushed into entrepreneurship, the same proportion as in ECA and about twice as many as in high-income economies. About 60 percent of entrepreneurs in high-income countries are pulled by great ideas for a business or a desire to be their own bosses against 45 percent in LAC and 40 percent in ECA (figure 2.7, panel a). Guatemala, Honduras, Brazil, El Salvador, Peru, and Haiti lie above the regional average, with more than 50 percent of business owners pushed into entrepreneurship. In the Caribbean, almost 70 percent of business owners declared having opened a business out of fear of losing their job or because jobs were not available. Uruguay, Chile, and Mexico, the countries with the lowest share of push entrepreneurs in the region, still lie above the 28 percent push entrepreneurship that characterizes high-income countries.

LAC stands out as the region where push factors are most clearly linked to informal entrepreneurship and pull factors with formality. More than 50 percent of pull entrepreneurs in LAC register their business, against just 30 percent of pushed entrepreneurs (figure 2.7, panel b). Differences are also positive but smaller in other regions dominated by middle-income countries, such as EAP4, where there is a difference of about 10 percentage points in the share of formal business owners that were pulled versus pushed into entrepreneurship. In regions where informality is almost nonexistent, such as high-income countries and ECA, or informality is the predominant form of ownership (India), differences between pull and push factors are not fundamental for formality status.

The differences between push and pull factors are also significant for the capacity (or willingness) of the entrepreneur to generate employment. Pull entrepreneurs are more likely to have employees. This difference is largest in India, where the likelihood that an entrepreneur generates at least one job is more than 25 percentage points higher

FIGURE 2.7 Push versus pull entrepreneurship in selected country groups, countries, and economies, 2011



Source: Klapper and Randall 2012, based on data from Gallup World Poll Survey.
Note: The sample consists of the working-age population only. Each country or economy has the same weight in the regional average. For countries and economies included in each group, see note 11.

if he or she was pulled into entrepreneurship as opposed to pushed. In LAC, 43 percent of pull entrepreneurs have at least one employee, against 30 percent of those who were pushed. The largest difference between pull and push entrepreneurs is observed in the Caribbean (15 percentage points), closely followed by EAP4 (13 percentage points) and LAC5 (12 percentage points). Excluding China, a clear outlier in the sample, this difference is smallest in Other LAC (5 percentage points).

These findings suggest that entrepreneurs set up businesses for a large variety of reasons and that such differences are important determinants of the type of business activity that will be developed. Entrepreneurs who are pulled into entrepreneurship are more likely to end up registering their business and hiring more workers than entrepreneurs who are pushed into entrepreneurship because of the fear of losing their jobs or lack of better employment opportunities. The proportion of businesses that are created because of push factors is much larger in developing regions, including LAC, than in high-income countries. However, push and pull factors are two sides of the same coin. If there are insufficient high-end entrepreneurs, or the entrepreneurs that exist generate little employment, there will be fewer good jobs for jobseekers and some of them will be pushed into low-growth potential forms of entrepreneurship. The rest of this chapter investigates the creation and dynamics of formal firms.

Business creation in Latin America and the Caribbean

New firm formation may play a crucial role in fostering competition, inducing innovation, and boosting the emergence of new sectors, as discussed by Wennekers and Thurik (1999) and Dejardin (2011). Entrepreneurs leading the new small firms may compensate for the restructuring of mature sectors and the downsizing of larger incumbent firms. Ultimately, new firms may contribute substantially to job creation, provided that the net effect of new entrants brings about overall market growth (Malchow-Møller, Schjerning, and Sørensen 2011). Indeed, industrial dynamics (that is, the entry and exit of firms) accounts for 20–40 percent of total productivity growth in eight selected Organisation for Economic Co-operation and Development (OECD) countries, according to OECD (2003), supporting the idea that entrepreneurs represent one of the driving forces of economic growth and structural change (Audretsch and Keilbach 2005; Foster, Haltiwanger, and Syverson 2005). The reasoning is that new entrants can displace obsolescent firms in a process of "creative destruction" (see Schumpeter 1939, 1943), which may be an important micro determinant of productivity dynamics that eventually results in economic growth.[14]

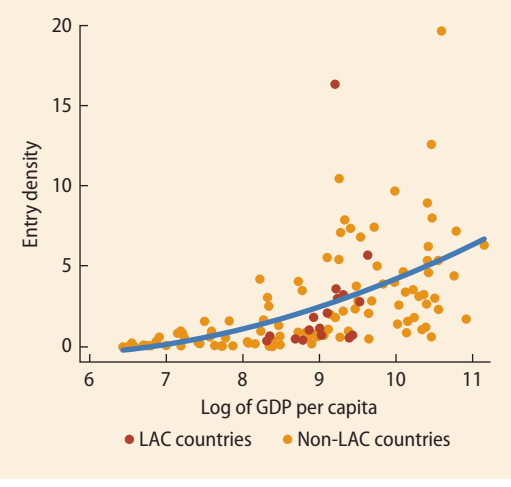
Recent studies based on data from the Global Entrepreneurship Monitor have identified a *U*-shaped relationship between a country's rate of entrepreneurial activity as measured by net entry and its level of economic development (Reynolds and others 2001; Wennekers and others 2005). The creation of new firms is very active in both highly developed and extremely poor countries, a fact that emphasizes the multifaceted phenomenon of entrepreneurship and demystifies simplistic mechanical links between firm creation and innovation, productivity growth, and economic development. Indeed, only when transformational entrepreneurs are distinguished from low-growth entrepreneurs is a positive linear relationship between economic development and entrepreneurship restored (Carree and others 2007; Acs 2008; Acs, Desai, and Klapper 2008). In developing countries, a positive relationship between entrepreneurship and job creation is detectable only when self-employment without employees and informal companies are excluded from the analysis (Ghani, Kerr, and O'Connell 2011).

Identifying transformational entrepreneurs and distinguishing them from low-growth entrepreneurs is a hard task. The previous analysis of push versus pull factors offers some hints, however. For instance, registered business owners in developing

countries are more likely to be pulled into entrepreneurship than business owners who did not register their business, suggesting that registered business owners have a higher likelihood of becoming transformational entrepreneurs. As the focus of this study is on transformational entrepreneurs, we start the discussion by examining the creation of formal businesses. Is LAC lagging behind in net formal entry?

Figure 2.8 displays the relationship between firm entry and the level of development across 129 countries. Perhaps as expected, entry, as measured by firm registration per 1,000 working-age people, is weakly positively associated with GDP per capita. Formal entry rates in LAC tend to be below the level predicted by their income per capita, although differences with respect to the predicted values are not always large and there is substantial heterogeneity within the region. By far the most dynamic economy in the region is Costa Rica, with an average entry rate of almost 16 new firms per 1,000 working-age people between 2004 and 2011, followed by St. Kitts and Nevis (6 new firms) and Dominica (4 new firms). Argentina and Mexico stand at the opposite end of the distribution, with rates of entry substantially below those suggested by their GDP per capita.

FIGURE 2.8 New firm entry rates and GDP per capita in selected countries, 2004–11



Source: World Bank, based on data from World Development Indicators and World Bank Group Entrepreneurship Snapshots (WBGES).
Note: Each point represents the average between 2004 and 2011. Curve shows quadratic fitted values. GDP = gross domestic product. LAC = Latin America and the Caribbean.

The relatively weak performance of LAC countries in formal business creation raises the question of what determines entry and the even more important question of how the process of business creation can be enhanced in the region. In an attempt to answer these questions, the literature has attributed a prominent role to regulatory barriers. The importance of entry costs as an obstacle to the creation of new businesses—and consequently a healthy reallocation of productive factors in the economy—has been documented as a limiting factor in firms' investments (Nicoletti and Scarpetta 2003) and an obstacle to productivity and growth (Alesina and others 2005) and the creation of new firms (Klapper, Laeven, and Rajan 2006). Within a sample that includes 85 developed and developing countries, entry regulation has also been found to promote corruption and larger unofficial economies (Djankov and others 2002). Could the removal of regulatory barriers spur the creation of formal businesses in the region?

We examine the association between entry and the share of formal business in the total business population on the one hand and two different indicators of administrative barriers to entrepreneurship on the other. The first indicator of entry barriers is the total cost of setting up a business, obtained from Doing Business data. This indicator includes an imputation of the monetary costs associated with the numbers of days needed to set up a business and the direct monetary cost related to fees and other taxes for a sample of 132 economies.[15]

The second indicator is a summary measure of barriers to entrepreneurship that is calculated as a weighted average of three subindexes: an indicator of regulatory and administrative opacity, an indicator of administrative barriers to start-ups, and an indicator of barriers to competition. Each subindex ranks countries on a scale from 0 to

6, with 0 representing lax and 6 representing strict regulations.

There is great heterogeneity across LAC countries in these red-tape barriers to entry (figure 2.9). In Guatemala, it takes 37 days, 12 procedures, and the equivalent of 52 percent of GDP per capita to open a business; in Chile it takes 7 days, 7 procedures, and the equivalent of 5 percent of GDP per capita (in contrast, in Canada, it takes just one administrative procedure to set up a new business).

Great heterogeneity across countries is also present in the broader summary measure of barriers to entrepreneurship. The average score for OECD countries excluding Mexico is 1.36. This score is lower than in the best-scoring country in LAC (Colombia at 1.79), where the framework is much more business friendly than in the worst-scoring countries (Honduras 3.65, Argentina 3.28, and Nicaragua 3.18).[16]

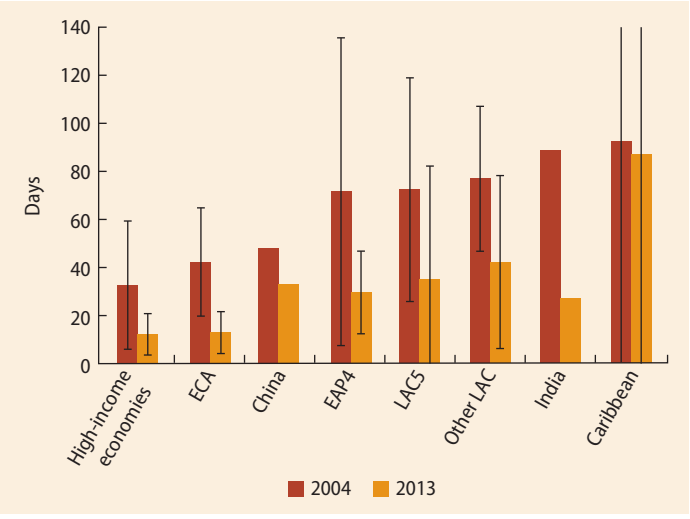
LAC countries have made significant progress in reducing such barriers in the last few years. The time to set up a business was halved in less than a decade (see figure 2.9), reflecting a general trend of worldwide deregulation in product markets. The cross-country variance in the number of procedures, the time, and the cost associated with setting up a business declined steadily between 2004 and 2013, as countries have become more aware of the need to create a more favorable business environment.[17] Despite progress, however, the burden imposed by red-tape regulations in the region is still higher than in other regions of similar income per capita, such as ECA or EAP4.

We examine next the association between entry and formal business ownership and barriers to entrepreneurship around the world. We present partial correlations that control for differences in GDP and population across countries because entry barriers tend to be concentrated among developing countries. The analysis yields very similar results for barriers to entry and barriers to entrepreneurship (panels a–d in figure 2.10). The partial correlations are weakly negative and not uniformly statistically significant. For similar levels of entry barriers or barriers to entrepreneurship, there is tremendous variability in the degree of formalization and entry. Moreover, in countries such as Peru and Brazil, where regulation was expected to be a major obstacle to business formalization, levels of entry are in broad accordance with the level of development.

These findings do not imply that barriers to entry need not be detrimental to firm performance and resource reallocation. The literature documents the obstacles imposed by entry barriers for a variety of outcomes, including employment in dynamic service sectors (Messina 2006), firm investment (Alesina and others 2005), and the creation of new firms (Klapper, Laeven, and Rajan 2006). The weak associations of the data here may reflect the fact that other counteracting forces blur the cross-country correlations under study. It should also be noted that most of the literature cited relied on OECD data or included a very limited set of middle-income countries.

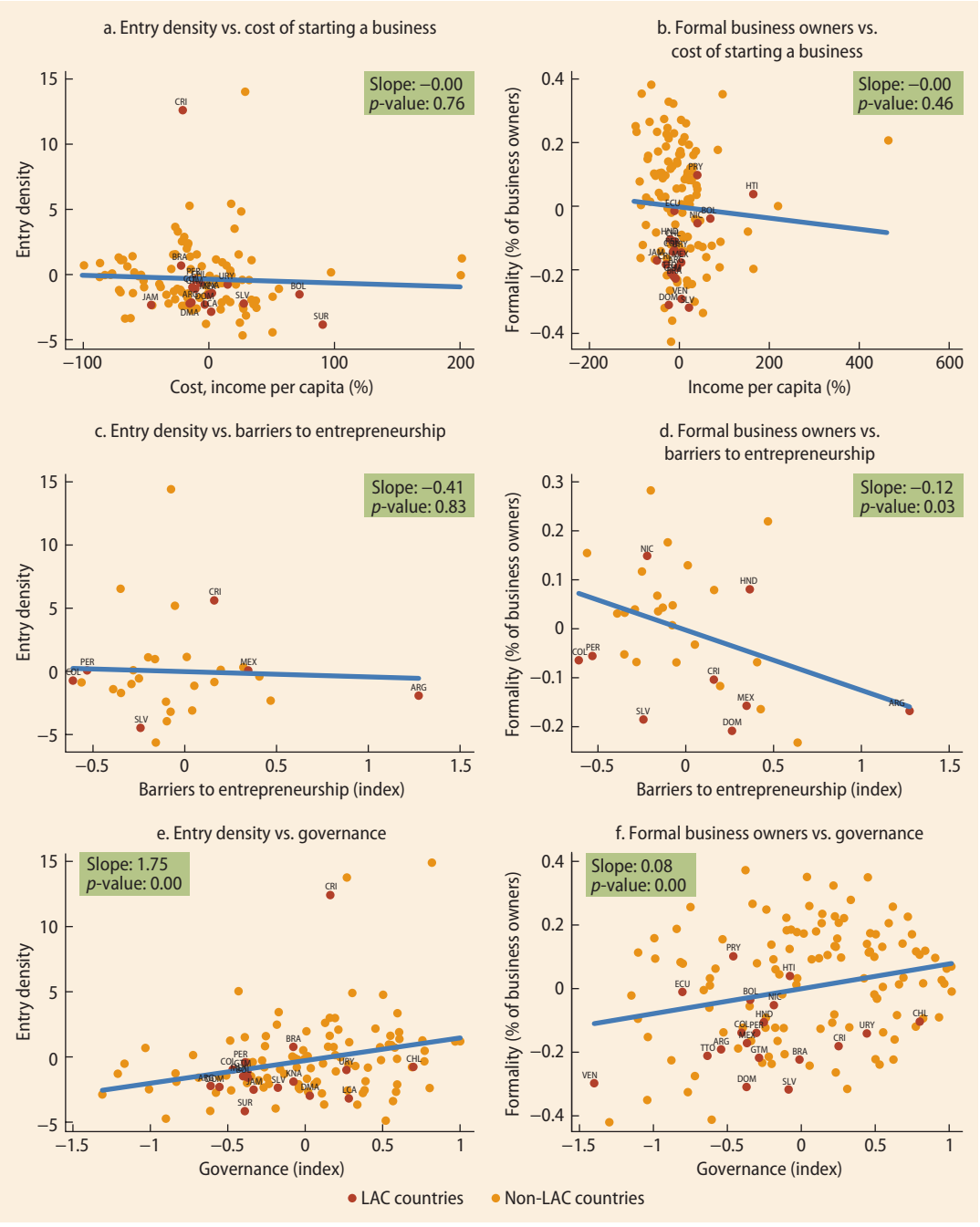
The analysis raises a question about the relevance of regulatory barriers for the formation of new businesses in developing countries. It may be that in developing countries

FIGURE 2.9 Time required to start a business in selected country groups, countries, and economies, 2004 and 2013



Source: World Bank 2011.
Note: Each bar represents the average for each region. The thin lines show the standard deviation for the countries within each region. For countries and economies included in each group, see note 11.

FIGURE 2.10 Relationship between business formality and barriers to entry in selected countries, various years



Source: World Bank, based on data from World Development Indicators, 2012; World Bank Entrepreneurship Database; Klapper and Randall 2012; Wölfl, Kozluk, and Nicoletti 2009; and Kaufman, Kraay, and Mastruzzi 2010; and Worldwide Governance Indicators.
Note: Each point represents the residuals of the regression between each variable, gross domestic product (GDP) adjusted for purchasing power parity, and population. Panels a and e use the average for 2004–2011; panels b, c, d, and f use the average for 2004–09. The slope is the coefficient of a regression between the two variables. The *p*-value shows the significance of the coefficient. LAC = Latin America and the Caribbean.

what matters for the business environment is the quality of broader institutional and policy arrangements, which may range from respect of the rule of law (Botero and others 2004) to the development of other markets, including finance and insurance.

To shed some light on this hypothesis, we correlate our measures of entry and formality with a broader index, the Worldwide Governance Indicator (WGI), which summarizes information on the degree of voice and accountability in the economy, political stability and absence of violence, government effectiveness, regulatory quality, the rule of law, and control of corruption (Kaufman, Kraay, and Mastruzzi 2010). The index estimates the quality of governance on a scale of –2.5 to 2.5 that increases in the quality of governance. Because this indicator is collected annually, all of the information on entry rates for the period 2004–11 can be exploited, which adds some precision to the estimates.[18]

The cross-correlations of entry and the share of formality with the quality of governance are highly consistent and suggest that in countries with better governance, the share of business owners and the creation of new formal firms are higher, even after controlling for GDP and population. The implication, which deserves further scrutiny, is that to stimulate a better business climate in the quest for a vigorous and vibrant entrepreneurial sector, governments should examine the overall business environment rather than specific aspects of it.

Beyond entry: Firm dynamics in Latin America and the Caribbean

The importance of entry in the process of structural change and productivity dynamics is hard to dispute. It is probably for this reason that all governments have specific programs to support entry and the performance of small firms. Indeed, if small businesses are the engines of net job creation (as suggested by Neumark, Wall, and Zhang 2011 for the United States), there is possibly a role for public support because of the presence of market failures. Small businesses are likely to face greater barriers than larger businesses because of more limited access to finance or capacity to deal with burdensome regulations. However, even in the United States, the typical small business is engaged in low-growth entrepreneurship, does not necessarily represent an engine of employment creation, and has no intention to grow (Hurst and Pugsley 2011). Thus, targeting small business as the sole criteria of entrepreneurship programs may involve substantial inefficiencies. Moreover, even if some market failures are concentrated among small businesses, little is known about the type of policies that may be successful in promoting entrepreneurship; the few studies that attempt to scrutinize these types of interventions are inconclusive (box 2.2).

Recent studies have tried to distinguish between low-growth and high-growth entrepreneurs (see Gindling and Newhouse 2012; Fafchamps, Woodruff, and Yin 2013). In parallel, some studies have emphasized the important distinction between young and small firms as sources of growth. Most of the job-creating process among small businesses in the United States is accounted for by new entrants and young businesses (Haltiwanger, Jarmin, and Miranda 2013). In contrast, small mature businesses have on average negative net job creation. There is also considerable heterogeneity in terms of job creation within any definition of firm class. Haltiwanger (2011) shows that the typical small or median young business in the United States displays very low growth, but average growth is high for this group because a small fraction of firms are growing very rapidly.

LAC does not seem to be lagging tremendously behind in the creation of new businesses. However, the productivity performance of the region during the last decades has been very disappointing. Total factor productivity in the manufacturing sector has not increased since the 1970s, and it actually declined in some countries (Busso, Madrigal, and Pagés-Serra 2012). The combination of these two facts suggests that the problems of resource misallocation and inefficiencies may lie either in the nature (rather than the number) of the businesses created or in the postentry performance of firms. Chapter 3

BOX 2.2 Do training programs for entrepreneurs work?

The typical micro or small business in a developing country does not implement many of the business practices considered standard in the developed world. For this reason, entrepreneur training programs have become increasingly popular in the developing world. There has been little rigorous evidence of the impacts of these programs; when these evaluations have taken place they have encountered serious methodological challenges.

Several issues arise in assessing the studies. First, the impact of training is likely to depend on who receives the training. Second, the business training offered varies across studies substantially. McKenzie and Woodruff (2013) distinguish four strategies for participant selection among existing studies: classroom-based training offered by microfinance organizations or banks to their clients, training offered to firms in a particular industry or cluster, individual application to training as part of a competition, and training offered to a random subsample of a representative population of microenterprises.

It is hard to draw general conclusions from existing studies because of four fundamental challenges. First, the studies often lack statistical power: only 2 of the 15 studies have enough statistical power to safely yield conclusions. Second, most of the studies include only one follow-up interview and are very short run, looking at impacts after one year or less after the training. Third, attrition rates range from 6 percent to 28 percent. Their relation to business failure, disappointment with training effects, and location movements complicates inference. Fourth, sales and profits reported may not be true indicators of impact: training may simply reduce bookkeeping mistakes rather than improve actual outcomes.

Keeping these caveats in mind, a few tentative conclusions can be drawn. On the one hand, there is little evidence of a relationship between training and survival, with significant effects for three out of seven estimations and estimated impacts ranging from 6 percent to 9 percent for men. On the other hand, the evidence suggests that business training generates short-run impacts on start-up, with significant effects in three out of six estimations, ranging from 3 percent to 57 percent. However, it is unclear whether training merely speeds up or permanently increases the rate of entry, as the control group of one program seems to catch up after two years (de Mel and others 2012).

An important channel through which training may improve business outcomes is better business practices; almost all studies find a positive effect. Seven out of 9 estimations find significant effects, ranging from 3 percent to 203 percent. Although some of these effects seem large, however, in absolute terms they are low, because business practices at baseline are very weak (less than 30 percent of firms keep records in most cases).

Another relevant outcome is the increase in profits after training. Only two of seven studies find significant effects on profits, with effects of 24 percent and 43 percent on female participants. There is also little evidence of employment creation, with just 1 in 20 trained entrepreneurs hiring an additional worker.

Five issues need better answers before governments start implementing large-scale interventions:

- Studies have not been able to say who benefits most from these programs. In theory, it would be optimal to target firms where management skills represent a constraint on growth, but identifying those firms is a complicated endeavor. It is still unclear through which channels training affects business outcomes.
- How do markets and the competition react to newly trained firms?
- The short-run scope of existing studies prevents extracting lessons in the long-run. Are there any market constraints preventing firms from accessing helpful training programs by themselves?
- What is the effect of attitudes and personalities of business owners on performance?
- Can people be turned into entrepreneurs?

characterizes the behavior of incumbent firms and their degree of entrepreneurship. The next few paragraphs describe some of the most salient stylized facts of business dynamics in the region.

Eslava and Haltiwanger (2013) analyze business dynamics in the formal manufacturing sector of Colombia, contrasting them when possible with similar data for the United States.[19] They find similar patterns

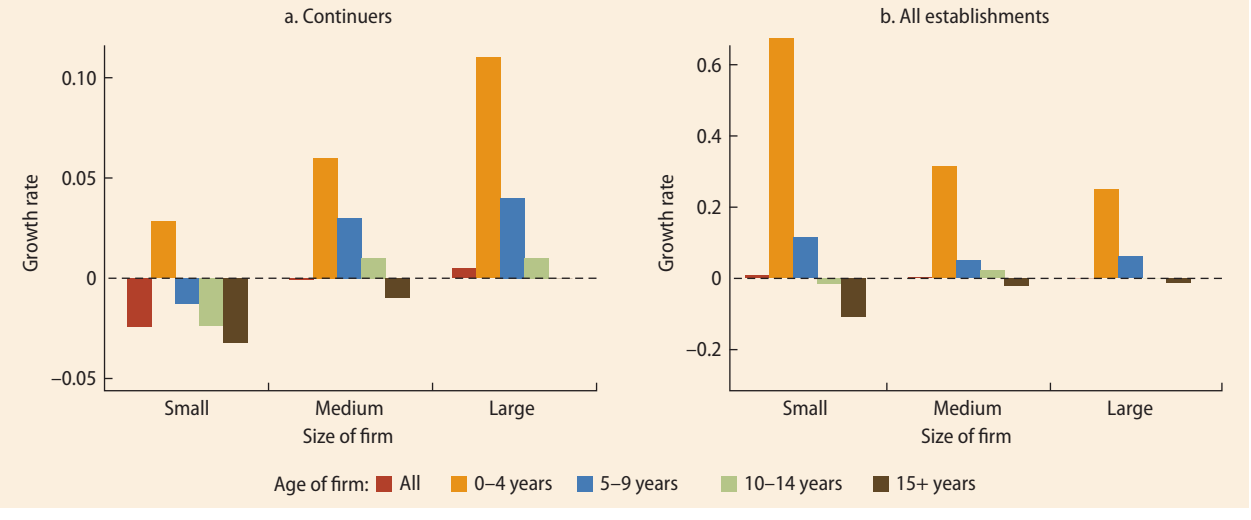
in the two countries. Figure 2.11, panel a, reveals the importance of the size versus the age of the plant for the generation of employment.[20] It separates plants into small, medium, and large based on their average employment levels in two consecutive periods and shows net employment creation for establishments of different ages.

Growth clearly increases with size and declines with age. However, the differences are much more marked along the age dimension. On average, young firms are net employment generators for all size classes, and average growth rates increase rapidly with size. The fastest-growing young establishments are the largest, a fact that appears to contradict the idea that most employment generation occurs among small firms. Moreover, and in line with evidence from the United States, small plants older than five years contract rather than grow.

This evidence does not imply that small firms are not important for growth. When the contribution of all firms (including new firms and firms that die) is considered, the picture changes dramatically (figure 2.11, panel b). The average growth rate of small plants up to four years old jumps from 4 percent to 53 percent.[21] Once entry and exit are considered, the fastest-growing establishments are small and young. Compared with the United States, younger Colombian firms appear "healthier": they exhibit stronger growth and are less likely to die. This evidence suggests that selection dynamics are stronger in the United States, where only the fittest firms are able to survive.

Even within relatively homogeneous size and age classes there is tremendous heterogeneity in growth rates across firms. Excluding entry and exit, it is always the case that the fastest-growing firms are among the youngest (figure 2.12). Employment by young gazelles—firms at the 90th percentile of the growth distribution—can increase by almost 50 percent in one year, even if they are already large. Across age classes, there is much more variation among top performers than among contracting firms (firms in the 10th percentile of the growth distribution). Smaller firms in the 10th percentile tend to decline faster than larger ones, with very little differences across age classes. When the additional impact of exits on employment growth is considered, it is also true that youngest firms are more likely to decline fastest.

FIGURE 2.11 Employment growth in Colombia, by firm size and age cohort

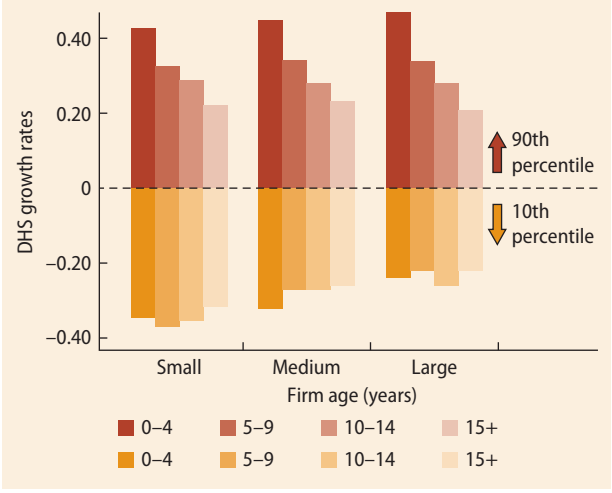


Source: Eslava and Haltiwanger 2013.
Note: Small: fewer than 50 employees; medium: 51–200 employees; large: more than 200 employees. Growth rates are defined as in Davis, Haltiwanger, and Schuh (1996); they are the change in employment between two consecutive periods divided by the average employment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

Young firms grow faster than mature firms in Colombia, even among the small fraction of gazelles. However, young establishments tend to be smaller. Does the growth of young establishments matter in terms of aggregate employment? The answer is a resounding yes. Table 2.2 shows the dynamics of Colombian manufacturing firms by birth cohort for 1994–2009. Firms that were 10 years or older in 1994 had shrunk in size by 2009. Indeed, if it were not for the creation of new firms, the Colombian manufacturing sector would have contracted considerably during the sample period.

In contrast to commonly held views, there is substantial mobility across establishments in the few LAC countries for which data are available. Table 2.3 shows transition matrixes for five years in Chile and Colombia across three establishment size classes: small (10–49 employees), medium (50–249 employees), and large (250 or more employees). There is substantial upward mobility in both countries: about a third of the medium and large firms in Chile (a fifth in Colombia) belonged to a smaller size class five years earlier. Downward mobility is very small in Chile (somewhat greater, at about 7 percent in Colombia), but the analysis does not consider the death and birth of firms. Upward mobility is even greater if only young firms in the base year are considered. Restricting the sample to establishments that were less than

FIGURE 2.12 Net employment growth rates by firms in Colombia, by establishment age and size, 1994–2009



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.

TABLE 2.2 Dynamics of manufacturing firms in Colombia

Plant's initial year of operation	Before 1970	1970–79	1980–84	1985–89	1990–94	1995–97	1998–2000	2001–03	2004–06	2007–09	Total
Total employment											
1994	316,612	139,428	80,396	73,248	26,377	—	—	—	—	—	636,061
1997	279,372	124,205	75,739	74,119	44,811	17,114	—	—	—	—	615,360
2000	222,464	102,478	63,371	64,540	43,868	20,669	8,297	—	—	—	525,687
2003	201,227	97,512	64,491	67,379	57,669	26,381	18,559	4,423	—	—	537,641
2006	215,886	106,163	69,771	78,947	68,357	37,073	25,226	12,544	3,182	—	617,149
2009	203,989	98,969	67,484	73,960	72,750	39,525	33,305	23,703	17,268	12,545	643,498
1994–2009	–112,623	–40,459	–12,912	712	46,373	39,525	33,305	23,703	17,268	12,545	7,437
Number of establishments											
1994	1,756	1,931	1,500	1,484	593	—	—	—	—	—	7,264
1997	1,643	1,891	1,511	1,585	1,032	375	—	—	—	—	8,037
2000	1,374	1,524	1,243	1,329	975	426	196	—	—	—	7,067
2003	1,212	1,375	1,104	1,271	1,051	521	388	138	—	—	7,060
2006	1,112	1,247	1,031	1,228	1,110	594	493	315	86	—	7,216
2009	1,029	1,114	968	1,235	1,286	740	794	693	596	373	8,828
1994–2009	–727	–817	–532	–249	693	740	794	693	596	373	1,564

Source: Eslava and Haltiwanger 2013.

TABLE 2.3 Five-year changes in size categories for establishments of different ages in Chile and Colombia

Country/size in year *t*	Size in year *t* + 4					
	Establishment of all ages			Establishments less than four years old in year *t*		
	Small	Medium	Large	Small	Medium	Large
Chile						
Small	96.0	28.0	2.0	96.0	31.0	1.0
Medium	4.0	71.0	33.0	4.0	68.0	38.0
Large	0	1.0	65.0	0	1.0	61.0
Colombia						
Small	92.6	19.3	0.6	94.8	38.5	6.4
Medium	7.1	74.4	18.8	5.1	58.1	35.0
Large	0.2	6.3	80.5	0.2	3.4	58.7

Sources: World Bank data for Chile; Eslava and Haltiwanger 2013 for Colombia.
Note: Small: 10–49 employees. Medium: 50–249 employees. Large: More than 250 employees.

four years old at baseline, some 38 percent of medium-size establishments in Chile (35 percent in Colombia) were large establishments five years later. This evidence shows dynamism across younger establishments in LAC, a feature that is consistent with the evidence for the United States reviewed above.

The detailed analysis presented so far leaves several questions open. How much of the observed patterns of firm dynamics can be generalized to the region? Ideally, one would like to trace firms in all countries over time to observe the contribution to total employment across birth cohorts. Unfortunately, such long panels of firms in the region are not easily available.

Firm dynamics can be examined across different birth cohorts in a large number of countries using Enterprise Surveys, however (see box 2.1 for a description of this data set). Although Enterprise Surveys are representative of a cross-section of firms at one point in time, they contain a key question that makes the analysis possible. Managers of the firms are asked "how many permanent full-time employees did this establishment employ when it started operations?" The question allows their current size to be compared with the size at the time of setting up the business.

Enterprise Surveys poll only formally registered firms. This sample is thus highly selective, including only those relatively successful firms that have formalized their businesses. Moreover, the question regarding initial size is ambiguous. If the firm started as an informal establishment, some managers may refer to the initial size as the size when the first full-time employee was hired, whereas others may refer to the size of the firm when it was formally registered. However, administrative data featuring long panels of firms yields similar results, providing some confirmation of the analysis of firm dynamics using this data set (box 2.3).

The relationship between age cohort and initial firm size is strong in LAC. Companies that were 30–39 years old in 2009 increased their initial size by a factor of eight over the 30- to 40-year period (figure 2.13). This performance is less impressive than that observed in high-income countries (where the multiplying factor exceeds 14) but better than in regions of similar levels of development. In EAP4, the relative size is close to seven; in ECA it barely exceeds 4. Note, however, that in ECA the firms created in the 1970s and 1980s were state firms, which underwent massive transformation in the 1990s during the transition to a market economy. But even if only the youngest cohorts are examined, LAC has a relative advantage in firm growth with respect to initial size.

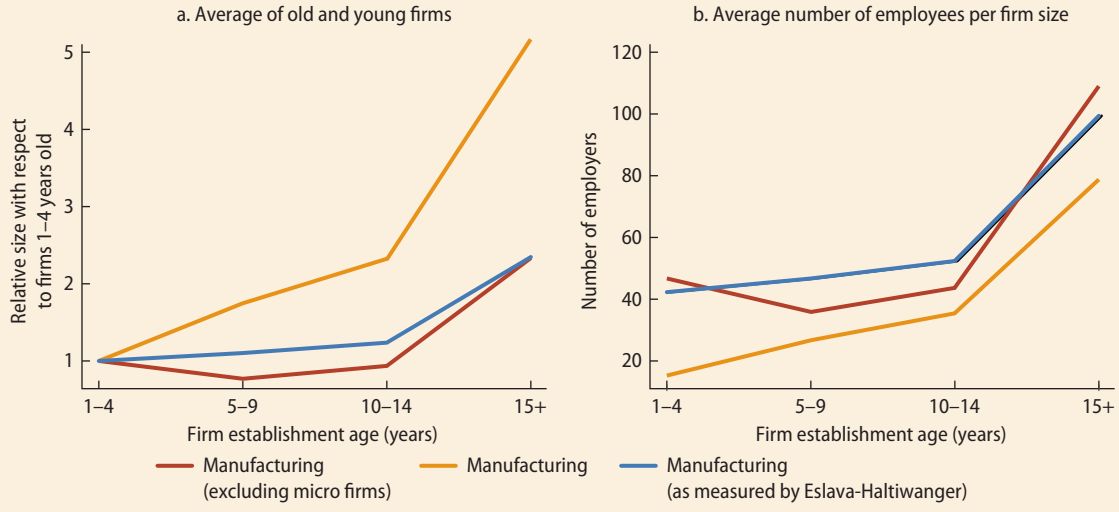
The impressive employment growth performance of LAC firms hides a fundamental

BOX 2.3 Comparing firm size across age cohorts in Colombia using Enterprise Surveys and administrative data

In an attempt to provide some external validity to the Enterprise Surveys, we compared the differences in firm size across age cohorts in Colombia from the Enterprise Surveys with the differences Eslava and Haltiwanger (2013) document based on a universal establishment registry. The data in Eslava and Haltiwanger cover only the manufacturing sector; refer to plants, not firms; and have a different size threshold from the Enterprise Surveys (more than 10 employees rather than more than 4 employees). The picture that emerges from the Enterprise Surveys restricted to the manufacturing sector is significantly different. Firms in the Enterprise Surveys are five times larger at age 15 or more than at age 1–5. In contrast, Eslava and Haltiwanger find that the size of these firms barely doubled. However, if the sample in the Enterprise Surveys is restricted to eliminate firms with 5–10 employees, a virtually identical picture of the size structure across ages emerges from the two sources.

The impact of eliminating very small firms from the sample is clearly observed in panel b of figure B2.3.1. The average firm size for age category 1–4 is below 20 when the smallest firms are included in the sample; it more than doubles when firms in the 5–9 category are dropped.

FIGURE B2.3.1 Employment in establishments in Colombia, by age of establishment

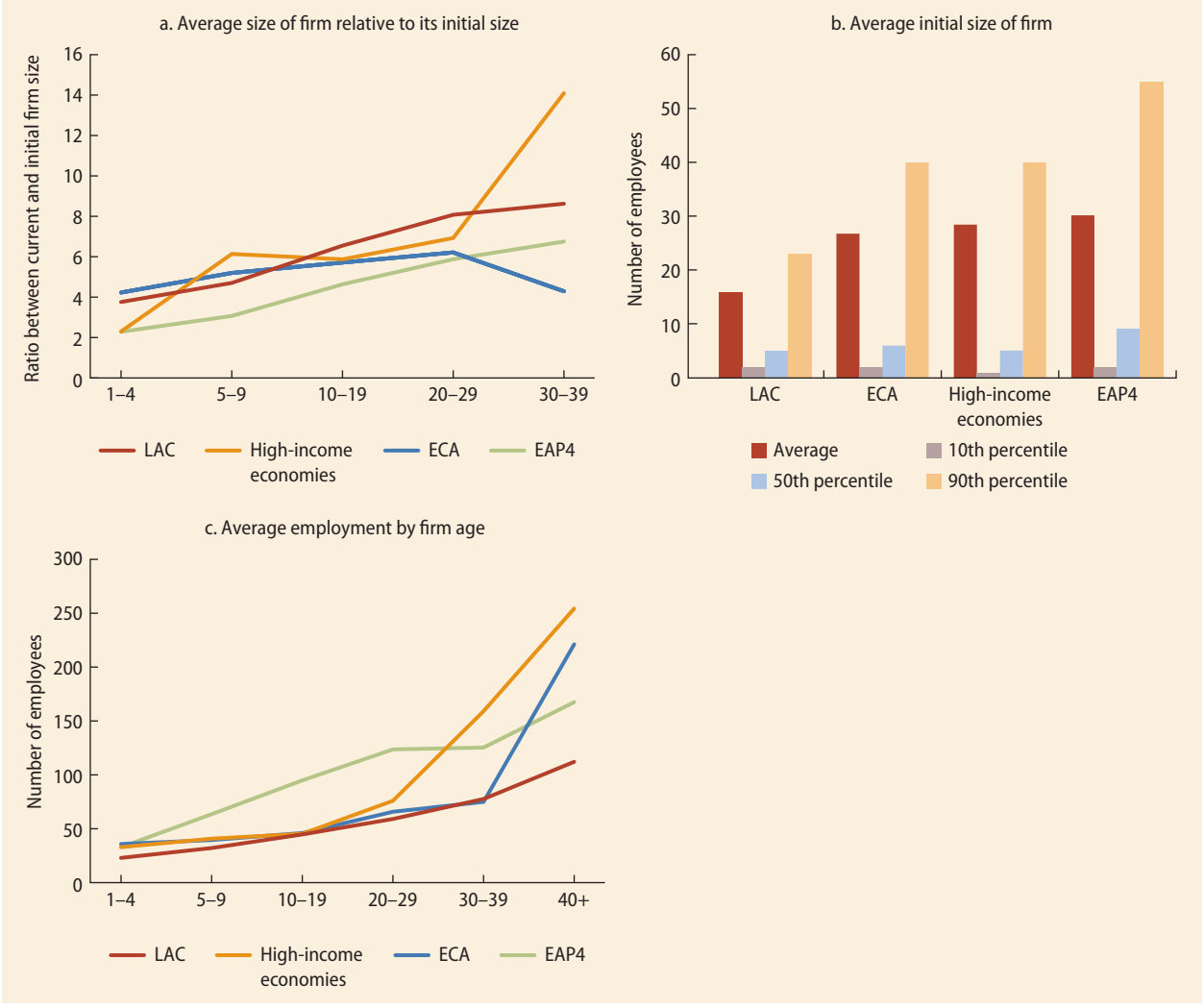


Source: World Bank, based on Eslava and Haltiwanger 2013.

weakness, however. At the time of creation LAC firms are smaller than in any other country group. The gap in initial firm size is not obvious for the average firm; rather, LAC seems to be lacking top performers. The median firm size at the start of operations in LAC is five employees, very much in line with ECA and high-income countries. However, the typical LAC firm at the 90 percent percentile barely reaches 25 employees, as opposed to 40 in ECA and high-income countries and almost 55 in EAP4 (panel b of figure 2.13).

The imbalance in initial firm size is such that LAC firms never catch up in size with firms from other regions. LAC firms that are 40 years old or older are on average half

FIGURE 2.13 **Firm size in Latin America and the Caribbean, by age of firm, 2006–10**



Source: World Bank, based on data from World Bank Enterprise Surveys.
Note: The last survey available for each country or economy was used. Each country or economy has the same weight in the regional average. Size at birth above 10,000 employees was replaced by "missing." For countries and economies included in each group, see note 11.

the size of firms in similar age cohorts from high-income countries or countries in ECA countries (panel b of figure 2.12). The size gap is also notable in comparison with EAP4. Even within the cohort of firms 10–19 years old, firms in EAP4 are twice the size of LAC firms, at 100 employees on average versus 50.

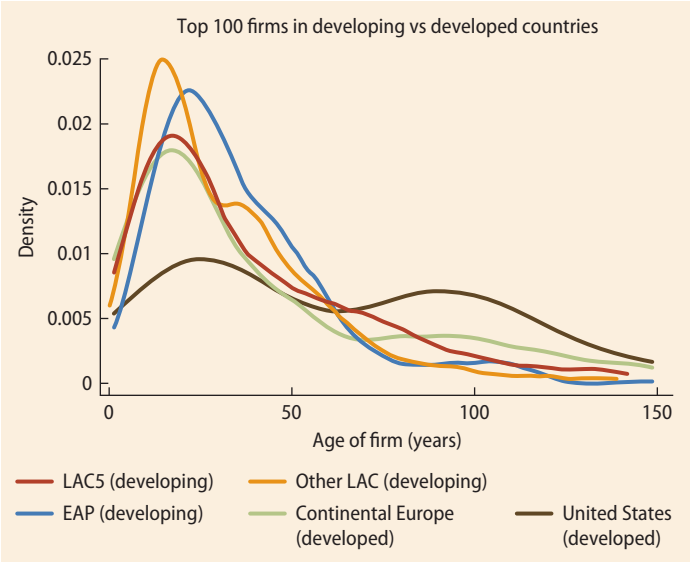
The finding of rapid growth of LAC firms may seem to contradict a recent study by Hsieh and Klenow (2012) for Mexico. They report an average firm size of merely two times the initial size after 40 years of operation. Differences in sampling frames between the Enterprise Surveys and the Mexican data used by these authors are likely to be the main factor behind these differences. The Hsieh and Klenow data set includes all firms, formal or informal, except street vendors. These micro firms were included in Hsieh and Klenow but excluded from the Enterprise Surveys. Most of them have no employees and are very unlikely to grow.

The high selectivity of the Enterprise Surveys sample is clearly observed in the reported initial firm size of five employees. Analysis of the Gallup data suggest that even among formal business owners, the median number of employees is 0. The implication is that there is a subset of firms in LAC that are highly dynamic. They start small in comparison with similar firms in other parts of the world but grow relatively quickly. However, these firms represent a small subset of the economy. The vast majority of LAC firms start small and never cross the size threshold of five employees to be considered in the sampling frame of the Enterprise Survey.

A final piece of evidence supporting the relative dynamism of good markets in the region is obtained by examining the age distributions of firms in different parts of the world (figure 2.14). The Orbis data (see box 2.1) were used to plot the size distribution of the 100 largest firms in terms of revenue in different regions, including LAC5, Other LAC, EAP4, Continental Europe, and the United States. If the largest firms in LAC are public sector companies that later privatized but still benefit from a position of dominance in the market, one would expect to observe that the largest firms are relatively old. In contrast, if the privatization of the 1990s resulted in a cleansing effect, killing unproductive firms and giving birth to a new entrepreneurial class, the age distribution should be tilted toward the relatively young. The problem is determining the right benchmark for comparison. Some top U.S. firms have had a remarkable ability to reinvent themselves: some companies date as far back as the early 1800s (Siegel 2007). Something similar is likely to have happened in Europe. Perhaps for this reason, the most interesting comparison is with EAP4. LAC firms are on average younger than firms in EAP4. In particular, both Other LAC and LAC5 have relatively large numbers of large firms that are very young (for example, less than 30 years old) and have a long tail, including some firms that are 100 years old or older.

The analysis so far provides a mixed picture. The formal sector in LAC is relatively dynamic. The rate of firm creation is somewhat lower than expected, but the share of formal businesses is larger than in other regions of similar levels of development. However, the share of informal business owners is also relatively large. These two set of facts mesh when one observes that formal sector firms in LAC tend to be smaller than firms in other parts of the world. Even firms that manage to grow and generate significant numbers of jobs are substantially smaller than in EAP4 or ECA. The last section examines whether this bias toward small firms is dictated by the environment in which LAC firms operate or is instead more deeply rooted in cultural and historical factors.

FIGURE 2.14 Age distribution of top 100 firms in selected country groups



Source: World Bank, based on data from Orbis.
Note: The distribution includes all firms within a region for which data were available. EAP (East Asia and Pacific): Indonesia, Malaysia, the Philippines, and Thailand. Continental Europe: Belgium, France, Germany, Italy, the Netherlands, and Spain. For countries included in LAC5 and Other LAC, see note 11.

What is hindering high-growth entrepreneurship: Culture, institutions, or the environment?

Is LAC missing truly innovative entrepreneurs? Firms in the region are small given the level of development, limiting employment opportunities, creating too few good-paying jobs, and contributing to the flourishing

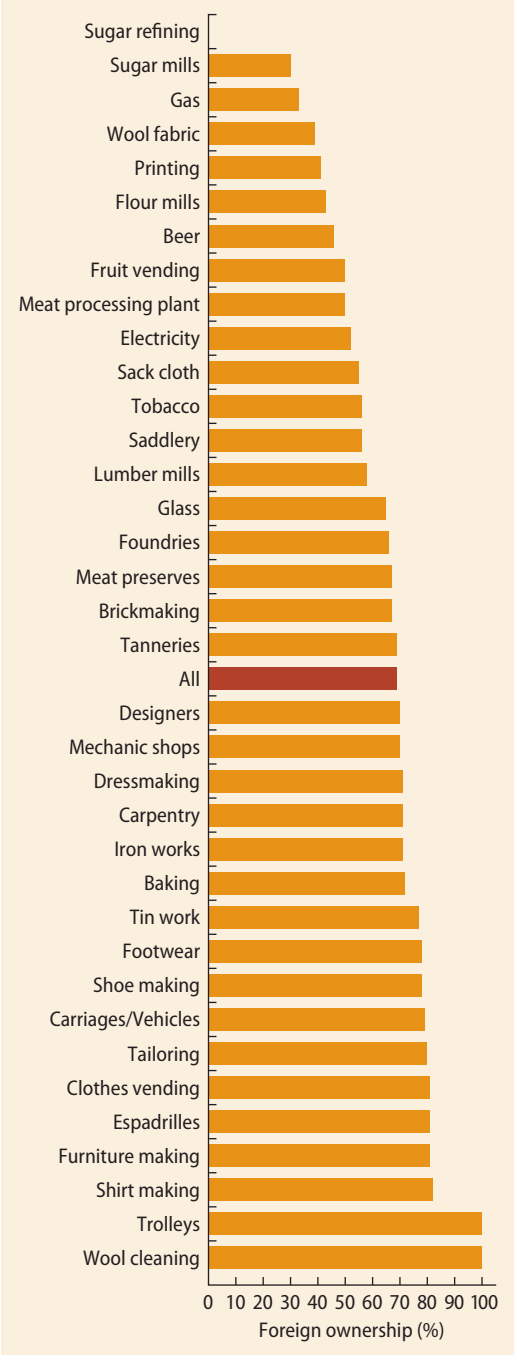
of low-growth firms and self-employment. These facts may point to an environment that is not business friendly; they may also be signs of insufficient entrepreneurial zeal. The two hypotheses may be connected, as an environment that is less favorable to innovation and high-growth entrepreneurship is likely to push potential employees into less dynamic forms of entrepreneurship or even outside the market (through migration, for instance).

One way to shed light on these questions is to look back at history. At the beginning of the 20th century, insufficient entrepreneurial spirit reflected the institutions and attitudes toward entrepreneurship inherited from Spain on the one hand, and the lack of techno-literacy and knowledge among the native population on the other (Maloney 2012). Foreign-born entrepreneurs were in charge of the vast majority of businesses in the Americas. Indeed, census data for 1910 in Argentina show that 7 out of 10 businesses registered in Argentina were owned by foreigners.

The influence of foreign-born ownership in Argentina was heavily tilted toward sectors that were more technologically advanced, including trolleys (100 percent foreign presence), carriages and other vehicles (79 percent), iron works (71 percent), mechanic shops (70 percent), and lumber mills (58 percent) (figure 2.15). Although foreign presence was also very important in some sectors that are arguably less technologically advanced (for example, baking and cloth vending), in general it was less important in some of the more traditional sectors, such as sugar milling (30 percent), wool production (39 percent), flour milling (43 percent), and beer production (46 percent).

The tremendous presence of foreign-born individuals in the productive network of Argentina is naturally influenced by the large influx of migrants there. However, foreign-born residents own a large share of businesses even in countries with smaller shares of migrants. In 1888 in Barranquilla, the major center of economic activity in Colombia at the time, some 64 percent of establishments

FIGURE 2.15 Share of business establishments in Argentina owned by foreigners, 1910



Source: Maloney 2012.

were owned by people born abroad (Maloney 2012). In Mexico in 1935, the share of establishments directed by people born abroad was 35 percent, while some 90 percent of the workers in the same sectors were Mexican. Spaniards dominate the foreign-born presence among the number of directors (16 percent), followed by people born in the United States (3 percent) and in Germany, France, Poland, and the Russian Federation (2 percent each).

This evidence suggests that people from LAC were not particularly prone to entrepreneurial activities at the turn of the century. If this tendency reflected cultural traits or deficits in human capital that were strongly persistent, it could explain the bias toward low-growth entrepreneurial firms in the region.[22] The perception of insufficient entrepreneurial drive among locals is behind innovative programs that try to attract foreign entrepreneurs (box 2.4).

Cross-country heterogeneity in local conditions such as access to credit, barriers to entry, and attitudes of institutions toward entrepreneurship make it difficult to draw causal relationships about why on average people from some countries are more likely than people from other countries to become entrepreneurs. It is almost impossible to isolate the role of the environment from the role of innate entrepreneurial ability or predisposition from cross-country comparisons. One possible albeit imperfect way to do so is to compare immigrants from different countries in a particular country.

Messina, Özden, and Sarzosa (2013) study differences across countries of origin in the

BOX 2.4 Importing entrepreneurs: Start-Up Chile

In August 2010, the Chilean economic development agency, CORFO, launched an innovative initiative with the aim of enhancing the country's competitiveness through technology, innovation, and entrepreneurship. The program, Start-Up Chile, aims to create a new entrepreneurial environment by enhancing international connections and removing the barriers faced by entrepreneurs: limited access to credit, low adoption of new technologies, and the lack of international customers.

Early-stage, high-potential entrepreneurs received seed capital of $40,000, which they had to match with at least $4,000 of their own resources.

Entrepreneurs were approved in an admission process conducted by Silicon Valley experts and a Chilean innovation board.

The truly innovative aspect of the initiative is that the program targets foreign entrepreneurs or Chileans developing projects abroad. Entrepreneurs are required to spend at least six months in Chile, where a variety of facilities, including a one-year visa, social security, a bank account, and a workplace with wireless Internet, are provided.

The pilot launched a modest 22 start-ups from 14 countries. By June 2012, 323 start-ups had been hosted; more than $8 million had been raised from investors in the United States, Argentina, and Mexico; and projects had achieved sales of $550,000 and employed 228 people. The goal is to reach 1,000 projects by 2014.

The program also created a network of entrepreneurs. Through the online platform Meetups, Start-Up Chile entrepreneurs and local interested parties can meet to share experiences and challenges. This part of the program is intended to promote entrepreneurial activity and contribute to changing the culture in the local environment.

Critics of the program complain about the bureaucracy of the reimbursement process and the lack of commitment of certain participants, highlighting problems with the selection process. The program needs to define its long-term goals and a method for measuring results. Although it is too early to assess the impact on economic activity, this initiative reveals the increasing interest of governments in attracting the most promising entrepreneurs to their countries.

Source: Applegate and others 2012.

entrepreneurial experiences of migrants to the United States. The main advantage of looking at migrants in one country is that they share the same economic environment. Perhaps the most important limitation is that migration is not a random phenomenon. A combination of factors, including the socioeconomic situation at home and expected prospects after migration, determines the decision to migrate. If such selection were similar across countries, one could compare differences in entrepreneurship across migrants from different birth countries and draw conclusions about differences in entrepreneurial drive. In fact, these factors differ across migrant groups. Indian migrants in the United States tend to be highly educated, even more so than natives, whereas migrants from Mexico and El Salvador have, on average, less education than U.S. natives. The year of migration also differs across groups, and the moment of arrival is likely to influence the entrepreneurial experience. The costs of migration are likely to be different as well, with geographical proximity reducing such costs. Some of these differences can be accounted for by controlling for observable characteristics of migrants and the year of migration.

Another complication is that the destination of migrants within the recipient country is not random. Migrants from different origins tend to cluster in geographical enclaves, and the characteristics of each of these geographical areas, including the entrepreneurial environment, are likely to differ. Indeed, in a pioneering study, Borjas (1986) finds that part of the migrant/native gap in self-employment rates reflects "enclave" effects.[23]

The final challenge to studying entrepreneurship among migrants in the United States is related to the difficulties in separating high- and low-growth-potential entrepreneurship. Messina, Özden, and Sarzosa (2013) employ a fundamental dimension that distinguishes the two forms of entrepreneurship: their capacity to generate employment. Transformational entrepreneurs by and large run larger firms than low-growth entrepreneurs and hence generate more jobs. According to the Current Population Survey (CPS), conducted by the U.S. Bureau of Labor Statistics, about 30 percent of self-employed people with incorporated businesses had firms with more than 10 employees; in contrast, only 1 percent of unincorporated businesses did so. Hence, the proxy for transformational entrepreneurship used in the analysis is the incorporation of the business.

Figure 2.16 shows differences across countries of origin in the self-employment rates of migrants in the United States after controlling for differences in education, age, and year of arrival. Results for men are examined, in order to avoid dealing with problems associated with self-selection into participation in the labor market. As expected, most migrants have a lower likelihood of being self-employed than non-Hispanic U.S. natives, but very interesting differences across region of origin emerge.[24]

With the exception of Spanish-speaking Caribbeans, people from LAC appear to be less entrepreneurial than migrants from other regions. The least entrepreneurial among migrants are Mexicans, closely followed by migrants from Central America and non-Spanish-speaking Caribbean islands. Migrants from South America do somewhat better, about as well as migrants from East Asia and the Anglo-Saxon countries (Australia, Ireland, New Zealand, and the United Kingdom). The estimated effects are large. Being of Mexican origin reduces the likelihood of being self-employed by almost 70 percent with respect to being a U.S. native (from 14 percent to 4 percent).

The gap between Latin American migrants and U.S. natives is much larger among self-employed people with incorporated businesses, although differences by region of origin are stable across classifications. Among Mexican immigrants, the gap with respect to non-Hispanic U.S. natives is almost 4 percentage points, which suggests the virtual nonexistence of Mexicans within this type of entrepreneurial activity, as the share of white U.S. natives that have incorporated businesses is about 4 percent.

FIGURE 2.16 Entrepreneurship among immigrants and natives in the United States, by type of business and country

Source: Adapted from Messina, Özden, and Sarzosa 2013.
Note: Figure shows the marginal effects of country of origin grouped by region for a 35-year-old male migrant with secondary education who immigrated between 1992 and 1996 and is observed in the period 2001–04 (that is, 5–12 years after arrival in the United States). The baseline category is U.S. non-Hispanic natives. These estimates are obtained from logit regressions (panel a) and multinomial logits (panels b and c) in specifications that control for age, age squared, educational attainment, the log of number of years since arrival in the United States, sector dummies, a citizenship dummy, and country of origin dummies. Points represent the marginal effect for each group. Bars represent the 95 confidence interval. Red points are migrants from Latin America and the Caribbean (LAC).

The large gap among LAC migrants in the share of incorporated businesses in the United States may reflect difficulties in accessing credit and other market imperfections that are more likely to affect migrants than U.S. natives (although such difficulties are likely to be similar across migrants of different origin). If this were the case, one would expect the gap to shrink as the immigrant spends time in the host country and assimilates. This hypothesis is examined by looking at the gap in businesses owned by immigrants from different regions over time.

Across most regions of origin, the gap in not incorporated self-employment with respect to non-Hispanic natives dissipates

FIGURE 2.17 Marginal effects of years in United States on entrepreneurship gap between migrant and nonmigrant white men, by cohort of arrival and region

Source: Messina, Özden, and Sarzosa 2013.
Note: Each line represents the marginal effects of years in the United States for each cohort of immigrants. Estimates are obtained from multinomial logits in specifications that control for age, age squared, educational attainment, the log of number of years since arrival in the United States, sector dummy, a citizenship dummy, and countries-of-origin dummies. The marginal effects are obtained for a male migrant with secondary education.

after 15–17 years in the United States (figure 2.17). In contrast, the gap in incorporated businesses persists among migrants from many regions, although there is some convergence after 15 years for some regions outside LAC. Convergence occurs for migrants from South Asia (panel b) but not among Mexicans (panel a), non-Spanish-speaking Caribbeans (panel c), or Central Americans (panel d).

LAC migrants thus catch up with non-Hispanic natives in the type of self-employment they are used to at home—namely, small-scale self-employment. But just like at home, they have a harder time engaging in the dynamic activities that have high employment-generation potential.

Notes

1. These statistics are averages of household surveys from Argentina, Chile, Colombia, the Dominican Republic, Ecuador, El Salvador, Mexico, Panama, Peru, and Paraguay in 2009–10. The samples were restricted to workers ages 25–60 who worked more than 30 hours in the reference week (SEDLAC).
2. Some of the most successful entrepreneurs in the region are probably not captured by the household surveys, which tend to underrepresent the upper tail of the income distribution.
3. Poschke (2013a) argues that a firm's productivity is an increasing and convex function of the ability of the entrepreneur who runs it—that is, both the level of productivity and the

rate at which productivity increases are positively associated with ability.

4. See, for instance, Boeri and Jimeno (2005) for a rationale of size-related employment protection in Italy and an analysis of its impact on the labor market.
5. Jovanovic (1994) provides a very rich treatment of the occupational choice between entrepreneurship and wage work. In this model, entrepreneurs are concentrated among high-ability individuals. In contrast, the simple framework presented here highlights the coexistence of two critical masses of entrepreneurs at the extremes of the ability distribution.
6. For simplicity and comparability across surveys, and unless otherwise stated in the text, the self-employed are assumed not to have paid employees, although in the data some self-employed run small firms. On average in Latin America and the Caribbean, about 14 percent of self-employed people had at least one employee in 2009.
7. These 73 countries represent two-thirds of the population of the developing world. Data sources vary by country. They are harmonized microlevel household surveys collected by the Development Economics Group (DEC) of the World Bank in the International Income Distribution Database (I2D2). See Gindling and Newhouse (2012) for details.
8. Loayza and Rigolini (2011) provide a detailed treatment of the relationship between self-employment and GDP per capita.
9. For example, the share of self-employment in the United States fell by half between 1910 and 1990, from 16 percent to 8 percent of workers in the adult population (Fairlie and Meyer 1999).
10. In order to mitigate differences in the length of the schooling period across countries, we concentrate on the population in the age bracket 25–65.
11. Throughout this chapter 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* include 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 chapter varies according to data availability.
12. A perhaps more obvious explanation would be that entrepreneurs are a more heterogeneous group than salaried workers. Replication of the analysis with the residuals of a flexible Mincer regression that includes a second-order polynomial in age and education, a gender dummy, and their interactions results in residual wage distributions that still display substantially higher variance for both groups of entrepreneurs. It is not possible to rule out the possibility that such higher variance in earnings is the result of greater heterogeneity in unobservable characteristics (for example, ability).
13. Interviewers were instructed to ask if the businesses were registered with the relevant authorities and had a license or certificate.
14. For an account in an endogenous growth framework, see Aghion and Howitt (1992).
15. The procedures, time, and costs to start up a business refer to the requirements to register formally a limited liability company of small to medium size (10–50). Our entry data include all formal registrations. The costs to register smaller firms may be different from those captured by Doing Business. In addition, local authorities, such as authorities in charge of zoning laws and building permits, impose some potentially important restrictions on small entrepreneurs that the Doing Business indicators do not include. However, the costs reported by Doing Business are likely to be correlated with the overall costs to set up a business.
16. Administrative barriers to entrepreneurship in OECD countries refer to the regulatory framework in 2008, whereas in LAC the indicator was constructed in 2013. See Wölfl, Kozluk,

and Nicoletti (2009) for a description of the methodology.

17. The standard deviation of the costs of red tape declined by a factor of more than four—from 218 in 2004 to 48 in 2013—for the 151 countries for which data were available throughout the period.
18. Results are very similar if the yearly observations or period averages are used.
19. The data set covers Colombian manufacturing firms with more than 10 employees or annual production of more than about $100,000. The 10-employee threshold has implications for the study of business dynamics, as discussed in box 3.3 in chapter 3.
20. Although all of the analysis is based on establishments, the main patterns remain when firms are considered (see Eslava and Haltiwanger 2013 for details).
21. Growth rates in this section are defined as the difference in firm size between two consecutive periods divided by the average employment in the two periods. These growth rates, popularized by the work of Davis, Haltiwanger, and Schuh (1996), present two main advantages. First, they are symmetric for expansions and contractions, ranging in the interval [–2, +2]. Second, they allow the treatment of firm birth and death in the computation of the growth rate.
22. For an interesting discussion of the main personality traits entrepreneurs typically have, see CAF (2013).
23. There is little we could do to tackle this problem with the data we have. Hence, the results remain informative but present some limitations.
24. Migrants other than Mexicans were pooled by region of origin because the number of entrepreneurial migrants in the American Community Survey (U.S. Census) samples were not large enough for some countries in particular cohorts of arrival. Mexicans constitute a sufficiently large group to be considered separately.

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Entrepreneurship by Incumbent Firms: What Explains the Innovation Gap?

3

Latin America and the Caribbean suffers from an innovation gap. On average, its entrepreneurs introduce new products less frequently, invest less in research and development, and hold fewer patents than entrepreneurs in other regions; moreover, their management practices are far from global best practices. A deficit in human capital for innovation, lack of competition, and inadequate intellectual property rights may explain the region's underperformance.

Entry is only one dimension of entrepreneurship. To survive, firms must innovate. Incumbent firms can innovate by bringing new products into the market or by exploring new markets at home and abroad (*product innovation*). They can also improve their internal processes and management practices (*process innovation*). These innovations are usually invisible to the final consumer but may be even more important for surviving the test of the market than other innovations.

Innovations by incumbent firms are likely to be at least as important as entry rates for long-term economic growth and employment generation. This chapter reviews the innovative performance of firms in Latin American and the Caribbean (LAC) in terms of their propensity to introduce new products, change their internal processes in search of efficiency, invest in research and development (R&D), and receive patents.

The chapter moves away from traditional analyses of cutting-edge innovation in high-tech sectors (although it briefly reviews this area as well). It shows that, with the exception of a few top-performing firms (examined in chapters 4 and 5), the types of innovations that drive productivity growth in low- and middle-income countries differ from those that drive growth in high-income economies. Most firms in emerging markets engage in activities that lie far from the technological frontier; they innovate by adopting and adapting products and production processes that have already been tested in countries that are at the technology frontier (Grossman and Helpman 1991; Segerstrom 1991; Dutz 2007; Ayyagari, Demirgüc-Kunt, and Maksimovic 2011). Cutting-edge innovation tends to gradually become more important when firms in a country approach the world technology frontier (Acemoglu, Aghion, and Zilibotti 2006).

Overall, the evidence suggests that LAC firms tend to score toward the bottom end of the spectrum in product innovation. Firms in East Asia and Eastern Europe tend

to introduce new products more frequently, conduct more R&D, and obtain patents in the United States more often than do firms in LAC.

Assessing process innovation across countries is difficult because of data constraints. Fortunately, thanks to the emergence of a wave of management surveys that are comparable across countries, it is now possible to compare the quality of management practices across countries and assess their relationship with firm productivity. The picture that emerges suggests that much remains to be done in LAC on the process front as well. With a few exceptions, management processes (even by the relatively large firms that are included in the surveys) remain weak and are comparable to those of firms in China or India. Weak processes may not be the sole determinant of long-term firm productivity, but given LAC's labor costs, which are significantly higher than Asia's, poor management processes can hamper productivity.

After comparing innovation performance across regions, the chapter reviews factors that can potentially affect firms' innovative potential. The focus is on four factors that have been shown to affect innovation: regulations, competition, access to finance, and entrepreneurial skills. It also briefly reviews the extent to which policy makers can affect entrepreneurship and innovation by exploiting agglomerations and spatial spillovers.

Designing regulations requires balancing the protection of workers and consumers against the ability of firms to operate without unnecessary obstacles. The consensus on the historical evolution of the region's regulatory environment is that in the 1980s, policy distortions were excessively tilted against firms and protecting only a minority of formal workers. Some have argued that the regulatory environment was so onerous for private sector firms that ultimately workers and consumers were negatively affected rather than protected (de Soto 1989). Over the past 20 years, however, the region made regulatory reforms that improved the business environment substantially. It also substantially expanded social assistance for the poor, addressing to some extent the vulnerability concern caused by inflexible labor markets.

This progress notwithstanding, LAC countries still underperform their peers in some aspects, and regulation may still hamper firms' ability to innovate. Nevertheless, although some benefits may still be extracted from improving the regulatory framework, regulation may no longer be the most severe obstacle to unleashing the private sector's innovative potential.

The toughest challenge ahead may be to address other aspects of the regulatory environment, such as governance and uncompetitive practices. To be sure, the relationship between competition and innovation is complex. In sectors with increasing returns to scale, for instance, there is a strong rationale for allowing a single (well-regulated) monopolist to operate. And new research indicates that even in sectors with low returns to scale, "excess" competition can, at times, reduce firms' incentives to innovate (Aghion, Bloom, and others 2005). LAC is far from the tipping point at which excess competition may hurt innovation, however. Although there are serious technical challenges in measuring de facto competition, LAC shows a pattern consistent with a few actors grabbing a large share of the market and having little incentive to innovate. Overall, as discussed in chapter 6, the region exhibits high concentration both across and within markets: production remains less diversified than in other countries, and within sectors, especially in nontradable industries, a few firms dominate the market.

An important stream of research has documented the channels through which underdeveloped financial markets and insufficient or inefficient financial intermediation may hurt productivity and innovation (see de la Torre, Ize, and Schmukler 2012). This chapter focuses on early-stage financing, an aspect of financial intermediation supposedly designed for young, innovative firms. Using a new database that surveys the region's private equity deals, it shows that most deals are large and involve mature firms. Venture capital targets large firms in traditional sectors, and angel investors are missing in action.

Enterprise Survey data indicate that for both young and old firms, the region is probably not lagging other emerging markets in terms of firms' access to credit, however.

Regarding the human capital aspect of entrepreneurship, often referred to as "entrepreneurial skills," entrepreneurs' technical and managerial background has been found to increase firms' chances of success (Vivarelli 2012). Historical studies also find a positive association between densities of engineers at the beginning of the 20th century and long-term economic growth (Maloney and Valencia-Caicedo 2012). Our analysis suggests that the region is still lagging along this dimension. Although cross-country comparisons remain a challenge in this field, most LAC countries have smaller percentages of science and engineering graduates than do countries in Eastern Europe or East Asia. To some extent, many Latin American countries remain "rent-seeking societies," in the words of Murphy, Shleifer, and Vishny (1991).

The region also appears to have surprisingly few well-managed modern firms, as reflected by the poor quality of management practices in relatively large formal sector firms. The correlation between how good managers are, and how good they think they are, is also very weak. To the extent that management practices can be taught—and evidence suggests that they can—these findings leave room for public action.

The chapter ends by discussing an aspect of innovation policies that has always fascinated policy makers: the (alleged) ability to foster self-sustaining innovation clusters by exploiting geographic spillovers. Geographic spillovers do indeed substantially affect firms' incentives and ability to innovate. However, it is extremely difficult to generate self-sustaining innovation clusters ex novo. In experimenting with these risky (and costly) strategies, it is therefore extremely important to build on natural advantages, partner with the private sector, and ensure that exit strategies are well defined to avoid subsidizing failed attempts.

All these factors, and many others, affect innovation. But if one were to pick priorities for policy action, which would one choose? Overall, the competition and skills fronts seem most important in LAC. Greater competition generates pressure to innovate, but without the human capital to do so, the momentum will probably be lost. There is therefore a need to produce skilled managers and technicians who, by promoting innovation, may increase competition. By acting on these two fronts, governments may be able to sustain a virtuous cycle of innovation and competition. These issues are revisited in chapter 6.

Finally, we would like to make a pitch for more rigorous evaluations of entrepreneurship and innovation programs. These programs are plentiful in the region, as comprehensively reviewed by recent studies by the Inter-American Development Bank (Pagés-Serra 2010) and the Corporación Andina de Fomento (CAF 2013). Despite the substantial resources invested in these programs, there is a sense that few deliver economic benefits. This failure can be a consequence of an environment that may be hindering innovation, but it may also reflect poor program design. In addition to working on the broader constraints reviewed in this chapter, there is a need to better understand which programs work and which do not. Few rigorous evaluations of entrepreneurship and innovation programs have been conducted in the region. Only by improving the understanding of which programs are effective through more rigorous evaluations will it be possible to act effectively on both the micro- and macroeconomic fronts.

What drives innovation? A conceptual framework

Multiple factors drive innovation, often interacting in a complex manner. The fictional story of Javier, the winemaker introduced in chapter 1, can shed some light on the process. His story illustrates a conceptual framework about the difficult choices faced by entrepreneurs around the world—namely, whether and how much to invest in innovation.

Javier's dreams have no boundaries. He wants to take advantage of Mendoza's

high-altitude Malbec grape varietal and export his product to the ever-growing wine market in New York. He knows, however, that in order to indulge the refined palates of New York's wine connoisseurs he needs to improve the quality of the wine from his vineyards. His first wines were good for the price, but many competitors produce similar wines. If he wants to conquer the competitive U.S. market, he knows he needs to go one step further.

After talking to some of his friends in the wine business, Javier realizes that achieving his goal of producing a top-quality wine requires investments. The first is a fixed investment that will be spent regardless of whether the business plan works. Javier needs to conduct a detailed analysis of the vineyard's soil, the genetic characteristics of the fruit, and the blending process in order to have a better sense of the scope for quality improvements. Before producing a single bottle of his longed-for wine, Javier has to invest a significant sum of money.

Once he determines the feasibility of producing a higher-quality wine, his next step is to hire an experienced winemaker. Javier understands that hiring an internationally renowned expert would increase his chances of reaching his goal but would also significantly increase his costs. And there is a risk that he fails to achieve the desired quality of wine, which would mean not only that the wine will not be good enough to export but that the local market may also be lost, because of the increased costs of production. Failure would also mean that Javier loses his sunk-costs investment without a payoff.

After evaluating these options, Javier ponders his options. Should he settle for the quiet life of a small local wine producer, or should he incur the costs and run the risks required to pursue his dreams of becoming an international winemaker?

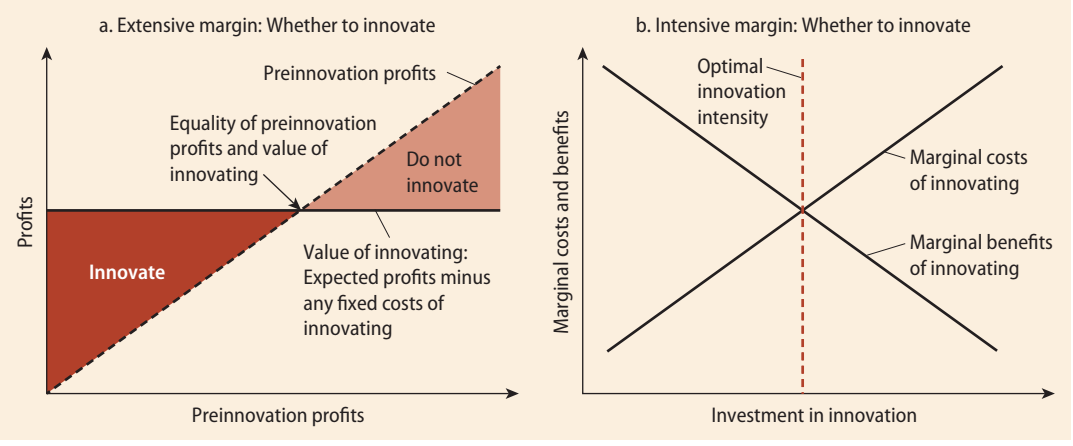
Javier's story illustrates the decision to innovate of almost any incumbent firm. Such firms are a major force behind the growth and innovation processes. In the United States, for instance, incumbent establishments account for almost 75 percent of average total factor productivity growth, and they are the main source of innovations that improve existing products (Bartelsman and Doms 2000; Foster, Haltiwanger, and Krizan 2001; Akcigit and Kerr 2010).

The first lesson from Javier's story is that there are two parts of the decision to innovate: whether to invest in innovation (the extensive margin of innovation) and, if so, how much (the intensive margin). Javier can continue to produce at the local scale or he can improve his production processes in order to export. Panel a of figure 3.1 analyzes this type of decision. The entrepreneur compares preinnovation profits with the value of innovating—expected profits less any initial fixed costs of engaging in innovation activities. Any factor influencing either preinnovation profits or the value of innovation may affect an entrepreneur's decisions to innovate. For instance, if the United States imposed import quotas on Argentine wines, the value of innovation would drop, and Javier might choose not to innovate.

The second aspect of the innovation decision—how much to spend on innovation—captures the amount of resources spent by a firm to improve its internal processes or products. The amount of the investment is likely associated with the probability of success. Panel b of figure 3.1 summarizes this choice. It illustrates that the entrepreneur has incentives to invest in innovation up to the point at which a small additional investment in innovation (that is, the marginal cost) equals the small additional gains that result from it (that is, the marginal benefit). Any factor affecting the marginal costs or benefits from innovation may change firms' innovation investments.

Thus far we have discussed the forces driving firms' innovation decisions without delving into the factors affecting these forces. What affects firms' profitability? How does a country's legal framework affect firms' incentives to innovate? Many factors affect the joint choices of whether to invest in innovation and how much to invest. The rest of this chapter focuses on a few of them, such as regulation, competition, or access to finance. Box 3.1 discusses others like risk, laws, or macroeconomic stability.

FIGURE 3.1 Extensive and intensive margins of innovation



Source: Adapted from Pienknagura 2013.

BOX 3.1 Risk, laws, macroeconomics, and the innovation gap in Latin America and the Caribbean

Our framework appears to be silent on the role of risk as an important constraint for innovative entrepreneurship, because it assumes that firms are risk neutral. However, uncertainty does play a role; it is hidden behind expected profits, which depend on the probability of being successful in the R&D process. To the extent that firms and entrepreneurs fear losses more than they value gains, risk can play an even larger role in driving the decision to innovate, as it reduces the value of innovation directly.

Risk is so embedded in everyday business practices that it is difficult to measure the full extent to which it affects innovation (chapter 6 briefly examines the risk of contracts being broken and the role of intellectual property rights). A few studies looking at the impacts of bankruptcy laws on innovation provide a glimpse into the ways in which risk can affect innovation. These studies tend to point toward a negative impact of harsh bankruptcy laws on the extensive margin of innovation (Armour and Cumming 2008; Acharya and Subramanian 2009; Primo and Green 2011). Lenient bankruptcy laws are associated with lower penalties if investments in innovation fail to bear fruit; they therefore reduce the expected fixed costs of innovation under the scenario in which the profits associated with an innovation do not materialize.

The relation between bankruptcy laws and innovation intensity has received much less attention in the literature. One of the few theoretical papers to argue that badly designed bankruptcy laws could hurt the intensive margin of innovation is Manso (2011). Bankruptcy laws can have two opposing effects on the intensive margin. On the one hand, lenient bankruptcy laws that limit the losses of a failed innovation could decrease incentives to invest in innovation, as the "punishment" factor is reduced (a downward shift of the marginal benefits curve in figure 3.1). On the other hand, limited liability may reduce the marginal cost of innovation, providing firms with an incentive to increase investments (this could be the case, for instance, if firms take loans to finance innovation, which will be repaid only if they are successful). The net effect therefore remains ambiguous a priori, which emphasizes the need to conduct empirical analyses.

The contractual environment in which entrepreneurs operate also affects the incentives to invest in innovation. Intellectual property rights, for instance, increase the expected profits from innovation investments. Risk caused by unexpected macroeconomic fluctuations can also hamper private sector investment (Servén 1998). LAC, however, enjoyed a period of relative macroeconomic calm during the years covered by the analyses in this chapter. It is therefore unlikely that the innovation gap documented in this chapter reflects macroeconomic volatility.

Regulations

Chapter 2 documented how poorly designed regulations may affect the entry of private sector firms into the marketplace. Regulations can also affect both the intensive and extensive margins of innovation investments. Regulations that increase the fixed costs of innovation, for instance, reduce the value of innovation, limiting the number of innovators and an economy's aggregate investments in innovation. Similarly, regulations that increase the cost of either capital or labor used for R&D, such as laboratory equipment or researchers, affect the marginal costs of innovation and thus the size of the optimal investment in innovation. This is not to say that all regulations are bad; regulation is needed to solve market failures, prevent unfair practices, and protect workers and consumers. But regulations may have impacts on innovation that need to be taken into account.

How regulation is implemented and enforced also matters.[1] Risk-averse firms may be better off knowing the rules with certainty—even if they are costly—than facing uncertainty. Higher uncertainty in the returns from innovation reduces the value of innovation, discouraging some firms from innovating.

Competition

Innovation decisions are tightly linked to profits, which depend crucially on the level of competition. The link between competition and innovation (or more generally productivity) has been central in the policy debate in developing countries for many decades. There are two opposing views regarding this relation. Less competition can provide incentives for entrepreneurs to invest in innovation. This view has led many to argue in favor of stronger patent protection as a way to boost incentives to innovate (see, for example, Romer 1990; Aghion and Bolton 1992). Such protection is equivalent to an increase in the value of innovation relative to the value of the status quo, which leads more firms to innovate.

Several studies have challenged this idea, providing evidence of a positive correlation between innovation and competition (Nickell 1996; Blundell, Griffith, and van Reenen 1999). The logic is that innovation may serve as a vehicle for escaping competition by providing the innovator with an edge over competitors (Aghion, Harris, and others 2001; Aghion, Bloom, and others 2005). In the example of Javier, an increase in the number of wine producers serving Mendoza's local market would reduce preinnovation profits, possibly putting pressure on Javier to improve the quality of his wine in order to export to New York or compete in a higher-quality niche market in Argentina.

These two views represent the extreme cases. Reality is probably more complex. Whether competition is good or bad for innovation needs to be assessed empirically, as done below.

Access to finance

The empirical literature has uncovered a strong association between financial development and growth (see King and Levine 1993; Beck, Levine, and Loayza 2000; and Rajan and Zingales 1998, to mention a few studies). From a theoretical standpoint, this positive correlation is consistent with the role played by financial intermediation in allowing firms to invest in growth-enhancing activities such as R&D (Aghion, Angeletos, and others 2010).

Financial development can positively affect innovation by decreasing the fixed and variable costs of innovation by reducing financing costs. Financial development can thus have a positive effect on innovation. In particular, deepening financial development may have large effects on innovation if it expands available credit to firms that were previously financially constrained.

Entrepreneurial skills

Entrepreneurial skills can affect both the number of innovations and the intensity of investment in innovation. To the extent that

entrepreneurial skills increase the ability to introduce new products or improve existing technologies, they raise the value of innovation and thus the likelihood of engaging in innovation activities.

Agglomeration and spatial spillovers

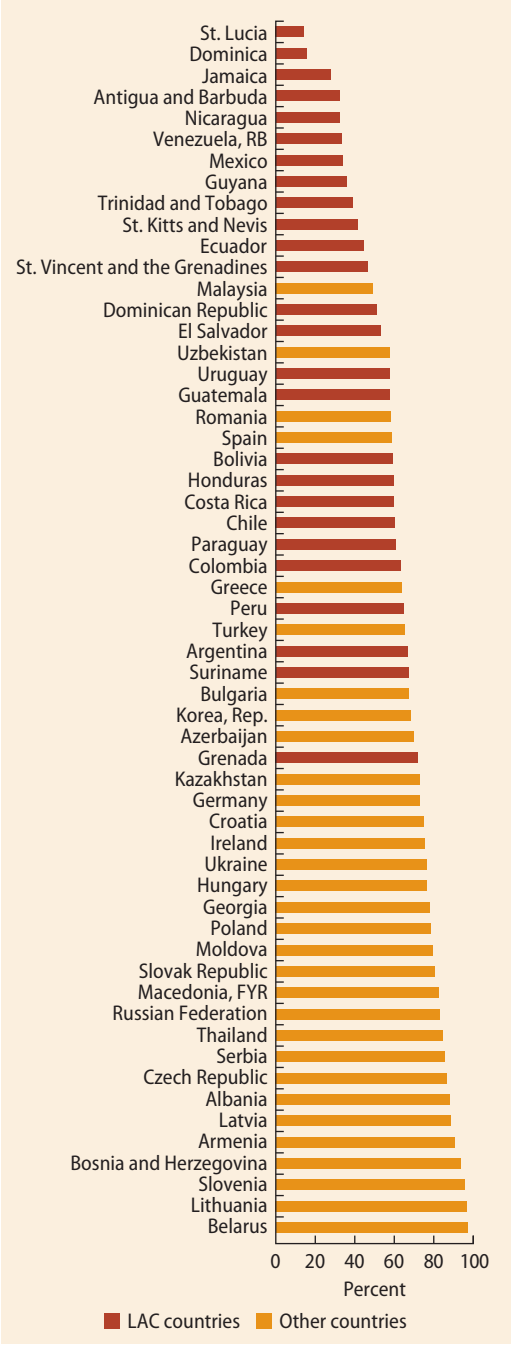
It is theoretically plausible that firms could upgrade their product mix and management practices without investing much of their own resources in innovation. Such an outcome could be possible if there are strong knowledge spillovers across firms, both within countries (through, for instance, agglomeration effects) and across countries (through international knowledge spillovers). The last section of this chapter briefly studies the potential of exploiting both domestic and international knowledge spillovers.

How innovative are firms in Latin America and the Caribbean?

LAC underwent substantial regulatory reforms in the past decade. These reforms improved firms' investment and employment decisions. As the next chapters document, the most successful firms managed to grow beyond their national boundaries to compete on the world scene. Nevertheless, although the success of companies such as Vale, Embraer, and CEMEX has been heralded, going beyond these top performers the picture is more nuanced. In fact, even some of these LAC giants may be underperforming relative to their peers (see chapters 4 and 5). Many formal firms in the region are engaged in some form of innovation, but in many cases the intensity and type of innovation may not increase much productivity.

Figure 3.2 shows the percentage of firms that developed or introduced a product that is new to the market (product innovation). With a few exceptions, Latin American firms tend to engage less in innovation than firms in other parts of the world. On average, firms in the region are 20 percent less likely to have introduced a new product than their counterparts in Eastern Europe and Central Asia

FIGURE 3.2 Percentage of firms in selected countries that introduced a new product in the past year



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

(ECA) or in high-income countries.[2] And the picture is even grimmer in the Caribbean, where the likelihood of introducing a new product is half that observed in ECA or high-income countries.

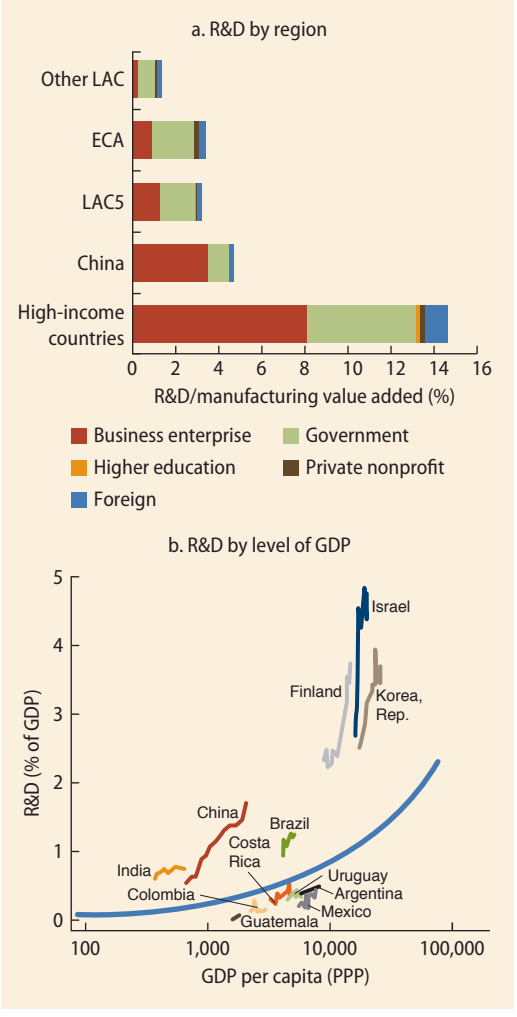
These raw numbers indicate the percentage of firms involved in innovation activities each year; they are uninformative about the quality and intensity of innovation, two factors strongly associated with firms' growth and productivity. Datasets exploring these fundamental factors at the level of the firm that are comparable across countries are of poor quality, but the few indicators available suggest that the quality of innovation in LAC may be as much of an obstacle to firms' growth and productivity as the quantity.

Figure 3.3 shows aggregate investment in R&D. Panel a compares average R&D as a percentage of value added in manufacturing (the sector where most R&D takes place) across regions. Panel b benchmarks R&D in LAC against the average of countries at similar stages of development.[3] On average, R&D investment in the five largest Latin American economies other than República Bolivariana de Venezuela is two-thirds the level of China when expressed as a percentage of manufacturing value added, and one-third when expressed as a percentage of gross domestic product (GDP).[4] For the remaining LAC countries, R&D investment is about one-third the Chinese level when expressed as a percentage of manufacturing value added and one-tenth when expressed as a percentage of GDP.

A second feature that distinguishes LAC from China and high-income countries is the preponderant role played by the public sector in R&D (Pagés-Serra 2010).[5] (This feature is also observed in Eastern Europe.) This is not to say that the public sector invests excessively in R&D: as a percentage of GDP, public sector R&D is lower than in China or high-income countries. Instead, it reflects the low level of private investment in innovation.

Many factors influence the extent to which lower levels of R&D are likely to translate into lower productivity and economic growth. But panel b of figure 3.3 shows

FIGURE 3.3 Average investment in research and development, by region and level of GDP, 2008–10



Sources: Panel a: World Bank, based on data from World Development Indicators and UIS. Panel b: Adapted from Lederman and Maloney 2003.
Note: For countries and economies included in each group, see note 2. GDP = gross domestic product. LAC = Latin America and the Caribbean. PPP = purchasing power parity. R&D = research and development.

that economies that experienced periods of sustained growth often had levels of R&D investments well above their peers. The low levels of R&D in LAC, and the fact that little R&D is conducted by the private sector, may represent a drag on productivity and growth in the medium term.

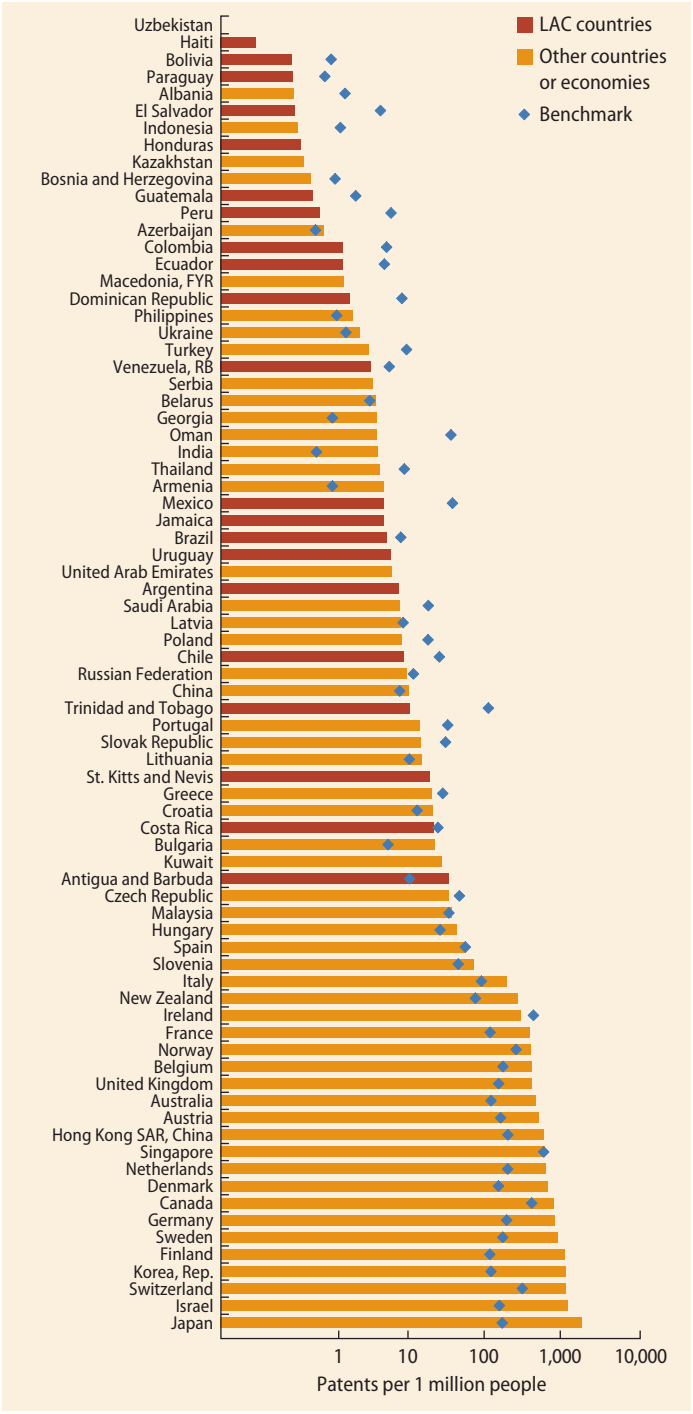
A similar picture emerges by looking at patents granted by the U.S. Patent and

Trademark Office (USPTO). Figure 3.4 shows the number of patents per million people that inventors from each country received from the USPTO between 2006 and 2010. It also displays the results of a multivariate regression analysis that shows where each country stands with respect to countries with similar levels of GDP, population, and exports to the United States.[6] Both comparisons suggest that patenting activity of most LAC countries remains low: no LAC country exhibits a level of patenting that equals that of a high-income country, and most countries have lower levels than their peers. Brazil, for instance, registered just 5 patents per million people between 2006 and 2010, half the number per capita of China (10) and only slightly less than a quarter the number per capita of Bulgaria (22).

Part of these differences can be explained by lower levels of income per capita and lower intensities of exports to the United States (which implies fewer incentives to apply for patents with the USPTO). As the benchmarking exercise shows, however, these structural factors do not fully account for the low patenting intensity of LAC firms. With very few exceptions, patenting intensity in most LAC countries falls well below the benchmark numbers. For example, given its GDP, population, and level of exports to the United States, Brazil is expected to register 1.5 times as many patents as were granted during 2006–10. For many countries in the region, the difference is even larger.

R&D and patenting are indicators of the intensity and quality of innovation, but they indicate only indirectly how firms perform in terms of process innovation. Until recently, comparable data across countries were scarce, which is unfortunate given the strong link between process innovation and productivity. In 2007, however, Bloom and van Reenen published a methodology that has since been applied to a large number of developed and developing countries. It assesses the quality of management practices, which are both an input and an outcome of process innovation (box 3.2).

FIGURE 3.4 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.

BOX 3.2 Management matters: How better practices could increase productivity in Latin America and the Caribbean

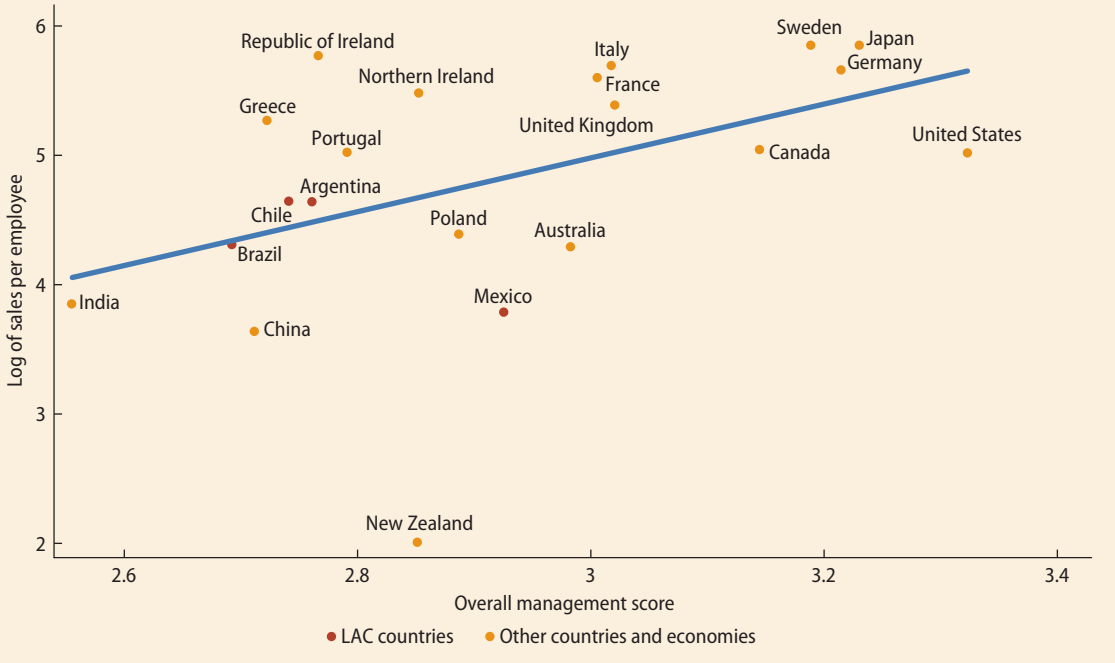
About half of per capita income and productivity differences across countries cannot be explained by the accumulation of factors of production such as labor and capital. How effectively these factors are combined accounts in part for the gap: the utilization and combination of factors of production requires a particular type of organizational capital management quality—something the literature has overlooked until recently.

Historically, the literature stressed the importance of management practices. Chandler (1990) and Lazonic (1990), for instance, argue that differences in management and organizational practices account for the United States overtaking the United Kingdom by the turn of the 20th century. Womack, Jones, and Roos (1990) see the organization of Japanese firms as critical to their growth miracle. Bertrand and Schoar (2003) focus on the impact of changing chief executive officers and chief financial officers in very large publicly traded U.S. firms (see also Bloom and van Reenen 2007).

Until recently, few studies focused on low- or middle-income countries. One reason for the dearth of work on management as a development issue is the absence of comparable cross-country data. Bloom and van Reenen (2007) surveyed manufacturing firms about management practices in the United States and Europe, a methodology that has been extended to four Latin American countries: Argentina, Brazil, Chile, and Mexico.

As expected, management quality appears significantly correlated with (average) labor productivity across countries (figure B3.2.1). But even within countries, management scores are correlated with firm-level productivity, growth, and survival. Although causality cannot be confidently assigned, the extreme heterogeneity of management quality suggests that significant gains in efficiency could result from increasing managerial quality, a dimension of human capital formation and firm behavior that should not be ignored.

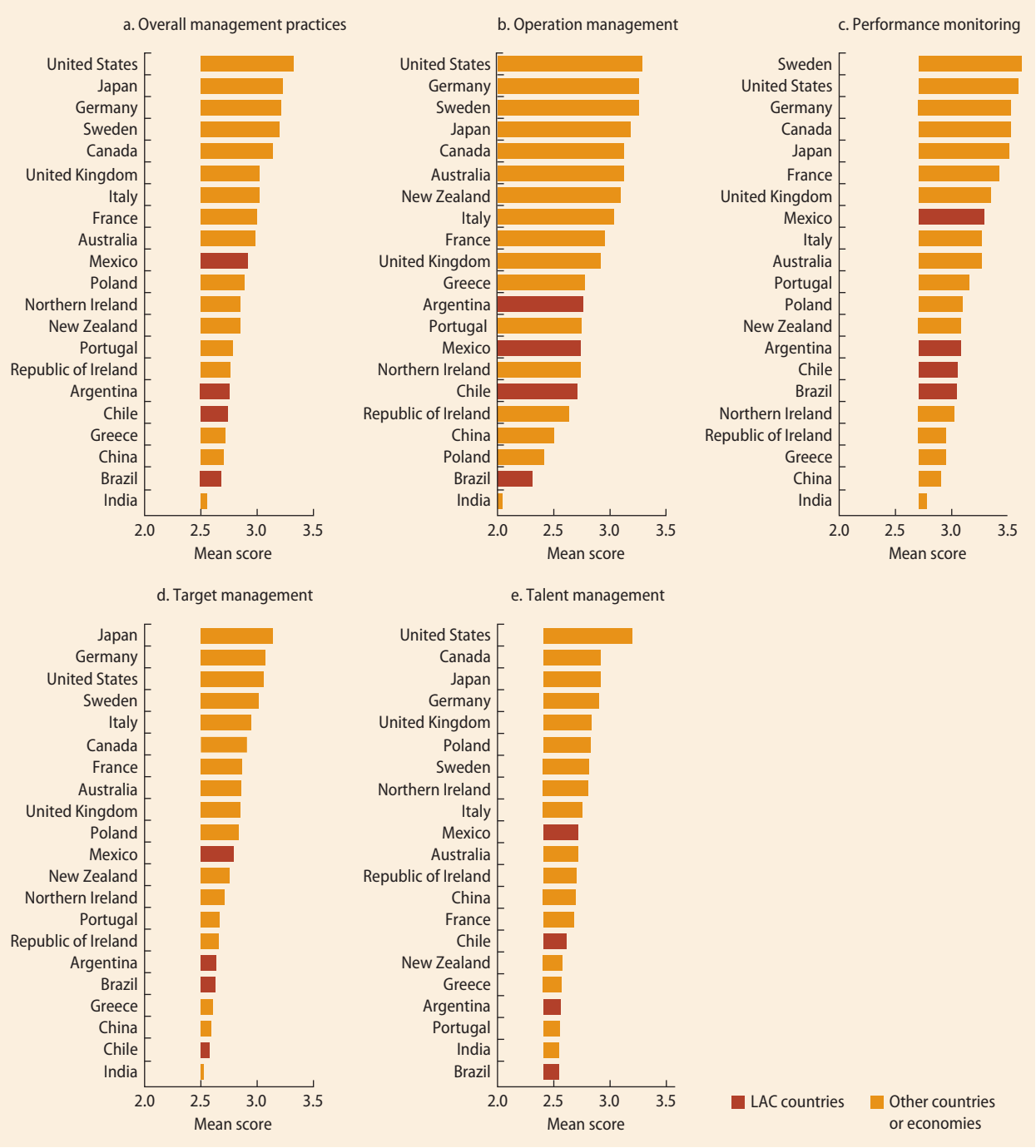
FIGURE B3.2.1 Correlation between management quality and productivity in selected countries and economies



Source: Maloney and Sarrias 2012, based on Bloom and van Reenen 2007.
Note: Samples are drawn from manufacturing firms with 100–5,000 employees. LAC = Latin America and the Caribbean.

Figure 3.5 compares management practices of manufacturing firms across different dimensions in LAC, high-income countries, China, and India (countries in which management surveys were conducted). With the exception of Mexico, Latin American countries score toward the bottom of the distribution: management practices remain

FIGURE 3.5 Management practices in selected countries or economies



Source: Maloney and Sarrias 2012.
Note: Samples are drawn from manufacturing firms with 100–5,000 employees. LAC = Latin America and the Caribbean.

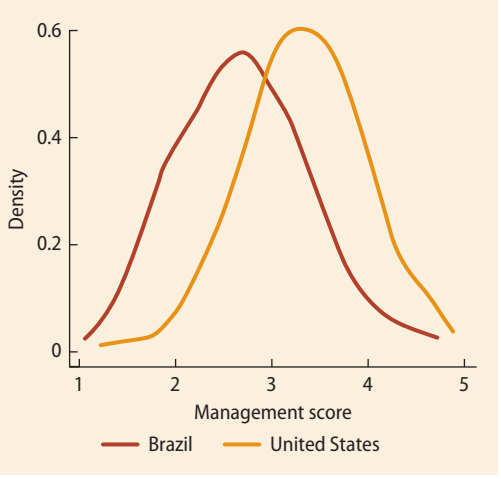
closer to the practices of Chinese and Indian firms than to firms in Germany, Japan, or the United States. Given that Latin American firms have higher labor costs than firms in China and India, management practices may pose a more severe constraint for labor productivity for them.

Maloney and Sarrias (2012) investigate the factors associated with the poor management practices of Latin American firms. Low average scores could be driven by a long, fat tail of underperforming firms that conceals good practices by top firms, but this does not appear to be the case. Figure 3.6 presents the distribution of management scores for Brazilian and U.S. firms. It shows that the whole distribution of Brazilian firms tends to underperform the distribution of their U.S. counterparts at all levels; very few Brazilian firms reach the management scores of top U.S. firms. Moreover, the actual distribution of management practices in Latin America is likely to be even weaker than the survey data indicate, because the survey covers firms with 100–5,000 employees, which should be better managed than the average firm.

Part of the "management gap" between the United States and Latin America can be explained by firm characteristics. In the United States, midsized firms have a larger share of employees with a college degree, are larger, and are more likely to be multinational corporations than firms in Latin America (table 3.1). The proportion of family-owned firms (which, on average, tend to be less well managed than publicly traded companies) is almost twice as large in Latin America (about 20 percent) as in the United States (about 10 percent). Furthermore, a large proportion of firms in Latin America are run by their founder (up to a third in Brazil).

These differences in firm characteristics account for a share of the management gap but not all of it. A decomposition exercise following the Machado-Mata (2005) methodology shows that median firm characteristics can explain at most a third of the

FIGURE 3.6 Distribution of overall management scores in Brazil and the United States



Source: Maloney and Sarrias 2012.
Note: Samples are drawn from manufacturing firms with 100–5,000 employees.

TABLE 3.1 Firm characteristics in Latin America, the United States, and China
(percent, except where indicated otherwise)

Firm characteristic	Argentina	Brazil	Chile	Mexico	United States	China
Number of employees	518	581	487	594	1,254	960
Employees with college degree	5	8	12	15	15	4
Output exported	22	14	30	38	17	48
Multinational	36	21	38	39	48	52
Family firms	21	23	19	19	12	5
Run by founder	21	32	14	19	8	29
Share of management gap with respect to United States explained by firm characteristics	28	37	13	3	n.a.	15
Share of management gap left unexplained	72	63	87	97	n.a.	85

Source: Maloney and Sarrias 2012.
Note: Samples are drawn from manufacturing firms with 100–5,000 employees. n.a. = Not applicable.

management gap between median firms in Latin America and the United States (bottom two rows of table 3.1). Moreover, in Mexico, where firm characteristics and the quality of management are closer to the United States', characteristics of the median firm do not appear to account at all for the management gap. To be sure, the survey probably missed important firm characteristics associated with the quality of management, increasing the unexplained component of the management gap. But given the results, it is unlikely that firm characteristics fully account for differences in the quality of management.

What explains the innovation gap?

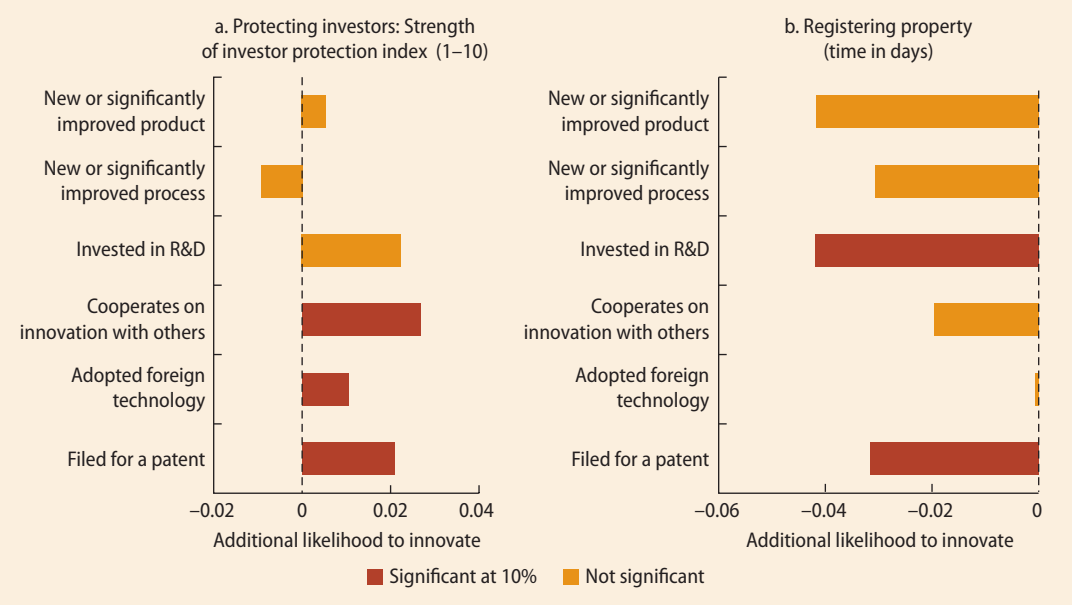
Many factors affect innovation, both directly and through their interaction with one another. There is probably no universal recipe for enhancing innovation, just as there is no single recipe for growth. But certain factors including regulations, competition, financial development, entrepreneurial skills, and agglomerations/externalities have repeatedly been shown to affect innovation. LAC is not likely to boost innovation without addressing these factors.

Regulation still matters—but less than in past decades

Early analyses—such as the work of de Soto (1989), Rauch (1991), Loayza (1996), and Johnson, Kaufmann, and Shleifer (1997)—spurred an important stream of research that aimed to understand and document the many ways in which poorly designed regulations affect entrepreneurial activity. Overall, most of these studies find a positive association between the quality of regulation, innovation, and economic growth (examples include Bassanini and Ernst 2002 and Djankov, McLiesh, and Ramalho 2006).

Figure 3.7 shows the association between the strength of investor protection and the

FIGURE 3.7 Relationship between investor protection and time required to register property and innovation in Latin America and the Caribbean



Source: World Bank, based on data from 2006–10 Enterprise Surveys.
Note: Bars show the impact on the dependent variable of one standard deviation of the explanatory variable. The regression includes other country-level Doing Business indicators; sectoral concentration (Herfindahl) indexes; the number of competitors; size; age; the number of establishments; legal organization; the manager's years of experience; the percentage of workers with complete university education; and whether the firm was registered at start-up, has a foreign owner, is an exporter, and has taken a loan. Robust standard errors are clustered at the country level. Countries include Argentina, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru, Trinidad and Tobago, and Uruguay. R&D = research and development.

time required to register a property (from the World Bank's Doing Business indicators) on the one hand, and the propensity of firms to engage in innovative activities on the other. The underlying econometric analysis controls for firms' characteristics, other Doing Business indicators, the number of competitors, and sectoral concentration. Even after controlling for competition, regulation appears to matter: a one standard deviation improvement in either investor protection or the time required to register property is associated with 2–4 percent more firms engaging in innovative activities, such as cooperating on innovation with others, adopting foreign technologies, filing for patents, and investing in R&D.

The significance of these correlations should be interpreted with caution. Some could stem from unobserved characteristics of the regulatory environment that are also correlated with Doing Business indicators. But taken as a whole, they remain suggestive of the role that the quality of regulation plays in promoting or preventing innovation. Although the magnitudes of the association may at first sight seem small, one should not forget that the regressions consider only variation within LAC, a fairly homogeneous group of countries in which innovation is relatively low to start with.

The good news is that, just as in the case of the entry regulations described in chapter 2, many LAC countries have made substantial regulatory reforms. However, because these reforms are part of a global deregulation process taking place in a broad international context, LAC countries still lag their peers along important dimensions. In addition, although the largest countries in the region (Argentina, Brazil, Chile, Colombia, and Mexico [LAC5]) have for the most part improved investor protection, many of the smaller countries have not made much progress (figure 3.8). The number of days required to register property, for instance, remains high throughout the region (on average, at the same level as in India), well above Eastern European and East Asian peers. This aspect of the regulatory environment seems particularly weak in Caribbean countries, where the number of days required to register property is four times the number in East Asia. Caribbean countries also score poorly on the cost of registering property, which averages almost 10 percent of the property value, against an average of less than 4 percent for other LAC countries. Interestingly, as in the rest of the world except some East Asian economies, export costs (imposed by government regulations, excluding trade taxes) have soared in LAC and remain second only to Eastern European countries.[7]

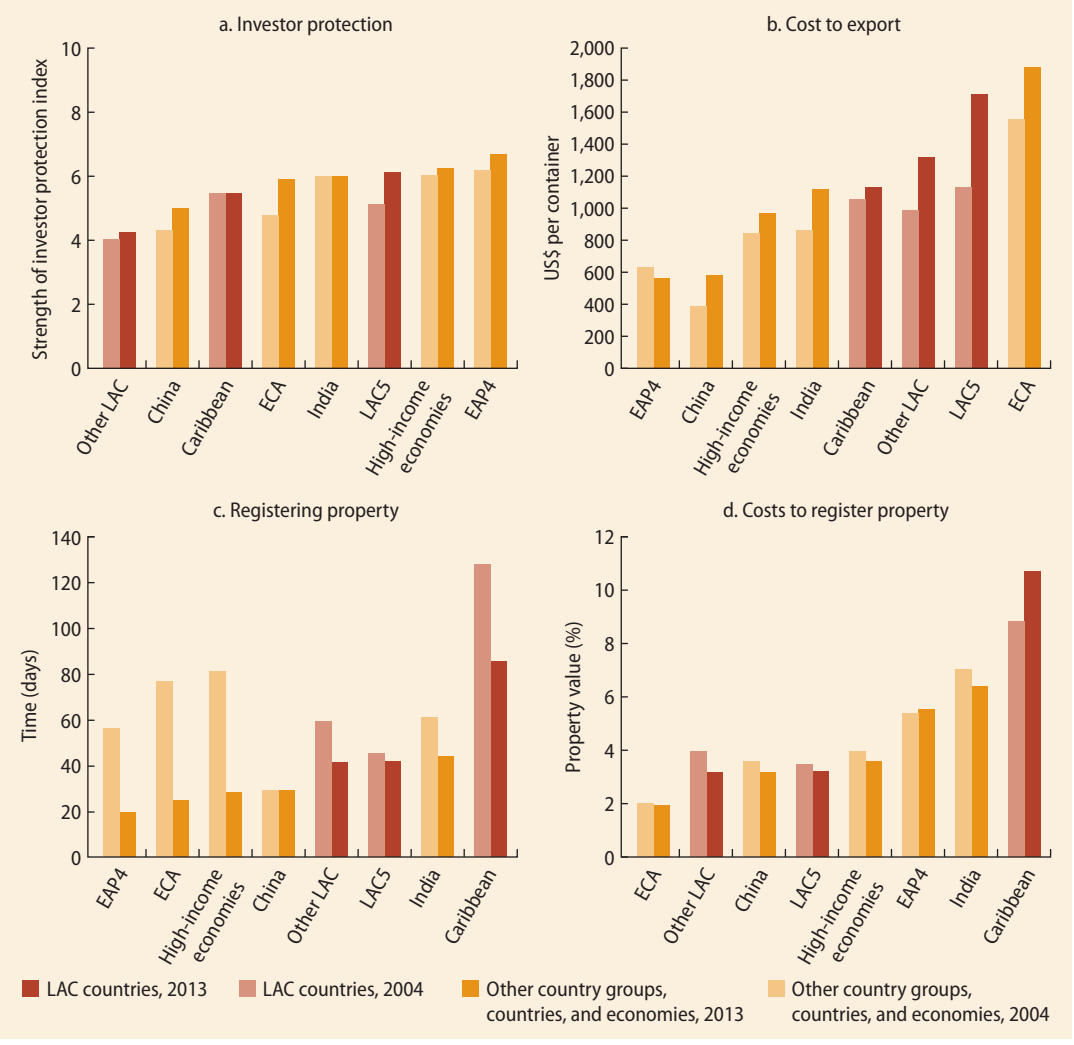
These numbers should be taken with a grain of salt, as they focus on very selective aspects of the regulatory environment. But they suggest that there is room for further improvement of the regulatory environment, which could stimulate firms' propensity to innovate. How much they would boost innovation remains an open question, however: thanks to recent waves of regulatory reforms in the region, regulation may no longer be the main bottleneck to innovation. As discussed below, new challenges are emerging.

Competition: An unfinished agenda

The ability to foster innovation through competition is of particular relevance for low- and middle-income countries, as governments may find it easier and more effective to level the playing field than to use more interventionist policies with strong governance challenges (Allen and Gale 2000; Ayyagari, Demirgüc-Kunt, and Maksimovic 2011). However, the empirical association between competition, productivity, and innovation is complex. Although there is little doubt that in many circumstances competition can have a positive impact on growth and innovation (Blundell, Griffith, and van Reenen 1995; Nickell 1996; Galdon-Sanchez and Schmitz 2002; Ayyagari, Demirgüc-Kunt, and Maksimovic 2011), there are many instances in which its impact may be limited or even negative.

In sectors with strong returns to scale, for instance, well-regulated monopolies may

FIGURE 3.8 **Doing Business in selected country groups and countries, circa 2004 versus 2013**



Source: Authors, based on Doing Business indicators.
Note: For countries and economies in each group, see note 2.

be the way to go. In some financial services, excessive competition can also be harmful, as it may prevent the building of sound reserves, raising the overall vulnerability of the system. And recent studies have uncovered that competition may hurt innovation (and productivity) even in more traditional sectors, such as manufacturing. A seminal study by Aghion, Bloom, and others (2005) suggests that the relationship between competition and innovation may have an inverted *U*-shape. In their analysis, low levels of competition lead to a few oligopolistic firms sharing similar production costs and laggard technologies. In such an environment, competition is good, as it drives rents down; firms react to higher competition by "escaping" it through innovation (along both the products and the process dimensions). In contrast, in highly competitive sectors, a (short-lived) technological leader captures the market. In these settings, further increases in competition may reduce

firms' incentives to innovate, as competition reduces any rent from innovation.[8]

Competition may also generate short-term distributional effects that have to be taken into account. Using firm-level data from the United Kingdom, Aghion, Blundell, and others (2009) find that the intensity of competition, measured by entry into an industry, fosters innovation and productivity growth among the more technologically advanced incumbents but slows it among less efficient incumbents. Iacovone, Rauch, and Winters (2013) find similar results for Mexico, where a surge in Chinese exports from 1994 to 2004 reduced sales of smaller and less innovative plants and minor products and increased sales of larger plants and main products. Although the long-term increase in productivity may well compensate for the short-term losses associated with the exit of the least productive firms, any competition reform should include measures to protect workers who may suffer from a potential short-term surge in plant closures.

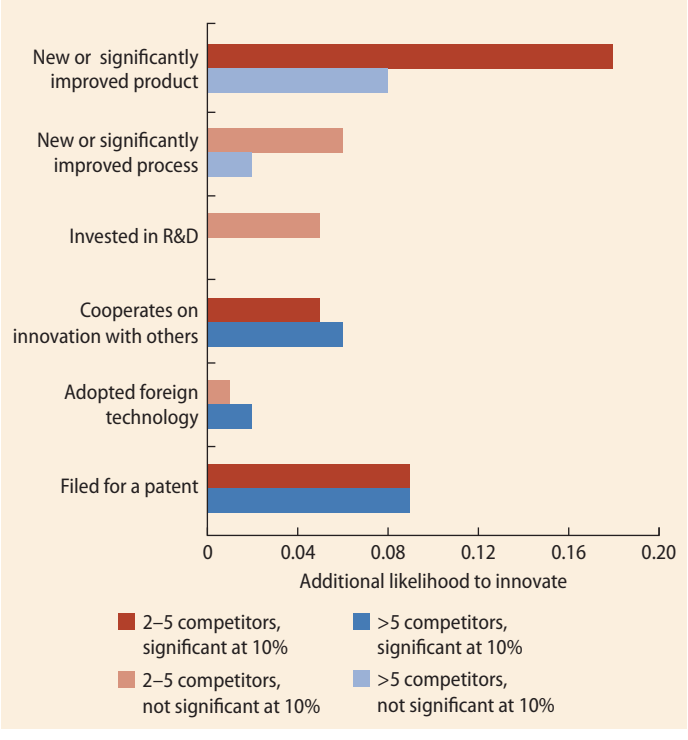
These caveats notwithstanding, LAC may not have reached the tipping point at which an increase in competition hurts innovation. On the contrary, lack of competition may inhibit firms' incentives to innovate.

Figure 3.9 shows the association between various dimensions of innovation and the number of competitors. The regressions control for other firm-level characteristics and country-level Doing Business indicators. Although there seems to be little association between competition and the generic question about whether firms have developed new products or processes, competition seems to be associated with the quality of innovation activities that firms claim to conduct: a more competitive environment is associated with a higher likelihood of firms collaborating with others on innovation, adopting foreign technologies, and filing patent applications.[9]

The magnitude of the correlations is at times substantial: all else being equal, having more than one competitor is associated with a 4 percent increase in the likelihood of cooperating on innovation and an 8 percent increase in the likelihood of applying for a patent. To be sure, unobserved factors (such as higher profit opportunities driving both entry and innovation) may be behind these associations. But these findings and the causal impact of competition found in most of the literature suggest that in many sectors, gains from increased competition could be substantial.

How could LAC governments foster a more competitive environment? Until now, efforts have focused on improving the regulatory environment. However, many countries have made substantial progress along the regulatory front. Although there may still be room for improvement, additional regulatory

FIGURE 3.9 Relationship between competition and various aspects of innovation in Latin America and the Caribbean



Source: World Bank, based on data from 2006–10 Enterprise Surveys.
Note: The regression includes other country-level Doing Business indicators; sectoral concentration (Herfindahl) indexes; number of competitors; size; age; number of establishments; legal organization; manager's years of experience; percentage of workers with complete university education; and whether firm was registered at start-up, has a foreign owner, is an exporter, and has taken a loan. Robust standard errors are clustered at the country level. Countries include Argentina, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru, Trinidad and Tobago, and Uruguay. R&D = research and development.

reform is not likely to bring countries in the region to the competitive frontier.

LAC countries are in a situation in which more active aspects of competition policies start to matter. These initiatives are multifaceted and fall under the umbrella of the governance structure and the effectiveness of competition and consumer protection policies and authorities.

Many countries in the region enacted competition laws in recent years (Honduras in 2005, Nicaragua in 2006, the Dominican Republic in 2008, and Ecuador in 2011) or saw major legislative reforms (Mexico in 2011, Brazil in 2012). These countries based their legal frameworks on international best practices. Many of their competition laws grant significant power to competition agencies to carry out investigations and impose sanctions.[10] Many countries also included provisions in their laws shielding competition agencies from political interferences to guarantee their independence.

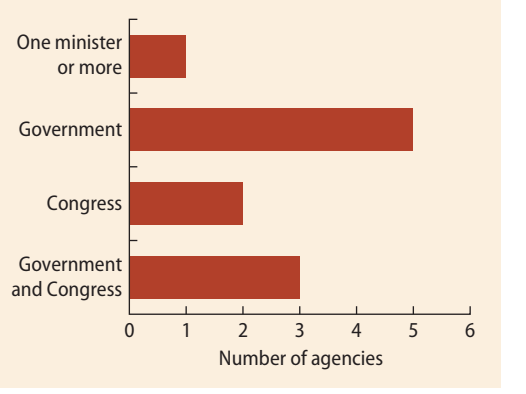
The challenges, however, lie in implementing these policies and laws. To varying extents, and with a few exceptions, countries in the region are characterized by limited cultures of competition, concentrated markets, vested interests, scarce human and economic resources, lack of cooperation among regulators, opposition from large corporations, and judiciary systems with little or no experience in competition matters. All these elements may reduce the capabilities of the competition agencies to enforce the law (Ortiz 2013). The extent to which they will be successful in promoting competition will depend on whether they have the means, independence, and powers to operate effectively. New data collected by the Centro Regional de Competencia para América Latina (CRC) allow some of these aspects to be explored in greater detail.

Independence of competition agencies

The Organisation for Economic Co-operation and Development (OECD) considers two aspects of independence: operational and structural. An agency that is created as a separate entity, rather than as part of a ministry, and is responsible directly to the parliament or legislature for its budget is structurally independent. Operational independency refers to the freedom to use the budget, organize the agency, and carry out enforcement activities and advocacy functions, without having a ministry supersede decisions (Clark 2005).

Data collected by the CRC suggest that in only about half of the surveyed agencies is the head appointed or cleared by Congress (figure 3.10). Mexico and Brazil have the strongest checks and balances to avoid political interference; their agencies are structurally and operationally independent, and there is a low risk that their decisions will be overruled by the executive branch. Although in Chile, the head of the Fiscalía Nacional Económica is not cleared by Congress, strong check and balances are in place. The institutional design of the competition agencies in the Dominican Republic, Ecuador, and Honduras also favors, at least de jure, the independency of the president of the regulatory agency and its commissioners (who are appointed by Congress, or jointly by Congress and the government, for a relatively long period of time), and only a court can overrule the agencies' decisions. In contrast, Argentina, Colombia, Costa Rica, and Uruguay may potentially

FIGURE 3.10 Appointment of head of regulatory agency in Latin America and the Caribbean



Source: Centro Regional de Competencia para América Latina 2013.
Note: Covered countries are Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, and Uruguay.

be more exposed to interference: their legal frameworks allow the government to intervene in the agencies by selecting its president and commissioners (including participating in their reelection), giving instructions to the agencies about current investigations, or determining the internal organization of the agency.

Another source of vulnerability may stem from the ability of the government to interfere in the agencies' decisions: agencies in only half of the surveyed countries are shielded from explicit government interventions (figure 3.11). In the other half, the government can overrule the agencies' decisions or interfere in an ongoing investigation.

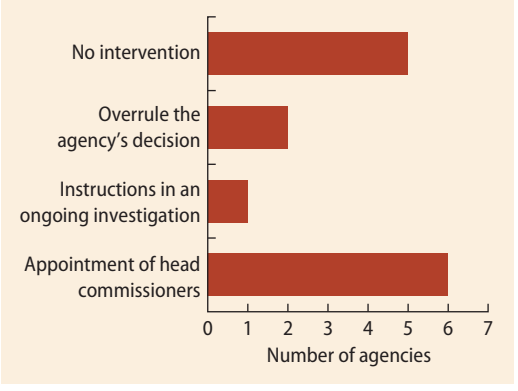
Given their limited experience in enforcement, it is too early to assess whether some of these recently created agencies are not only de jure but also de facto independent. To date, none of the agencies has seen its decision overruled, and none reports having received instructions from the executive branch. Nevertheless, lack of legislation makes agencies more vulnerable to potential interference.

Budget and scope of action

The budget of competition agencies, as well as the legal means they have been given to conduct investigations and impose fines and criminal sanctions, affect their effectiveness. Much heterogeneity is evident along these two dimensions. Competition agencies in Brazil, Chile, and Mexico appear to be well endowed, operating with budgets ranging from $9 million to almost $20 million. At the other end of the spectrum, some agencies, such as the ones in in Costa Rica, Honduras, and Uruguay, operate with much more limited budgets.[11]

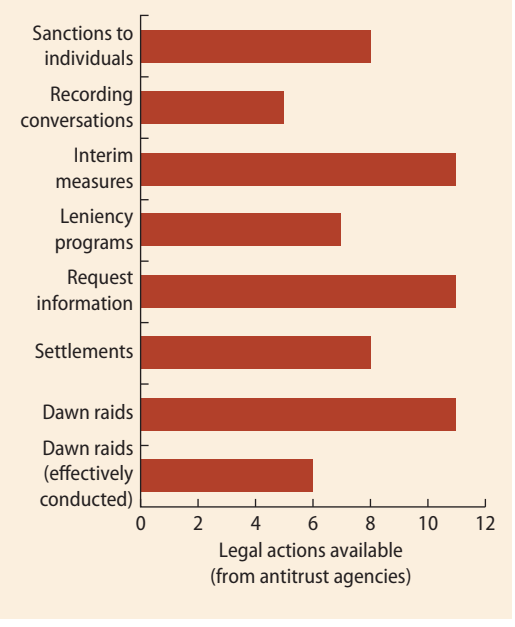
The scope of action also varies across agencies. Although all agencies are entitled to conduct "dawn raids" (on-site investigations) at the premises of the companies investigated, only 6 out of 11 did so between 2010 and 2013 (figure 3.12). All agencies can also request information from the companies investigated, but only 5 out of 11 can record or ask the police to record conversations between employees to collect evidence. Furthermore, in some countries, such as Brazil, Costa Rica, and Mexico, some sectors are exempt from competition law enforcement.

FIGURE 3.11 Level of allowed government intervention in regulatory decisions



Source: Centro Regional de Competencia para América Latina 2013.
Note: Covered countries are Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, and Uruguay.

FIGURE 3.12 Scope of action of regulatory agencies in Latin America and the Caribbean



Source: Centro Regional de Competencia para América Latina 2013.
Note: Covered countries are Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, and Uruguay. Effectively conducted dawn raids cover 2010–13.

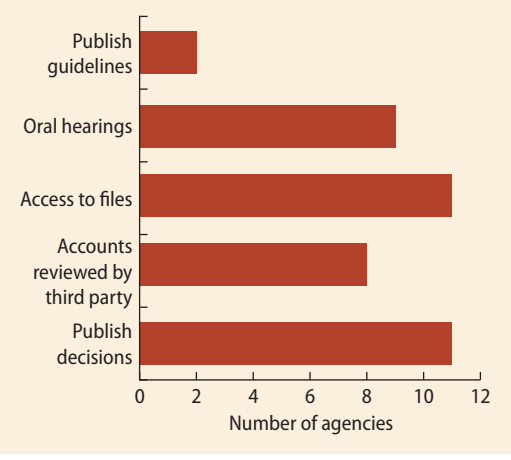
Transparency

Good transparency practices include publishing decisions, disclosing the facts and theories of harm under consideration, providing access to evidence, providing opportunities to meet with the agency, responding to concerns, and guaranteeing the confidentiality of third parties.

Most agencies display a relatively high standard of transparency (figure 3.13). All 11 agencies publish their decisions and the underlying legal and economic reasoning, and all 11 provide access to the file once the decision has been made (sometimes this information is publicly available, but sometimes it is necessary to formally request it). All 11 agencies also release annual reports and other types of reports to inform the public about their activities, and all of them guarantee confidentiality when parties submit information.

An area where there is still room for improvement is the adoption of guidelines for how specific anticompetitive practices are treated. Brazil and Mexico are the only countries that have published guidelines explaining horizontal agreements, vertical agreements, abuse of dominant position, and mergers. The remaining nine agencies do not have guidelines in some of these areas, although some are in the process of drafting them. Although the absence of guidelines need not reduce transparency, it is desirable to make available to the public the methodology used by the agency when assessing conduct.

FIGURE 3.13 Transparency practices of regulatory agencies in Latin America and the Caribbean



Source: Centro Regional de Competencia para América Latina 2013.
Note: Covered countries are Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, and Uruguay.

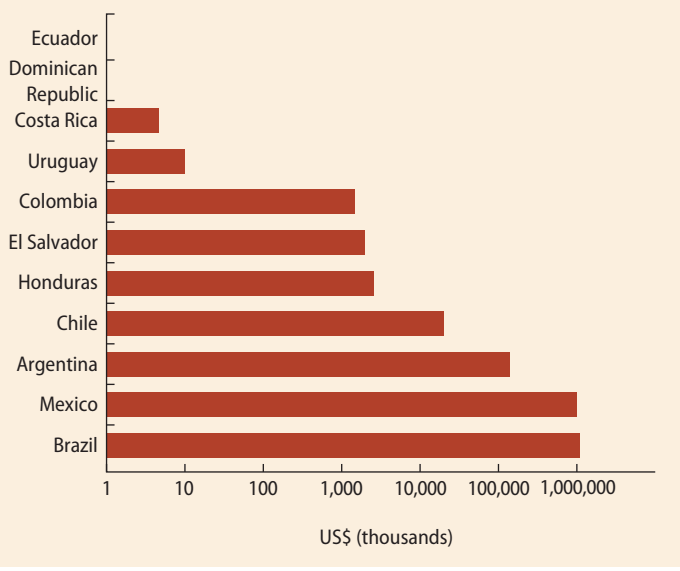
Anticompetitive conduct and fines

The data on anticompetitive conduct and fines are far from exhaustive. The surveys collected information only about the existence of certain anticompetitive conduct and the possibility of investigating and sanctioning it.

All agencies share similar capacities to investigate horizontal agreements, vertical agreements, abuse of dominant positions, and mergers. There are, however, important differences in various dimensions, reflecting the different roles agencies play in each country. Countries differ in how anticompetitive conducts are assessed. Brazil, Chile, Colombia, and Ecuador, for instance, do not consider all cartels as anticompetitive per se.

The maximum fines that have been imposed also differ substantially across countries (figure 3.14). The toughest agencies are

FIGURE 3.14 Maximum fines imposed by regulatory agencies in selected countries in Latin America and the Caribbean



Source: Centro Regional de Competencia para América Latina 2013.

CADE (Brazil), which imposed a fine of $1.1 billion on White Martins, and CFC (Mexico), which fined Telcel $1 billion. The lowest maximum fines were imposed by Uruguay ($10,000) and Costa Rica ($4,600). Agencies in the Dominican Republic and Ecuador have not yet imposed fines. Of course, not all of this heterogeneity can be attributed to the agencies' effectiveness: many of these agencies were established or reformed only recently and are in the process of defining their scope and scaling up operations.

Mergers

Good merger evaluation practices should include a comprehensive framework to address mergers that are likely to harm competition significantly. Factors other than market share or increase in market share, such as entry barriers, should also be evaluated.

Mergers represent the area with possibly the greatest divergence across agencies. Agencies in four countries (Brazil Colombia, Costa Rica, and El Salvador) have to approve all mergers and acquisitions before the parties can close the deal. Agencies in three countries (Ecuador, Honduras, and Mexico) have to approve only some operations before the parties can proceed. In Chile, there is no need to approve a merger or acquisition. The Dominican Republic and Uruguay do not yet have a merger notification system in place.

Disparities can also be found in the analysis of mergers. Argentina, Chile, Honduras, and Mexico take into account only criteria based on competition grounds (that is, efficiencies) in determining whether to approve a merger. In contrast, Brazil, Colombia, Ecuador, and El Salvador also take into consideration other issues, such as public interest or impacts on the labor market.

Training and advocacy

Training and advocacy should be central activities of any competition agency. The more judges, policy makers, and the private sector are trained on the benefits of good competitive practices and regulation, the easier it will be to sustain a competitive environment.

Colombia and Mexico are the only two countries in the region that conduct a "competition impact assessment" of new proposed regulation, implement sector studies, and carry out ex post evaluations of their activities—and the competition agency in Mexico is the only one entitled to issue binding opinions under certain circumstances. In all countries, the competition agency can issue (nonbinding) opinions to prevent the adoption of regulation with negative effects in the market and publish market and sector studies.

Training and advocacy need to be customized to the local context. Instruments used in one country (conferences, training courses, opinions, market studies, media appearances) may not be effective in another. Limited economic resources and a still nascent competition culture make training and advocacy costly and challenging. Nonetheless, it is important to keep investing in this area, because it affects the likelihood of enforcement of competition policies.

Does financial underdevelopment explain the innovation gap?

Innovation is a risky activity; if markets fail to share some of these risks, entrepreneurs may find it difficult to innovate. The association between financial intermediation and growth and innovation has been documented extensively in the literature. Early works by King and Levine (1993) and Beck, Levine, and Loayza (2000) find a positive association between financial development and growth (see Levine 2005 for a review).

In addition to the depth of financial markets, it also appears that regulations and the type of financial intermediation tools available to firms affect economic performance. According to Bekaert, Harvey, and Lundblad (2005), for example, liberalization of the equity market led to an average increase in annual real economic growth of 1 percent.

Most of these studies suffer from reverse causality biases, as better-performing economies may foster the development of financial markets. In an attempt to draw causal relationships, Rajan and Zingales (1998)

construct a measure of "financial dependency" of each sector. They show that industrial sectors that need more external finance grow faster in countries with more developed financial markets.

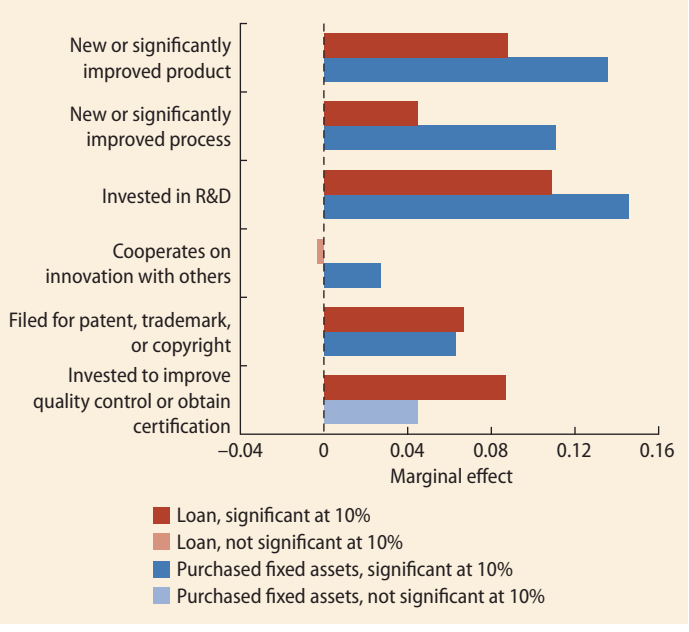
Financial development, in terms of both the depth and the diversification of financing instruments, appears to exert a disproportionately positive effect on small firms, which tend to find it more difficult to raise funds (Guiso, Sapienza, and Zingales 2004; Beck and others 2008). Because small firms tend to operate locally, local financial development has also been found to be an important determinant of the economic success of an area (Guiso, Sapienza, and Zingales 2004).

Ayyagari, Demirgüc-Kunt, and Maksimovic (2011) explore the association between financial development and innovation in emerging markets. They define innovation to include the introduction of new products and technologies, knowledge transfers, and new production processes. They find that access to external financing is associated with greater firm innovation. Although data constraints limit the causal interpretation of the association, the study highlights an important channel through which financial development can affect productivity.

These analyses are not specific to LAC, but figure 3.15 shows that the region is no exception. Based on a multivariate regression that controls for other firm-level characteristics, sector, and country effects, it shows the association between having taken a loan and various forms of innovation. It also shows the association between investment in fixed assets and innovation (controlling for taking a loan), as these types of investments are an important avenue through which firms innovate.

The results show that at least one of the two variables is significantly associated with any form of innovation captured in Enterprise Surveys. The magnitudes of these effects are also relatively large: everything else being equal, having taken a loan is associated with a 9 percent higher probability of introducing a new product, a 5 percent higher probability of improving processes, an 11 percent higher probability of conducting R&D, and a 9 percent higher probability of investing in quality control and certification.

FIGURE 3.15 Credit, investment, and innovation in Latin America and the Caribbean



Source: World Bank, based on data from 2006–10 Enterprise Surveys.
Note: Robust standard errors are clustered at the country level. As additional controls, the regressions include firm size, age, legal organization, the number of establishments, whether the firm was registered at start-up, whether it is foreign owned, the percentage of full-time workers with university degrees, and country and sector fixed effects. Countries include Antigua and Barbuda, Argentina, the Bahamas, Barbados, Belize, Chile, Colombia, Costa Rica, Dominica, the Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and Uruguay. R&D = Research and development.

Investment in fixed assets also appears to be an important channel through which innovation takes place. The fact that the fixed assets indicator remains significant even after controlling for borrowing suggests that many firms invest using other means, such as self-financing and (for large firms) equity financing. For some firms, however, these types of financing may be second-best choices dictated by the lack of good financial intermediation.

LAC financial markets developed substantially in the last two decades, as de la Torre, Ize, and Schmukler (2012) document. Bond and equity markets have gained ground, institutional investors now play a central role, new markets and instruments have sprung

up, maturities have lengthened, and dollarization has been reduced. However, many of these gains are benefitting only larger firms; significant gaps remain in the financing of smaller ones, as manifested by the depth and efficiency (as measured by interest rate margins) of banking intermediation and the liquidity of domestic equity markets.

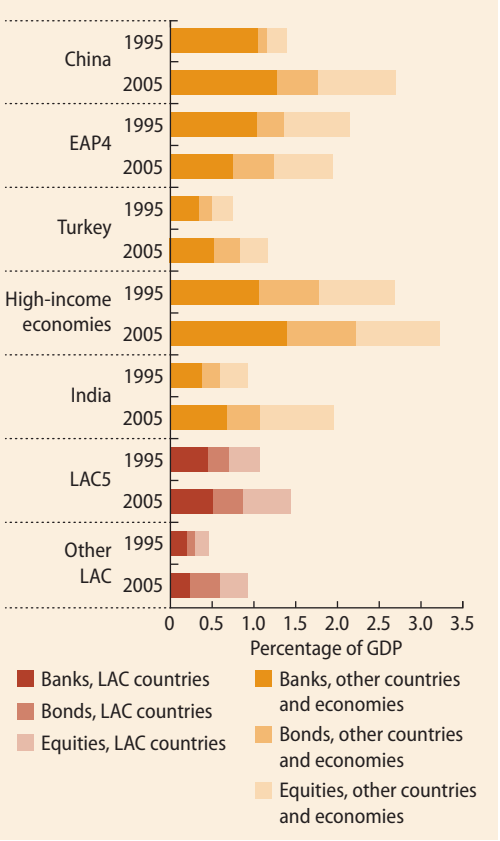
These gaps are of concern because they coincide with some of the financial indicators that have been shown to be the best predictors of future output growth and because, except for bank margins, there is little evidence of convergence toward benchmark levels consistent with the economic development of the region and its basic structural characteristics (figure 3.16). The lack of depth of the banking sector, an important financing avenue of small firms, may in particular hurt the innovation potential of emerging firms. Another area of concern is the limited capacity of institutional investors to expand their portfolios beyond the safest and most liquid investments.

These features are not identical across countries. There is substantial heterogeneity in financial development within the region, with smaller, lower-income countries generally lagging behind.

The innovation potential of firms in LAC—in particular small ones—may also be hindered by the dearth of private equity and venture capital financing options. Mondragón (2012) benchmarks the private equity and venture capital (PEVC) industry in LAC relative to other low- and middle-income regions using a new dataset that merges various sources of information on PEVC financing. Although the dataset may miss smaller deals, it is one of the most comprehensive efforts to measure PEVC intensity at the regional level.

Despite unprecedented growth since the mid-2000s, PEVC investments in LAC remains relatively low, below the region's share of world GDP and capital inflows (figure 3.17). In 2011, PEVC investments in LAC totaled $3.2 billion. This figure was close to the figure in Eastern Europe and Central Asia ($3.6 billion) but well below PEVC investments in emerging Asia ($18.7 billion). The industry is quite new in middle-income countries (before 2005, PEVC investments were minimal in all emerging economies). It dramatically picked up in Asia but remains relatively modest in LAC and Eastern Europe and Central Asia.

FIGURE 3.16 Depth of financial systems in selected country groups and countries, 1995 and 2005



Source: Adapted from Didier and Schmukler 2011.
Note: For countries and economies included in each group, see note 2.

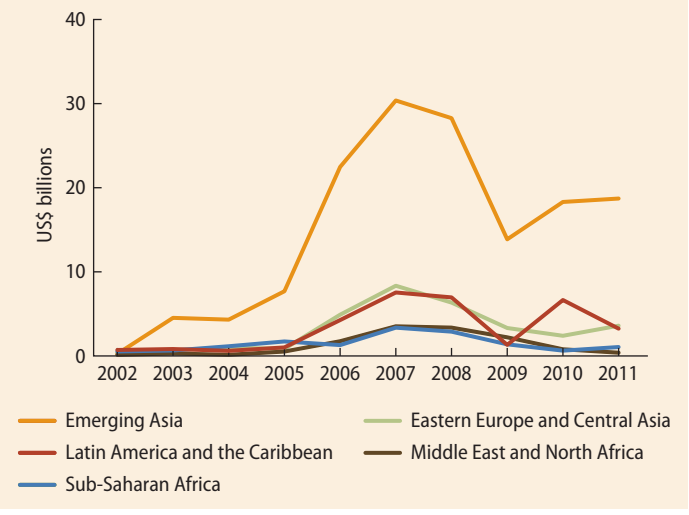
In addition to being in its infancy, the PEVC industry in the region focuses on large deals, in mature industries, in a few countries (figure 3.18). More than 90 percent of activity takes place in Mexico or the major economies of South America, with Brazil accounting for half of reported deals in 2008–11 and two-thirds of investments. The larger number of deals in Brazil suggests that market size and liquidity may be important factors driving the expansion of the PEVC industry; without liquidity and a constant stream of potential deals, it may be difficult for the industry to expand.

It may thus not come as a surprise that in the smaller countries, very few PEVC deals have been reported. More surprising is the size of the deals and the type of company the PEVC industry is targeting. Only 20 percent of deals are smaller than $5 million (see figure 3.18), and the average deal is $30 million. Moreover, companies that benefit from PEVC financing do not appear to be young, innovative start-ups: the average company is about 18 years old. After controlling for other company characteristics, each additional year in operation implies $0.9 million of additional PEVC investments. Investments also have a strong bias toward energy and natural resources, which account for about a third of PEVC investments.

Overall, start-up financing remains a challenge in the region: venture capital accounts for less than 10 percent of total PEVC investments. Moreover, venture capital typically does not finance young, innovative firms.

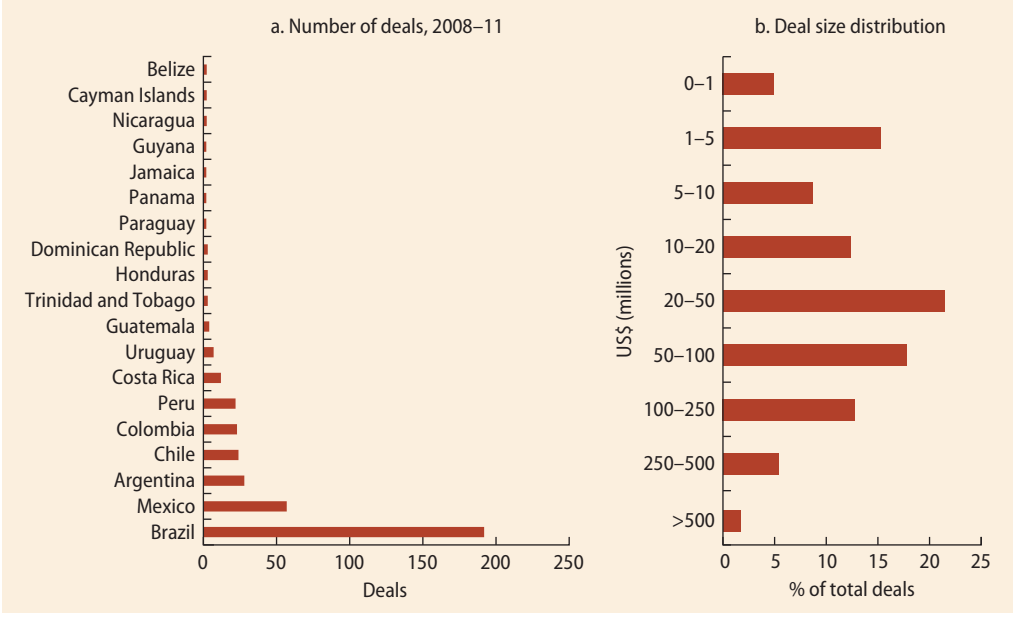
The dearth of financing opportunities for young, innovative firms may be hindering the region's entrepreneurial potential. But the problem may not necessarily be solved by

FIGURE 3.17 Private equity and venture capital investments, by region, 2002–11



Source: Mondragón 2012, based on data from the Emerging Markets Private Equity Association (EMPEA).
Note: Emerging Asia: All countries; excludes funds whose primary mandate is investments in Japan, Australia, or New Zealand. Eastern Europe and Central Asia: Countries in Central and Eastern Europe, the Commonwealth of Independent States, the Baltics, and the Balkans; the European Union accession countries; and Turkey. Latin America and the Caribbean: countries in Central America, South America, and the Caribbean excluding Puerto Rico; Middle East and North Africa: Afghanistan, Algeria, the Arab Republic of Egypt, the Gulf Cooperation Council countries, the Islamic Republic of Iran, Iraq, Libya, Jordan, Lebanon, Morocco, Pakistan, the Palestinian Territories, Sudan, Syria, Tunisia, and the Republic of Yemen. Sub-Saharan Africa: All countries; excludes funds whose primary mandate is investments in Algeria, Egypt, Libya, Morocco, Sudan, or Tunisia.

FIGURE 3.18 Number and size of private equity and venture capital deals in Latin America and the Caribbean, by country, 2008–11



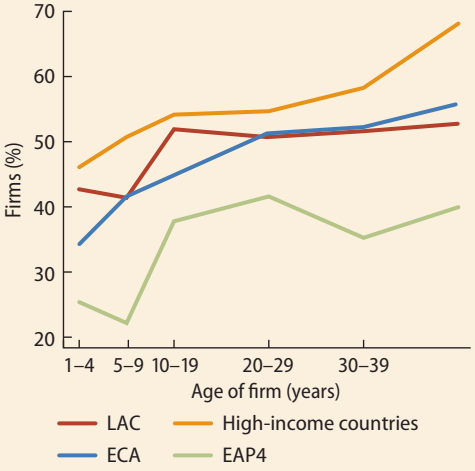
Source: Mondragón 2012.
Note: Information on the size of the investment was not available on all deals.

simple supply-side interventions. The region may be trapped in a vicious cycle of low innovation leading to too little demand for a healthy PEVC industry to flourish. It may be possible to break such a cycle with government-led supply side interventions—but without a larger mass of young, innovative firms, supply-only interventions are likely to fail.

In addition, the facts that LAC has underdeveloped capital markets and that venture capital appears to chase big deals in traditional industries do not by themselves imply that the region's innovation gap is caused by lack of access to finance. Young rather than small firms drive growth and employment generation in the long run (see chapter 2). Hence, it is worthwhile to explore the link between firm age and access to finance.

Figure 3.19 shows the share of firms across regions and age groups covered by the Enterprise Survey database that report having access to credit. LAC appears not to have a meaningful gap. Consequently, it seems difficult to conclude that lack of finance is the main explanation for the region's innovation gap. Much remains to be done to continue transforming the region's capital markets into engines of growth without hampering recently achieved stability. Yet lack of finance is unlikely to be the main driver of the innovation gap. Chapter 6 revisits this issue.

FIGURE 3.19 Access to credit, by region and age of firm



Source: World Bank, based on data from 2006–10 Enterprise Surveys.
Note: The last survey available is used for each country. Each country has the same weight in the regional average. Initial size of more than 10,000 was replaced by missing. Data do not take into account the initial year for firms more than 39 years old. High income: Croatia, the Czech Republic, Hungary, Poland, the Slovak Republic, Slovenia and Spain. For countries included in other groups, see note 2.

Entrepreneurial skills: A key missing link?

Entrepreneurial skills are personal traits, experience, and human capital that favor experimentation, risk taking, and ultimately the growth of incumbent firms. For the purposes of this section, entrepreneurs include all individuals in a position to make important strategic decisions in a firm, including managers, chief executive officers, founders, and engineers.

Some personal traits have been associated with entrepreneurial success. Education, for instance, increases the likelihood of survival of new firms and subsequent economic performance (Bates 1990; Gimeno and others 1997; Acs, Armington, and Zhang 2007), particularly for high-tech start-ups, where the founder's human capital is a key driver of growth (Colombo and Grilli 2010; Arvanitis and Stucki 2012).

Education in technical or scientific fields and work experience in technical and commercial functions within the same industry also matter for success, especially for new technology–based firms (Almus and Nerlinger 1999; Colombo and Grilli 2005; Balconi and Fontana 2011; Ganotakis 2012). Entrepreneurs who are well endowed in a variety of fields—"jacks-of-all trades"—may also have higher probabilities of success, because entrepreneurs have to manage different people and tasks and be well versed in a variety of management skills (Lazear 2004, 2005). Using cross-section analyses, Lazear (2005) and Wagner (2003) find that accumulation of a balanced skills mix (that is, general human capital) is associated with above-average postentry performance (see also Vivarelli 2012).

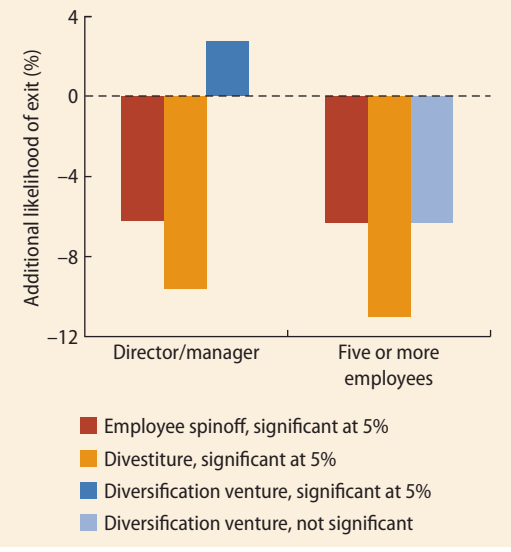
These aspects of entrepreneurship appear to be relevant in LAC. In Brazil, for instance,

employee spin-offs from existing enterprises account for one-sixth to one-third of new formal sector firms, and these firms exhibit a higher likelihood of survival. Muendler, Rauch, and Tocoian (2012) analyze post-entry performance of new firms using a unique employee-employer database from Brazil that offers comprehensive individual employee information on occupations, demographic characteristics, and earnings. Exploiting these data, they compare differences in likelihood of exit after five years between "ordinary" new firms and spin-offs, distinguishing between spin-offs by employees, spin-offs generated by the firms themselves out of diversification purposes, and "divestitures," where a new firm absorbs plants from an existing firm. They also break out spin-offs that included high-level managers from the mother firm from spin-offs that included only employees. Their results suggest that the founders' profile influences postentry performance: in almost all cases, spin-offs have a lower likelihood of exit (figure 3.20): employee spin-offs, for instance, are 6 percent more likely than ordinary new firms to survive.

These results point to the importance of knowing the sector and the country context for the success of new firms, but they remain silent about the particular skills that are needed. Lessons from high-income countries—derived largely from analyses of high-tech sectors—may be of limited relevance for most countries in LAC, where firms do not necessarily operate at the technology frontier.

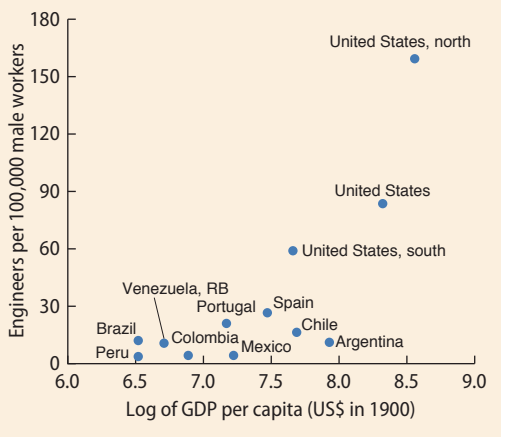
New studies of LAC show that people with good technical and managerial skills may improve a firm's innovative potential and, ultimately, productivity. Drawing on graduation records, membership in professional societies, and historical census data, Maloney and Valencia-Caicedo (2012) generated new data on the stock of engineers at the end of the 19th century at the subnational level for a panel of five countries (the United States, Argentina, Chile, Mexico, and the República Bolivariana de Venezuela). Two findings stand out from these data. First, Argentina, Chile, and Mexico had lower densities of engineers in 1900 than Spain and Portugal, despite higher income per capita (figure 3.21).

FIGURE 3.20 Likelihood of spin-off firm after five years, by type of entrant



Source: Muendler, Rauch, and Tocoian 2012.
Note: Bars show coefficients of a multivariate regression on the likelihood of exit. "Director/manager" means that a director or manager from the former company was involved in the new company; "five or more employees" means that five or more employees of the former company joined the new company. The omitted category is all other new formal sector firms. Regressions include cohort and sector fixed effects.

FIGURE 3.21 Engineering density and GDP of selected countries, 1900



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

This gap in the number of engineers per capita appears to have persisted over the course of history. Second, at both the national and subnational levels, there is a significant association between engineering density in the 1900s and per capita income in the 2000s. A low prevalence of people with good technical skills in LAC may thus have hurt firms' innovative potential and affected long-term growth prospects.

Why do engineers matter? The romantic vision of engineers conducting high-tech research and pushing the technology frontier may represent only part of the story, especially in middle-income countries. Most engineers play a less fashionable but equally important role in continuously improving basis products and production processes and adapting foreign products and technologies to local conditions. There is no need for a degree from Harvard or MIT to equip engineers to perform such functions: a solid curriculum that combines good analytical thinking with practice—and teaches what the industry is demanding—may suffice. Chapter 6 provides further evidence on the association between the region's innovation gap and its low density of engineers.

But technology is only one part of the equation. How people and technologies are managed also matters: a potentially great new product may never see the light of day if engineering efforts are poorly coordinated. And, as discussed, the region's largest firms seem to have subpar management practices.

An additional finding is that few managers may be aware of how they are running their company. Maloney and Sarrias (2012) present survey evidence on managers' ratings of how well they think they are running the company (figure 3.22) The correlation between how good managers are (as measured by the management score) and how good they think they are is very low (about 0.2). This low correlation is also evident in other countries, even high-income countries. But given the lower average management performance of LAC firms, it suggests that interventions aimed at improving awareness of the importance of management practices, along with efforts to improve management performance itself, could potentially be an effective avenue for policy action.

Agglomerations and spillovers: Can policy makers affect them?

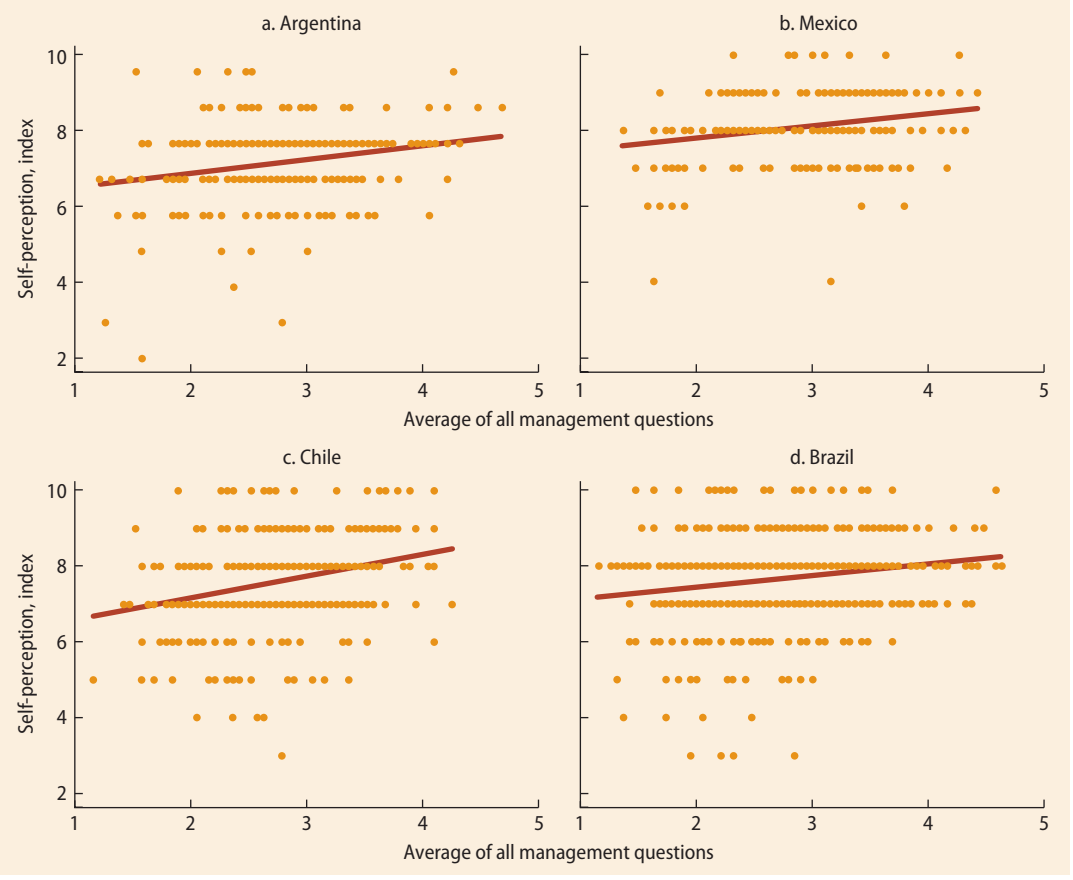
The holy grail of entrepreneurship policies is scale effects: once a critical mass of entrepreneurial firms is achieved, the ball may keep rolling almost by itself. Scale effects can be driven by technological factors, such as increasing returns to scale in production, as well as by factors beyond technology that can, in principle, be steered through policy actions. Such factors include positive externalities generated by geographic agglomerations of similar industries.

The idea of designing policies that promote agglomeration is tempting, and the evidence supporting the presence of externality effects is strong. Natural advantages can explain only about 20 percent of geographic concentration; although correcting for omitted geographic characteristics might raise the share they account for slightly, agglomeration effects would not exist without localized intraindustry spillovers (Ellison and Glaeser 1999).

In the United States, for instance, employment growth is strongly predicted by the presence of small establishments, across both cities and industries within cities. The presence of entrepreneurs may thus attract more entrepreneurs, by lowering the cost of entry through the growth of suppliers, venture capitalists, and by developing an entrepreneurial culture (Chinitz 1961; Glaeser and Kerr 2009; Glaeser, Kerr, and Ponzetto 2010). Greenstone, Hornbeck, and Moretti (2010) also find that five years after the opening of a large plant, the total factor productivity of incumbent plants is 12 percent higher than in counties without large plant openings. Moreover, this productivity spillover is larger for plants that share similar labor and technology pools with the new plant.

Human capital spillovers can also be significant. Moretti (2004) finds that the productivity of plants in cities that experienced large increases in the share of college graduates rises more than the productivity of similar plants

FIGURE 3.22 **Actual versus perceived management quality in Argentina, Mexico, Chile, and Brazil**



Source: Maloney and Sarrias 2012.

in cities that experienced small increases. For human capital, too, "technological proximity" seems to matter: within a city, spillovers between industries that are economically close are larger than spillovers between industries that are economically distant.

Local multipliers also play a role in fostering agglomerations. Moretti and Thulin (2012), for instance, distinguish between locally tradable and nontradable jobs. They find that every time a local economy generates a new job by attracting a new business in the traded sector, a significant number of additional jobs is created in the nontraded sector. The type of job generated matters: the local multiplier varies from a third to three. It is particularly large for high-tech industries and other jobs that require high levels of human capital.

Given the large impacts of externalities, it is tempting for policy makers to invest large sums to attract firms and promote agglomerations. And indeed, when there is competition to attract investments, providing (reasonable) financial incentives to make the balance tilt in a region's favor may be money well spent (Moretti 2010). But there is very little evidence that it is possible to artificially generate self-sustaining agglomerations. Successful industrial parks that were promoted by the government are hard to find, and there is little evidence that large tax incentives aimed at attracting foreign firms and investments have systematically provided good returns.

Success stories often result out of the combination of natural advantages (including "first-mover" advantages), luck, and good policies that nudged incentives in already

favorable local conditions. Silicon Valley, the gold standard of entrepreneurship ecosystems, was never "founded." It evolved from a unique set of circumstances: Stanford University's interest in hooking up with the industry, a strong aerospace industry, a handful of industries making breakthrough progresses in the semiconductor industry, a liberal immigration policy toward doctoral students, and pure luck, among others (Isenberg 2010). Silicon Valley also benefitted from a first-mover advantage. It is not clear that if the same conditions appeared today they would lead to the same success.

Overall, there is not enough evidence to say with certainty what works and what does not. But some do's and don'ts are starting to emerge (box 3.3). And one fact seems to be repeatedly confirmed: it is very hard to get it right.

Geography is only one channel through which spillovers may affect firms' productivity and innovative behavior. Another is trade. There have been few attempts to understand the extent to which domestic as opposed to international spillovers (mostly generated by the transfer of knowledge) affect innovation. The policy implications may change dramatically depending on the source of the spillovers. If spillovers are domestic, there may be space for government intervention to solve free-riding problems (the so-called "appropriability problem"): because firms do not internalize the positive impacts of their production of knowledge on other firms, they may underinvest in knowledge production. If, in contrast, knowledge spillovers are generated internationally—by technology transfers through trade, for example—then the appropriate policy may be one of laissez-faire and trade liberalization, especially for small open economies that do not affect prices in international markets.

Bravo-Ortega, Causalito, and Lederman (2013) attempt to identify the origins of spillovers. Using a cross-country panel of investment in R&D and USPTO patents, they look at the extent to which domestic patenting activity is influenced by domestic investments in R&D, the domestic stock

BOX 3.3 Do's and don'ts of entrepreneurship ecosystems

In a 2010 article in the *Harvard Business Review,* Daniel Isenberg, a business school professor, summarizes years of experience in analyzing conditions under which entrepreneurs thrive ("entrepreneurship ecosystems"). His list of dos and don'ts includes the following:

- *Shape the ecosystem around local conditions.* Natural advantages cannot fully account for the higher productivity of agglomerations, but they can give a good head start. The less natural advantage there is a, the more difficult it will be to foster a self-sustaining agglomeration.
- *Engage the private sector from the start.* Profit-driven motives may lead firms to miss the beneficial effect of spillovers, but they provide the best perspective to judge whether a venture will work.
- *Tackle cultural change head-on.* Because culture is at times intangible, the importance of cultural factors in fostering entrepreneurship has been understudied. But there is a growing sense that culture matters significantly.
- *Experiment holistically, but do not overengineer.* For ecosystems to thrive, several elements must work well together—hence the need to experiment holistically along several fronts. Overengineering, however, may also lead to failure. The more there is a need to intervene, the less likely it is that ecosystems will eventually thrive alone.
- *Think about an exit strategy.* Not all experimentation will deliver the desired results—if it did it would not be an experiment. But there is a danger, often for political economy reasons, to keep subsidizing pilots that do not work. All experiments should have clearly defined time horizons and exit strategies.

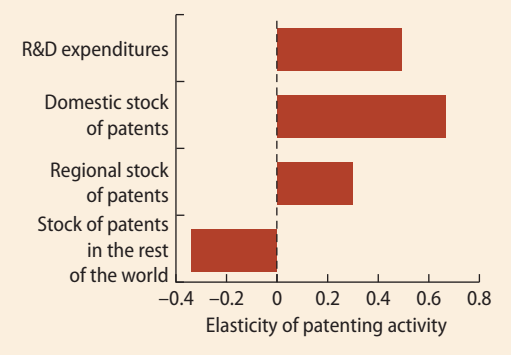
Source: Adapted from Isenberg 2010.

of patents, the stock of patents from other countries in the same region, and the stock of patents in the rest of the world. The results suggest some scope for government intervention (figure 3.23). Net of R&D expenditures, the domestic stock of USPTO patents does affect the number (that is, flow) of patents by a country, a result that is consistent with the presence of domestic knowledge spillovers. The elasticity is less than one, however, suggesting that "big push" interventions to generate a self-sustaining virtuous cycle of innovation may be difficult to achieve.

On the international front, the stock of patents of countries in the same region does seem to positively affect domestic patenting activity, suggesting the presence of positive regional knowledge spillovers. In contrast, the stock of patents from the rest of the world appears to negatively affect domestic patenting activity. This negative coefficient can be interpreted in two ways. It could simply be an outcome of "patent races" between high- and low-income countries, where low-income countries do not see a need to patent innovations because of lower engagement at a global scale or because of lower returns from patenting in sectors where firms in high-income countries are also active. It could also be a genuine negative externality, where firms in low-income countries do not see a need to innovate because their distance from the technology leaders is large and they prefer to import technology.

The ambiguous interpretations about the role of international movements of goods, services, and capital on domestic innovation highlights the need to understand the roles that trade and multinational activity play in fostering innovation and entrepreneurship. The following chapters examine the performance of some of the top entrepreneurs in LAC and the firms that enter and survive in highly competitive export markets and seek out foreign markets by investing abroad. These firms are led by the highest end of the region's entrepreneurs. But how innovative are they? Chapters 4 and 5 examine these issues.

FIGURE 3.23 Domestic versus international spillovers in patenting activity



Source: Bravo-Ortega, Cusolito, and Lederman 2013.
Note: R&D = research and development.

Notes

1. Some observers argue that it may be optimal not to enforce some poorly conceived regulations that may hurt firms or people excessively, but weak enforcement is a second-best option that often creates more complications than it solves.
2. Throughout this chapter 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* include 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 chapter varies according to data availability.

3. 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.
4. It is likely that multinational corporations rather than domestic firms conduct a large share of R&D in China. A similar bias in reported R&D statistics may affect some LAC economies, such as Mexico. It is unlikely that LAC economies would overcome China's measured R&D effort even if the data were corrected for this bias, however. (The authors would like to thank William F. Maloney for pointing this out.)
5. R&D data are classified as "productive-sector" R&D when the source of the financing comes from a company that participates in the market. However, these companies can be publicly owned, thus 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.
6. Specifically, the log of patents per million people was regressed on the log of GDP (expressed in purchasing power parity terms), the log of population, and the log of merchandise exports to the United States. The dots in figure 3.4 represent the estimated intensity of patenting in the United States given each country's characteristics along these three dimensions.
7. Official export costs include costs for documents, administrative fees for customs clearance and technical control, customs broker fees, terminal handling charges, and inland transport. The cost measure does not include tariffs or trade taxes.
8. In the aggregate, productivity may still increase, because more firms innovating raises the chances of a technological breakthrough (Bento, forthcoming).
9. The measured effects are in addition to the impact of regulation on innovation as measured by the Doing Business indicators (see figure 3.7), which, by affecting competition themselves, also capture part of the effects of working though competition.
10. This section benefitted immensely from discussions with Paolo Benedetti and Aitor Ortiz, of the Centro Regional de Competencia para América Latina (CRC), as well as from information provided by the CRC.
11. Budget information is not provided because of the challenges in obtaining comparative data. Some agencies are incorporated into ministries, making it difficult to estimate the budget available to the agency.

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Export Entrepreneurship

4

Exporting is difficult: only highly successful firms ever try to do so, and most of them exit exporting within a year. Export entrepreneurship by the small number of superstar firms that survive drives long-term export growth. New evidence indicates that the economies of Latin America and the Caribbean underperform poorer economies in terms of export entry rates. However, companies in the region proved resilient in the face of the contraction of foreign demand in 2008–09, experimenting with new export products and attempting to penetrate new markets. These findings suggest that competitive pressures can spur innovation by high-end entrepreneurs. If the costs of entry into export markets partly reflect the need to gather information about the characteristics of foreign markets, export promotion policies that provide such information could increase export entry and enhance the likelihood of survival in global markets. Preliminary evidence suggests that export promotion policies in the region are having these effects, although even the region's superstars enter exporting at lower rates than comparators in other regions.

This chapter focuses on one type of high-end innovative entrepreneurship: the act of entering and surviving in global markets.[1] Like the forms of innovation discussed in chapter 3, exporting is costly. Firms thus carefully analyze the potential costs and benefits of entering new markets.

The chapter begins with an assessment of the contribution of export entrepreneurship to overall export growth in Latin America and the Caribbean (LAC) in the medium term. It benchmarks LAC countries relative to other developing economies in terms of export entrepreneurship.

Export entrepreneurship has several dimensions. This chapter studies the rate of entry and exit of exporting firms, the likelihood of survival of firms in export markets after entry, and the size of their exports at entry. (Chapter 6 revisits the issue of whether LAC is lagging similar economies in its level of openness to international trade.)

Partly because of LAC's comparative advantage in mining and agriculture commodities, observers have long been pessimistic about the region's growth and entrepreneurial potential (see, for example, the literature reviewed by Lederman and Maloney 2007). However, the literature has remained silent

with respect to the role of entrepreneurship as a driver of export growth in developing countries with diverse trade structures. This chapter therefore benchmarks broad sectors of economic activity in terms of their potential for export entrepreneurship and discusses the role of comparative advantage as a determinant of export entrepreneurship.

The chapter presents results from complementary benchmarking exercises. The first set is descriptive; it presents the basic statistics for groups of countries in LAC and other regions classified by their structural characteristics. The analysis does not identify the portion of each export entrepreneurship indicator that is strictly associated with country features or industry characteristics.

The second set of exercises highlights "conditional" international comparisons. This approach relies on econometric analysis to decompose the sources of the observed international differences in export entrepreneurship indicators into country, industry, and time-period effects.

The evidence presented suggests that export entrepreneurship in most LAC countries has significantly contributed to national export growth, even over short time periods. The picture that emerges is one of a seemingly dynamic export sector, characterized by vigorous entry and exit, with relatively healthy survival rates. Unfortunately, the region's export entry and survival rates appear to be lower than those of poorer countries after controlling for industry characteristics and GDP per capita.

There is, however, good news on the policy front. Export promotion policies focused on solving informational market failures seem to stimulate the entry of new LAC firms into exporting activities as well as enhance their likelihood of survival in export markets.

Exporting as a transformative entrepreneurial act

Exporting is difficult and thus rare among private enterprises. Only the best firms—the largest, most productive, "superstar" firms—enter and thrive in export markets.[2] In an influential review of the literature on firms in international trade, Bernard and others (2007) document that in 2000 only about 4 percent of the 5.5 million firms operating in the United States were exporters. Among manufacturing and agricultural firms, only about 15 percent were exporters. Eaton, Kortum, and Kramarz (2011) show that only about 15 percent of French manufacturing firms with more than 20 employees were exporters in 1986.

Although census data on enterprises are scarce in developing countries, it is safe to speculate that exporting firms are also rare in LAC and elsewhere. Lederman (2010) reports that about 36 percent of a developing country sample of more than 25,000 manufacturing firms surveyed between 2000 and 2006 reported exporting (these data are from the World Bank's Enterprise Surveys, which are not censuses and are probably upwardly biased in terms of the number of exporters).[3] Lederman (2013) reports that the average export intensity (the ratio of exports to total sales) ranges from less than 1 percent (in the 2006 enterprise survey of Burundi) to 29 percent (in the 2007 enterprise survey of Bangladesh). The samples of firms from LAC countries had average export intensities ranging from less than 1 percent (in the República Bolivariana de Venezuela survey of 2010) to slightly less than 15 percent (in the Peru survey of 2010). Moreover, in Lederman's global sample of more than 55,000 firms, the correlation between export intensity and size (measured by the number of employees) is high: average export intensity among developing country firms with less than 15 employees was about 13 percent, whereas firms with more than 1,000 employees reported average exports over total sales of about 40 percent. In sum, the vast majority of private sector enterprises do not export, partly because export intensity tends to rise with the size of firms and developing economies tend to have small firms.

The literature analyzes the export decision as a function of both variable and fixed costs.

Variable costs are associated with transport and trade barriers (such as import or export taxes). The magnitude of such costs presumably varies with the quantity exported. Fixed costs (which do not vary with the quantity of exports) include investments necessary to establish foreign business partners and clients, learn about product standards (both policy-induced via regulations and consumer preferences), market products, and conduct market feasibility studies and other business due diligence particular to each foreign market.

Fixed costs can be large. Using Colombian plant-level data, Das, Roberts, and Tybout (2007) estimate that the fixed costs of exporting were more than $400,000 in 1986 (large firms tended to have fixed costs 10 percent lower than small firms). When entrepreneurs decide to export their products or services abroad, they are taking a bet that export revenues will be large enough to cover the fixed costs of exporting as well as the variable costs. The expected profits from exporting have to be higher than the profits from selling domestically.

Private sector enterprises that decide to export are thus taking an entrepreneurial leap. They are exceptional entrepreneurs who incur upfront costs in the expectation that their foreign sales will be more profitable than their domestic sales. It is widely believed that only the most productive firms are able to cover the costs of exporting and grow in foreign markets. As discussed below, most governments rely on export promotion agencies and policies that focus on providing information on foreign markets to domestic entrepreneurs with the objective of increasing national exports or diversifying the set of exported products.

Rephrasing the question about the fictional entrepreneur introduced in chapter 1: Why should policy makers care whether Javier, a well-educated wine entrepreneur from South America, succeeds in exporting high-quality wine to the United States? The concern for policy makers is not who exports but rather the size of the population of firms that are globalized.

A large body of literature suggests that more globalized economies (usually measured by the share of international trade over gross domestic product [GDP] or by indicators related to trade policies) tend to grow more rapidly than countries with less globalized economies (see Sachs and Warner 1995; Frankel and Romer 1999; Alcala and Ciccone 2004; Wacziarg and Welch 2008; Feyrer 2009; Arkolakis, Costinot, and Rodriguez-Clare 2012; and Brückner and Lederman 2012, among others). This literature has its skeptics (such as Rodriguez and Rodrik 2001), and openness to international trade need not cause economic growth. Baldwin and Robert-Nicoud (2008), for instance, argue that the impact of international integration depends on the relative magnitude of two opposing effects. On the one hand, international competition may wipe out low-productivity firms that must compete with imports in the domestic market. Although this one-time effect raises an economy's aggregate productivity (by eliminating low-productivity firms) and increases domestic consumer welfare (by making goods in the domestic market less expensive) the long-term growth rate can decline because of domestic firms' perceptions that they are less likely to "win" new varieties of goods. Such firms may reduce their investments in both physical and knowledge capital (for innovation). This analysis is similar to the discussion in chapter 3 on the impacts of competition on innovation. If investment by the typical domestic firm declines, then an economy's aggregate growth is expected to decline as well. But trade liberalization (or any reduction in fixed or variable trade costs) can reduce the marginal cost of investments in research and development (R&D) or knowledge capital by reducing the price of "knowledge capital." As capital becomes cheaper, private sector investment can rise, boosting the economy's aggregate income growth rate.

Similarly, international integration can affect the incentives of the private sector and households to invest in human capital. Another strand of the trade literature, for example, links exports to the returns to

skills or education. It shows that under most plausible scenarios for developing countries, increases in exports are associated with increases in the relative demand for skilled or highly educated workers, thus raising the returns to schooling and potentially stimulating investments in human capital (see, for example, Brambilla and others 2012; Lederman and Maloney 2012; and Brambilla, Lederman, and Porto 2012 and the literature cited therein).

In a nutshell, international integration can raise the prospects for quickening the pace of growth in the long term by raising the rate of accumulation of various forms of capital (including human capital) and enhancing technological upgrading. Such effects are not preordained, however; they depend on domestic firms' capabilities to innovate and introduce new varieties. Indeed, it can be argued that for international integration to be a source of inclusive growth, domestic firms have to have the capacity to adapt to competition by shifting their product and service varieties to sectors with higher relative domestic prices (Lederman 2013). As discussed in chapter 3, such innovation requires investing before (potentially) reaping the benefits of uncertain future profits.

Smart public interventions in the context of open, outward-oriented trade policy regimes can help reduce the fixed and variable costs of exporting for the benefit of all domestic entrepreneurs by diffusing information about the idiosyncrasies of foreign markets. Policy makers should thus care about Javier's success in foreign markets because his enterprise can become a conduit for other firms to obtain knowledge about the nature and magnitude of the fixed and variable costs of exporting to the United States at a lower cost than if Javier had not shown the way.

Contribution of export entrepreneurship in the medium term

From a policy viewpoint, increasing exports is usually the mandate of publicly funded export promotion agencies (EPAs). Data from a global survey of EPAs conducted by the World Bank (in 2010) suggest that in all regions of the world the promotion of exports dominates other policy objectives (figure 4.1). In fact, 60 percent of the 94 agencies that responded reported that stimulating export growth was the top priority, 20 percent reported that the top priority was the promotion of nontraditional exports, and another 20 percent stated that their top priority was the promotion of specific sectors.

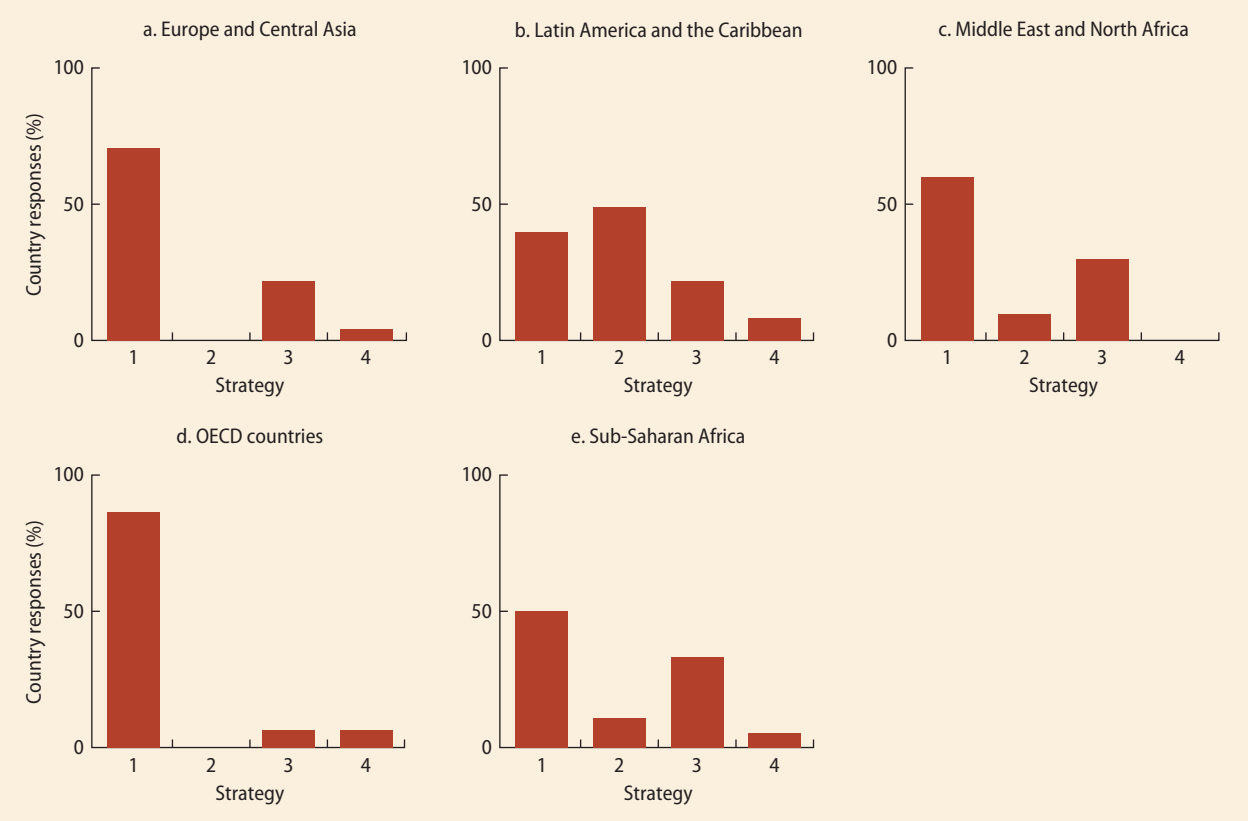
LAC agencies differ from agencies in other regions: their most important objective is the promotion of nontraditional exports; overall export growth is their second most important objective. Both are part and parcel of export entrepreneurship, however, as will become clear through this chapter.

Policy makers around the world tend to focus on export growth as an important policy objective. Hence, assessing the contribution of entrepreneurship to national export growth seems important on both analytical and policy grounds.

The key issue is the contribution of export entrepreneurs to export growth in the long run rather than their contribution in a single year. On a yearly basis, the contribution of new exporters is expected to be low, for two reasons. First, the number of new exporters is expected to be small relative to the number of incumbent exporting firms; entrepreneurs are a rare breed. Second, the average value of exports of new entrants is expected to be lower than the average for established exporters. The combination of these two factors dictates that the short-run contribution of new exporters will be small from an accounting perspective.

To the extent that export entrepreneurs can survive and attain relatively high export growth rates, their contribution to national exports tends to grow over time. Perhaps the easiest way to visualize the long-run contribution of new exporters is to recognize that today's exporters were probably not in business a century ago. In this extreme example, the contribution of export entrepreneurs to national exports approaches 100 percent

FIGURE 4.1 **Strategic objectives of export promotion agencies, by region**



Source: Lederman, Olarreaga, and Zavala 2013.
Note: 1 = promote overall exports; 2 = promote nontraditional exports only; 3 = promote specific sectors; 4 = promote industrial clusters and other objectives. Survey covered 96 countries, but only 94 responded to this set of questions. OECD = Organisation for Economic Co-operation and Development.

over time as older firms exit. Hence, the issue is how quickly this process of renewal of exporting firms occurs; the speed of renewal is associated with entry and exit rates, as well as the probability of survival of new entrants and their growth rates.

Given our interest in long-run export growth, we focus first on the contribution of entrepreneurs to exports over the period of time that is the longest possible period for which data are available for a large sample of countries: 2004–09. These data come from the Exporter Dynamics Database, a new database assembled by the World Bank's Development Research Group (Cebeci and others 2012).[4]

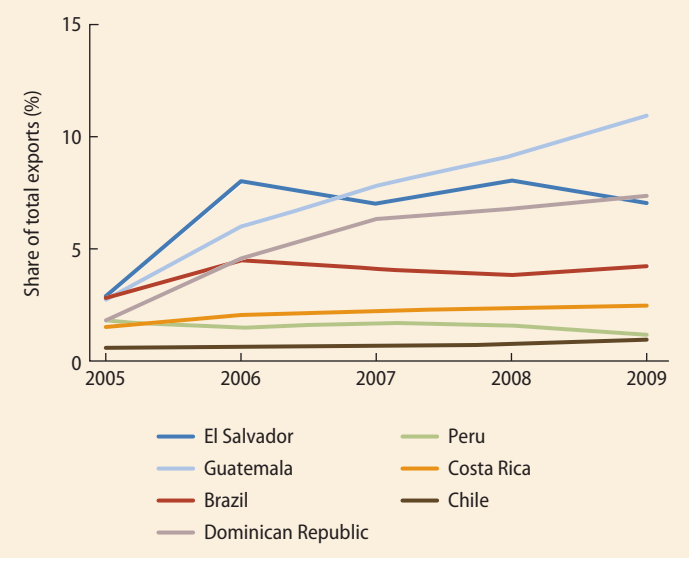
In each LAC country, we define as the 2005 exporter entrant cohort firms that were not exporting in 2004 but were exporting in 2005.[5] We define a subset of the 2005 exporter entrant cohort that includes only firms that continued to export continuously through 2009. We define as incumbents firms that were already exporting in 2004 and continued to export through 2009. For each of these three groups of firms, we examine the changes in their contribution to total exports and in the average size of firms (measured by their exports). The 2005 cohort of new exporters includes both firms that began exporting in 2005 but did not continue to export through 2009 and firms that entered in 2005 and survived through 2009. The sample of incumbents covers firms that exported every year between 2004 and 2009.

TABLE 4.1 Number of new and incumbent exporters in seven countries in Latin America and the Caribbean, 2005–09

Year	Brazil	Chile	Costa Rica	Dominican Republic	El Salvador	Guatemala	Peru
Number of firms in 2005 exporter entrant cohort							
2005	4,209	2,269	884	976	746	1,176	2,375
2006	2,272	856	488	309	303	473	1,115
2007	1,919	693	392	310	261	420	844
2008	1,662	619	340	271	237	383	689
2009	1,364	530	291	248	216	318	575
Number of firms in 2005 exporter entrant cohort surviving until 2009							
	984	314	210	104	128	221	392
Number of continuous exporters in 2004–09							
	8,472	2,345	985	586	942	1,566	1,713
Total number of exporters							
2005	19,868	6,420	2,356	2,381	2,375	3,980	5,701
2006	19,102	6,535	2,824	2,043	2,360	4,022	6,147
2007	19,624	7,402	2,862	2,951	2,499	4,174	6,351
2008	19,087	7,677	2,778	2,515	2,558	4,424	6,833
2009	18,177	6,934	2,697	2,754	2,501	4,309	7,026

Source: Calculations based on data from the World Bank Exporter Dynamics Database.

FIGURE 4.2 Share of total exports accounted for by new export entrants in seven countries in Latin America and the Caribbean, 2005–09



Source: Calculations based on data from the World Bank Exporter Dynamics Database.

Table 4.1 shows that the number of exporter entrants in 2005 is large for most LAC countries relative to the total number of exporters (this finding is consistent with the high rates of exporter entry documented in the following section). Across countries, the number of new exporters in 2005 that remain in export markets continuously through 2009 is substantially smaller, ranging from 10 percent of the 2005 exporter entrants cohort in the Dominican Republic to almost a quarter in Brazil.

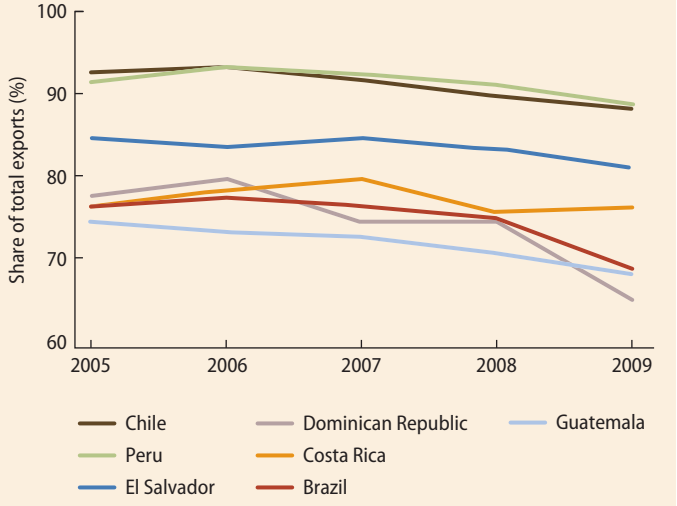
The share of national exports contributed by new entrants rose over time in six of the seven countries (figure 4.2). Only in Peru was the share of total exports from the new 2005 cohort lower in 2009 than in 2005. Perhaps more important, in all seven countries the share of total exports contributed by the incumbent exporters that continuously exported during 2000–09 declined over time (figure 4.3).[6] The decline in all countries except Costa Rica was 4–5 percentage points in just four years. The decline in Costa Rica was about 2 percentage points, but it occurred in 2008. Continued declines of these magnitudes would imply that a

country's export base of firms would be completely renewed in about 80–100 years.

Complementary evidence from other research indicates that the renewal of the pool of firms that sustains national exports can occur more quickly than implied by the exporter dynamics portrayed in figures 4.2 and 4.3. Eaton and others (2007) show that in a sample of Colombian firms from 1996 to 2005, new exporters accounted for almost half of exporting firms in any given year but contributed little to annual export growth. The few firms that survived as exporters for more than a year, however, grew rapidly and accounted for about half of the country's total merchandise export growth after a decade. Lederman, Rodriguez-Clare, and Xu (2011) report that the 1999 cohort of entrants into exporting accounted for almost 40 percent of Costa Rica's total merchandise exports by 2005, albeit with significant turnover. This evidence suggests that firm entry into export activities and survival are as important as exports from incumbent firms for aggregate export growth in the medium term.[7]

Mimicking the analyses of firm dynamics and employment generation discussed in chapter 2, table 4.2 shows annual growth rates of the dollar value of exports of the 2005 cohort of new exporters and the growth rates of continuous exporters.

FIGURE 4.3 Share of total exports accounted for by continuous exporters in seven countries in Latin America and the Caribbean, 2004–09



Source: Calculations based on data from the World Bank Exporter Dynamics Database.

TABLE 4.2 Export growth by new entrants and incumbents in seven countries in Latin America and the Caribbean, 2004–09
(percent)

Year	Brazil	Chile	Costa Rica	Dominican Republic	El Salvador	Guatemala	Peru
Growth in total exports of 2005 exporter entrant cohort							
2005/06	84.9	58.7	55.4	175.8	177.5	144.6	18.1
2006/07	5.7	17.5	18.2	47.2	–0.3	49.5	32.0
2007/08	15.5	20.6	13.8	19.8	43.8	31.5	1.3
2008/09	–14.9	–6.2	–6.5	–1.4	–30.2	11.7	–33.2
Growth in total exports of 2005 exporter entrant cohort surviving until 2009							
2005/06	165.5	133.9	127.1	399.3	262.0	320.4	135.7
2006/07	15.8	53.2	34.2	60.8	1.6	81.3	63.7
2007/08	12.8	23.4	23.3	21.4	44.6	36.5	27.6
2008/09	–20.0	–6.5	–3.9	2.0	–30.1	13.3	–30.4
Growth in total exports of continuous exporters in 2004–09							
2005/06	17.0	46.4	18.2	8.1	0.1	8.4	42.7
2006/07	14.6	16.6	9.2	–0.1	14.0	14.5	16.7
2007/08	20.3	1.7	2.1	12.3	23.5	9.4	6.7
2008/09	–28.7	–28.8	–9.4	–20.2	–22.0	–10.0	–14.3

Source: Calculations based on data from the World Bank Exporter Dynamics Database.

The first-year export growth rates for the cohort of 2005 entrants are striking. They range from 18 percent to more than 177 percent between 2005 and 2006. Growth rates for the group of entrants that continuously exported after 2005 range from 135 percent to almost 400 percent. These growth rates are upwardly biased, because they underestimate first-year exports (in 2005), because firms enter into exporting activities throughout the calendar year—that is, the value of exports reported by new entrants in 2005 was accumulated over several months, whereas their annual exports reported in 2006 cover all 12 months of the year. Bernard and others (2007) label this bias the "partial-year effect." To account for this bias, it is prudent to adjust the observed growth rates of the 2005 entrant cohorts by subtracting 30 percent from the reported growth rates for 2005–06.[8] Even after this adjustment, in every country, the 2005–06 growth rates of the entrants cohort that survived until 2009 are much higher than the growth rates of the incumbent exporters.

Growth rates of the surviving 2005 cohort tend to be higher than those of incumbents in subsequent years as well, although not for all countries. In Brazil, incumbents' exports outpaced exports by the 2005 cohort in 2006/07 and 2007/08 but not during the global financial crisis of 2008/09. In El Salvador and Peru, incumbents' exports grew more rapidly than exports by the 2005 cohort in some years. Only in these two countries did exports of incumbents decline less than exports of the 2005 cohort during 2008/09. We return to the role played by export entrepreneurship of incumbent exporters in the following section, which provides evidence that incumbents tried to cushion the blow of the decline in foreign demand in 2008/09 by introducing new products and attempting to export to new foreign market destinations.

Descriptive benchmarking of export entrepreneurship

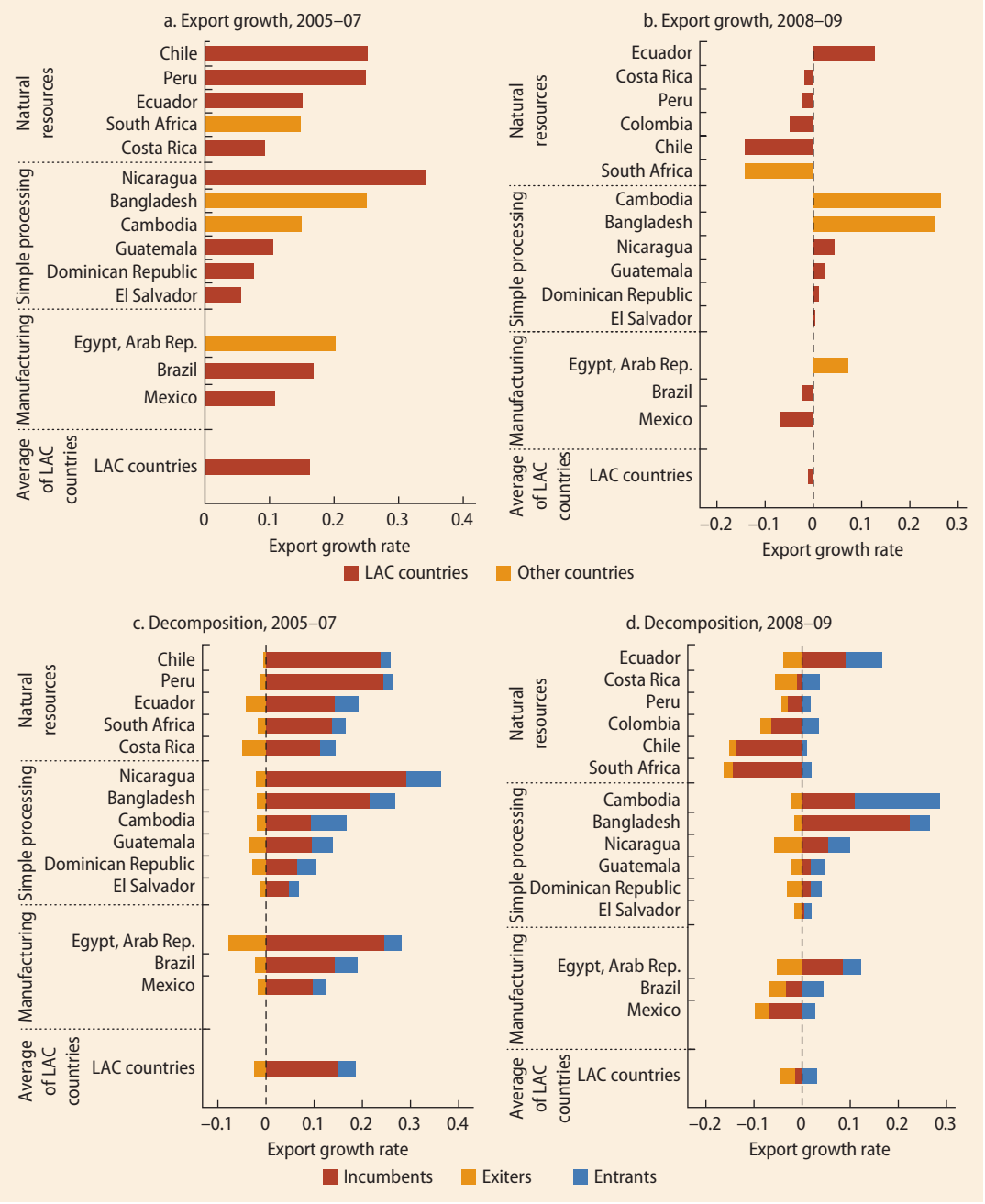
The evidence from the literature and from the new data compiled for this report suggest that export entrepreneurship is rare but has the potential to sustain high growth rates of national exports. The data in table 4.1 on the number of new exporters in 2005 implies that the rate of export entrepreneurship (defined as the ratio of new exporters to the total number of exporters) could be high in LAC. What is a "normal" export entry rate? Where do LAC countries stand relative to other countries? To answer these questions, the analyses in this section rely on the World Bank's Exporter Dynamics Database.[9]

To facilitate the descriptive international comparisons with LAC countries, Fernandes, Lederman, and Gutierrez-Rocha (2013) selected comparators for three types of economies: natural resource economies (including Chile, Colombia, Peru, and Costa Rica); simple processing or assembly economies (including Guatemala, the Dominican Republic, El Salvador, and Nicaragua); and economies with a broad export manufacturing base (including Brazil and Mexico).[10] The natural resource countries were chosen based on net exports of natural resources during 1980–2005 (see Lederman and Maloney 2012).[11] The simple processing countries have large shares of exports of apparel and textiles in their total exports, according to the database of the World Integrated Trade Solution (WITS)/United Nations Commodity Trade Statistics (COMTRADE).[12] Countries with a broad manufacturing export base had large shares of manufacturing exports in merchandise exports in 1990–2010, according to the World Development Indicators. In addition to comparator countries in each of these groups, the figures in the next section include data for "LAC countries" (the average across the region), "World higher" (the average across higher-income countries in the Exporter Dynamics Database), and "World lower" (the average across lower-income countries in the database).

Entrepreneurship and export growth during good times and bad

Figure 4.4 shows the average annual growth rate of total exports for each country in 2005–07 (the steady growth period) and 2008–09 (the global crisis). It presents the

FIGURE 4.4 **Export growth and its components in selected countries, 2005–07 and 2008–09**



Source: Fernandes, Lederman, and Gutierrez-Rocha 2013, based on data from the World Bank Exporter Dynamics Database.
Note: Data for Ecuador in panel a are for 2006–07. Colombia is not included in panels a and c because data were not available. LAC = Latin America and the Caribbean.

average contribution of the three terms in the export growth decomposition (new, incumbent, and exiting exporters).

During the steady growth period, incumbent exporters played the dominant role in explaining export growth in all LAC countries as well as comparator countries in natural resources, processing, and broad manufacturing export base countries. This finding confirms the evidence from high-income

countries (such as the United States) reported by Bernard and others (2007). New exporters contributed very little to export growth in Chile, Peru, and Costa Rica; they played a nonnegligible role in the Dominican Republic and, to a lesser extent, in Brazil, Ecuador, Guatemala, and Nicaragua in LAC as well as in Bangladesh and Cambodia (the comparators for processing countries). Exiting exporters reduced total export growth in Costa Rica and Ecuador, as well as in the Arab Republic of Egypt (the comparator for broad manufacturing export base countries). Across country types, the contribution of new exporters was more important in LAC countries experiencing moderate export growth (Costa Rica, the Dominican Republic) than in LAC countries experiencing fast export growth (Chile, Peru) between 2005 and 2007.

Average export growth rates were lower during the global recession of 2008–09. They were negative for the most developed LAC countries—Brazil, Chile, Colombia, Costa Rica, Mexico, and Peru. Incumbent exporters played a dominant role in explaining the export decline in those countries (except Costa Rica) and in increasing exports in Ecuador and Nicaragua. Exiting exporters contributed significantly to the export decline in Brazil and Costa Rica and to reduced export growth in the Dominican Republic, Guatemala, and Nicaragua during the crisis.

This evidence on LAC countries can be interpreted in the light of the literature's focus on the fixed costs of exporting. High entry rates are expected when either fixed costs are low or uncertainty is high. Because we know from other sources that entry costs can be high, the high exit rates offer another piece of the puzzle. Exit rates are likely to be high because weaker (possibly less productive) firms enter when entry costs are low or when the probability of a large payoff is high. What the evidence for the LAC region suggests is that the sunk costs of entering export markets—which play such a crucial role in the models of heterogeneous firms and trade pioneered by Eaton and Kortum (2002) and Melitz (2003)—do not seem to be very large in practice relative to the uncertainty about the sales gains from export success.

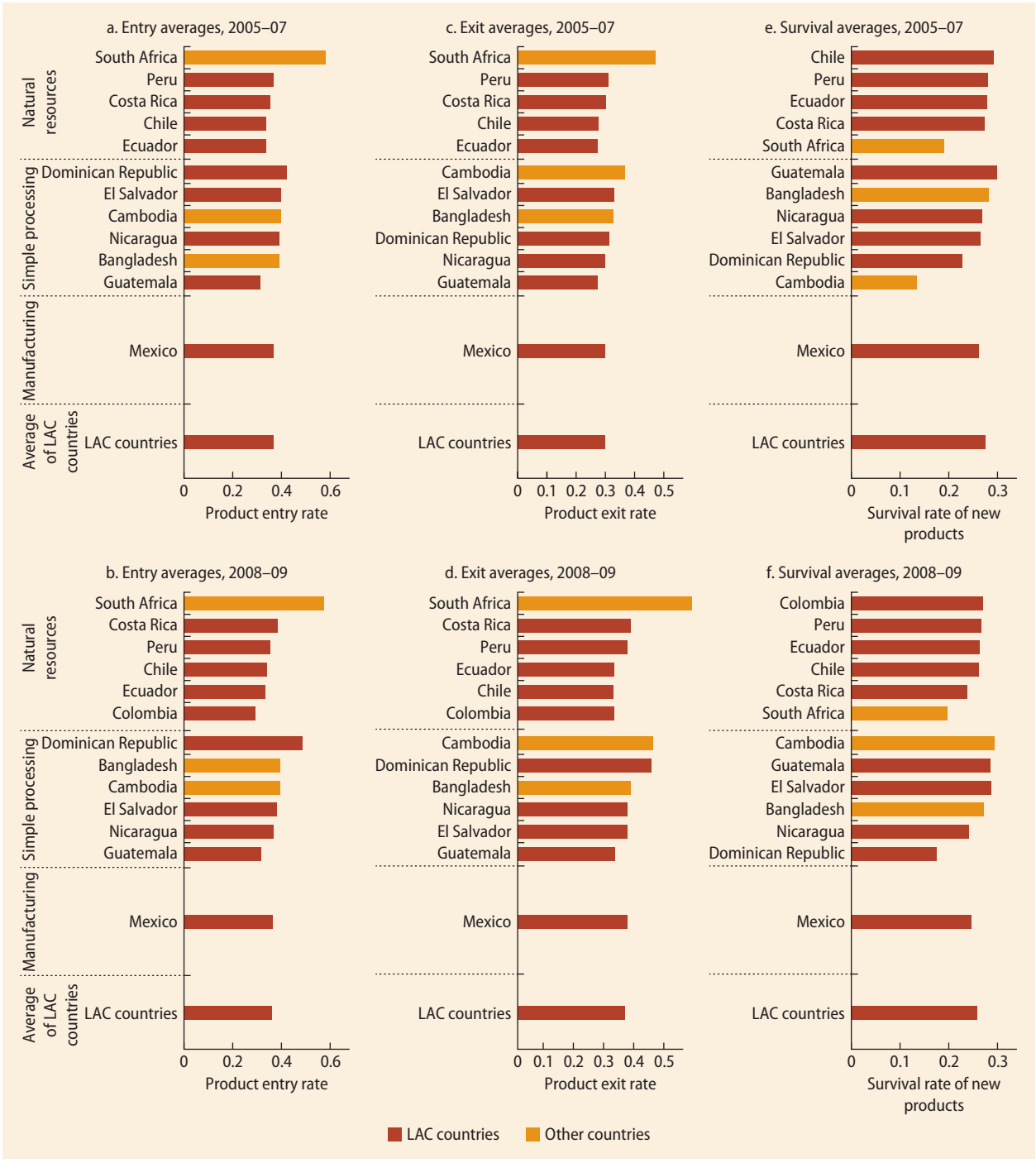
Exports of new products

Export entrepreneurship is present when incumbent exporters export new products; it is similar to the innovation of introducing new products discussed in chapter 3. To examine this dimension of innovative entrepreneurship, we focus on incumbent exporters in each country and consider products defined at the six-digit level of the Harmonized System (HS) of trade classification.[13]

Figure 4.5 presents product entry rates for incumbent exporters in each country during 2005–07 and 2008–09.[14] Incumbent exporters displayed a tremendous degree of experimentation along the product dimension during the steady growth period: on average more than a third of the products exported by incumbents in a given year were not exported the previous year. Within LAC, the rates of new product introduction by incumbent exporters were somewhat higher in processing countries, with the Dominican Republic exhibiting the highest rate (42 percent). Within the group of natural resource countries, incumbent exporters in LAC exhibited product entry rates that were more than 20 percentage points lower than the rates for incumbent exporters in South Africa. The global recession did *not* reduce export entrepreneurship by incumbent exporters along the product dimension in the LAC region as a whole, actually increasing in a few countries (Costa Rica, the Dominican Republic, and Guatemala).

To contrast with the patterns based on product entry rates, we present product exit rates for incumbent exporters in each country (panels c and d of figure 4.5). During the steady growth period, product exit rates were high in all LAC countries: on average 29 percent of the products exported by incumbents in a given year were dropped by the following year. Within LAC, product exit rates were similar across groups of countries. Among natural resource countries, product exit rates of incumbent exporters were more than

FIGURE 4.5 **Product entry, exit, and first-year survival rates of incumbent exporters in selected countries, 2005–07 and 2008–09**



Source: Fernandes, Lederman, and Gutierrez-Rocha 2013, based on data from the World Bank Exporter Dynamics Database.
Note: Data for Ecuador in panels a, c, and e are for 2006–07. Colombia is not included in panels a, c, and e because data were not available. Brazil is not included because of lack of exporter-level customs data. LAC = Latin America and the Caribbean.

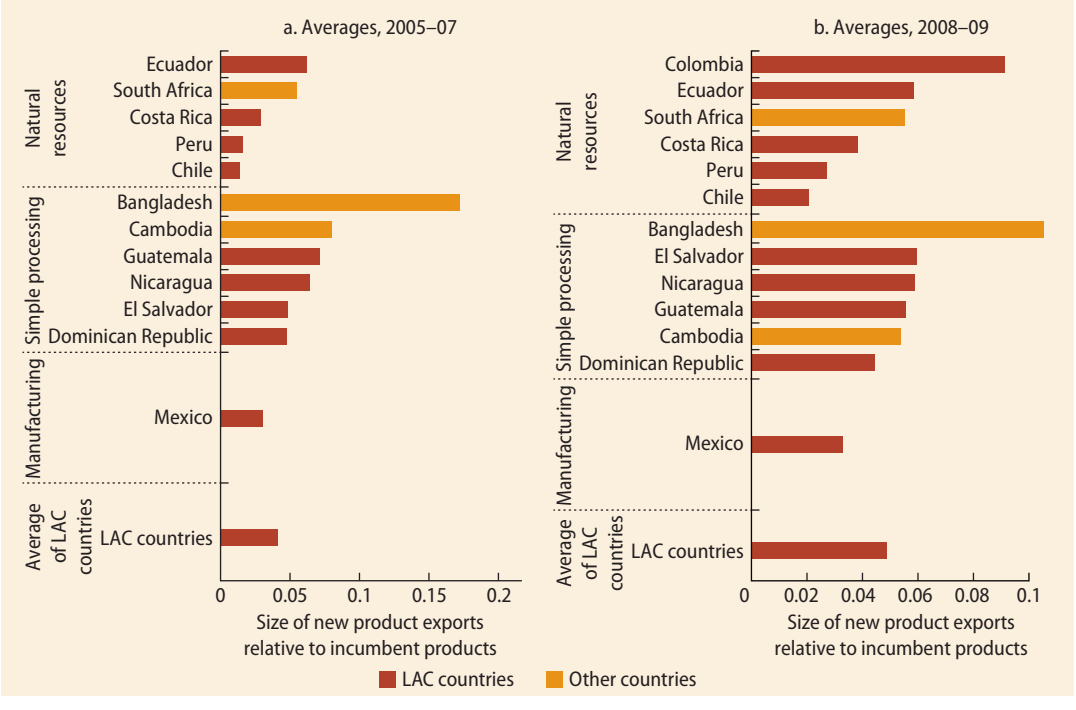
20 percentage points lower in LAC than in South Africa. The crisis increased the product exit rates of incumbent exporters substantially only in the Dominican Republic; it caused a moderate increase in Costa Rica, Mexico, and Nicaragua.

The average survival rate during the steady growth period indicates tremendous attrition: more than 70 percent of the new products incumbent exporters started to export in a given year were not exported the following year. Incumbent exporters in LAC natural resource countries exhibited substantially higher new product survival rates than incumbent exporters in comparator South Africa, however. Among processing countries, Guatemala exhibited the highest new product survival rate. The global recession reduced the survival rates of new products of incumbent exporters substantially in the Dominican Republic and moderately in other LAC countries.

Figure 4.6 shows the average export value of new products relative to incumbent products for incumbent exporters. Exports of new products were very small, ranging from less than 2 percent of incumbent product exports in Chile and Peru to 7.3 percent in Guatemala during the steady growth period. These differences may be linked to the level of maturity and experience as an exporting country, which is much higher in Chile than in Guatemala. The value of new products relative to incumbent products increased in the crisis period in Chile, Costa Rica, El Salvador, Mexico, and Peru. In these countries, incumbent exporters started to export new products at a relatively larger scale during the global recession.

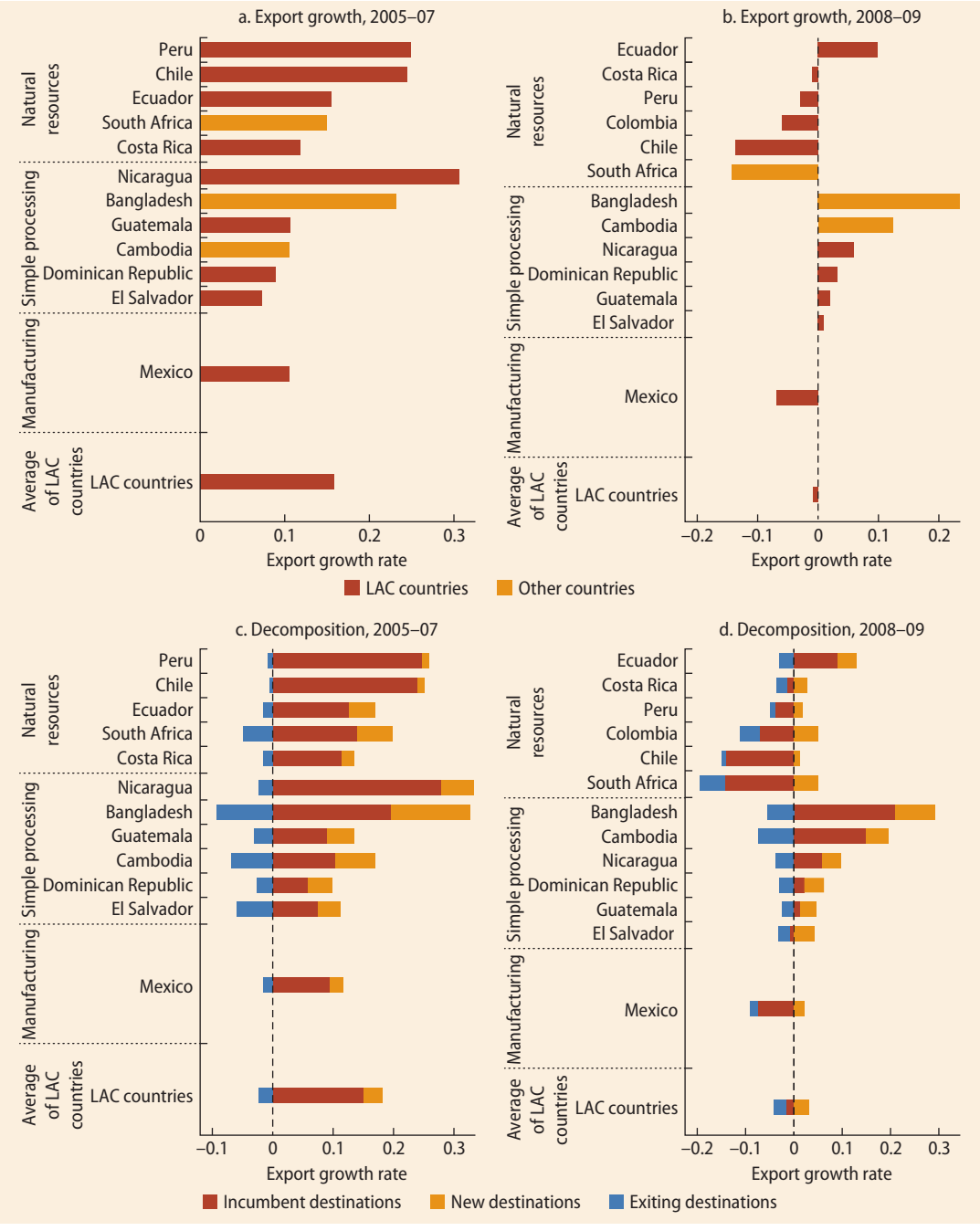
Figure 4.7 shows the average annual growth rate in total exports of incumbent exporters. It shows the average contribution of the three terms in the incumbent exporters' export growth decomposition (new, incumbent, and exiting products).

FIGURE 4.6 Size of new product exports relative to incumbent products in selected countries, 2005–07 and 2008–09



Source: Fernandes, Lederman, and Gutierrez-Rocha 2013, based on data from the World Bank Exporter Dynamics Database.
Note: Data for Ecuador in panel a are for 2006–07. Colombia is not included in panel a because data were not available. Brazil is not included because exporter-level customs data were not available. LAC = Latin America and the Caribbean.

FIGURE 4.7 Export growth of incumbent exporters in selected countries and its decomposition along the product dimension, 2005–07 and 2008–09



Source: Fernandes, Lederman, and Gutierrez-Rocha 2013, based on data from the World Bank Exporter Dynamics Database.
Note: Data for Ecuador in panel a are for 2006–07. Colombia is not included in panels a and c because data were not available. LAC = Latin America and the Caribbean.

During the steady growth period, incumbent products contributed the largest share to the growth of incumbent exporters in every LAC country. New products represented a significant share of export growth of incumbent exporters only in the Dominican Republic, El Salvador, Guatemala, and Nicaragua. One possible explanation for the importance of new products in these countries is the entry into force of the Central America Free Trade Agreement (CAFTA) with the United States, which granted incumbent exporters access to a very large market. In El Salvador, the reduction in exports because of products dropped by incumbent exporters more than compensated for the increase in exports of new products. The importance of new products in explaining export growth of incumbent exporters was smaller in LAC than in its comparators in natural resource and processing countries.

During the global recession, exports from incumbent firms declined in the most developed LAC countries—Chile, Colombia, Costa Rica, Mexico, and Peru—as well as in South Africa; exports of incumbents grew in the LAC processing countries (as well as their comparators) and in Ecuador. Incumbent products explained most of the export decline for incumbent exporters in Chile, Colombia, Mexico, and Peru and most of the export growth for incumbent exporters in Ecuador and Nicaragua. During the crisis, new products became the major contributor to export growth of incumbent exporters in the Dominican Republic, El Salvador, and Guatemala, and they accounted for a large share in Nicaragua and Ecuador. Participation in CAFTA may have partially insulated the LAC processing countries' incumbent exporters from the crisis (despite the decline in U.S. demand) by fostering entrepreneurship through the introduction of new products. This pattern of the crisis fostering entrepreneurship was also evident in Ecuador.

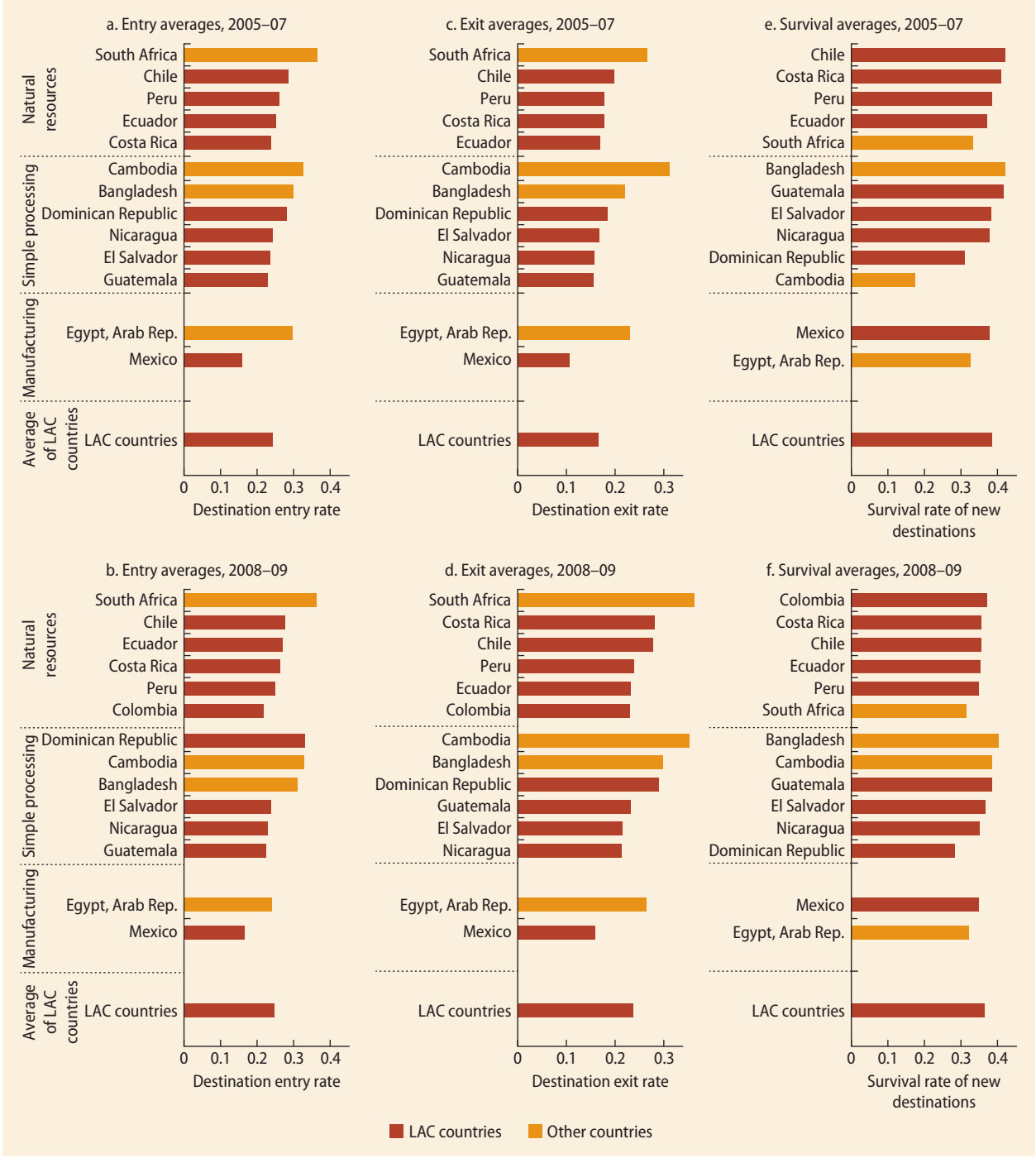
Exports to new destinations

Incumbent exporters in LAC engaged in a high degree of experimentation along the destination dimension during the steady growth period: on average a quarter of the destinations served by incumbents in a given year were not served the previous year (figure 4.8).[15] Mexico exhibited the lowest destination entry rate by incumbent exporters; entry rates did not differ much across natural resource and processing countries in LAC. However, among both natural resource and processing countries, incumbent exporters in LAC exhibited much lower destination entry rates than incumbent exporters in the comparator countries. The global recession did *not* reduce export entrepreneurship by incumbent exporters along the destination dimension in LAC; in the case of the Dominican Republic, it increased it substantially.

During the steady growth period, 17 percent of the destinations served by incumbents in LAC in a given year were dropped by the following year. Because product exit rates were lower than entry rates, there was positive net entry into new destinations between 2005 and 2007. As was the case for entry rates, Mexico exhibited the lowest destination exit rate. Within natural resource and processing countries, exit rates were similar across LAC countries. However, among both natural resource and processing countries, incumbent exporters in LAC countries exhibited much lower destination exit rates than did incumbent exporters in comparator countries. The crisis did not alter destination exit rates by incumbent exporters in LAC, except in the Dominican Republic, where exit rates increased substantially.

The average survival rate during the steady growth period indicated a high degree of attrition. More than 60 percent of the new destinations served by incumbent exporters in a given year were no longer served the next year. Within LAC, natural resource countries exhibited slightly higher survival rates than other countries. Among natural resource countries, incumbent exporters in LAC exhibited substantially higher survival rates than incumbent exporters in South Africa. Among processing countries, all LAC countries exhibited lower survival rates than Bangladesh but higher survival rates than

FIGURE 4.8 Destination entry, exit, and first-year survival rates of incumbent exporters in selected countries, 2005–07 and 2008–09



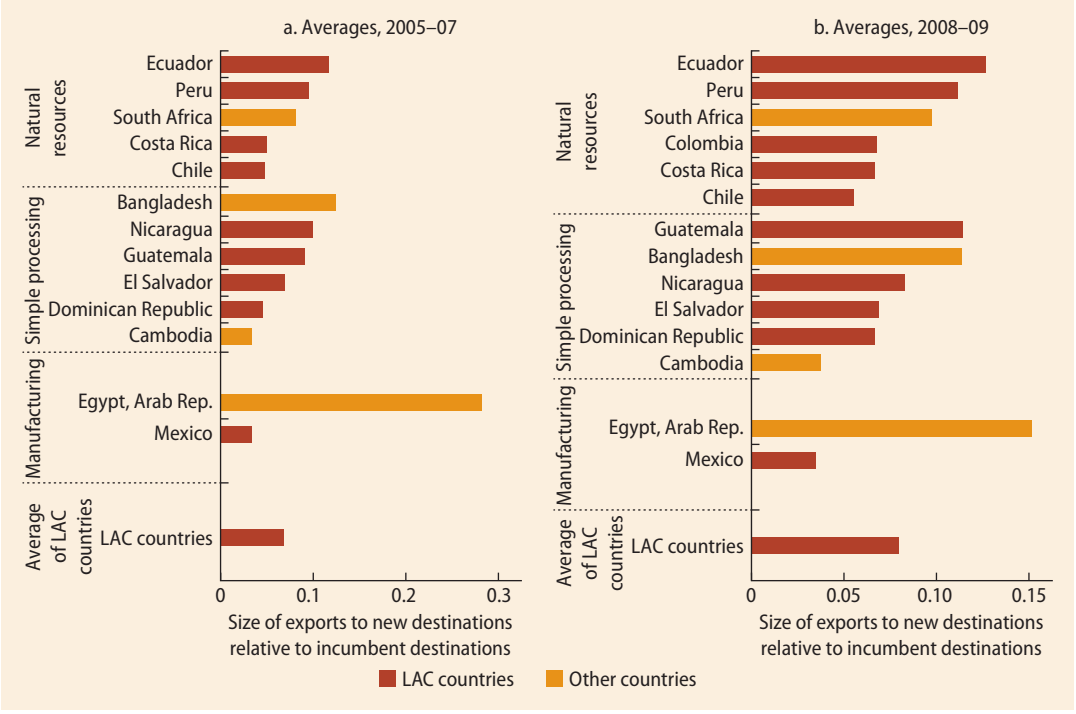
Source: Fernandes, Lederman, and Gutierrez-Rocha 2013, based on data from the World Bank Exporter Dynamics Database.
Note: Data for Ecuador in panel a are for 2006–07. Colombia is not included in panels a, c, and e because data were not available. Brazil is not included because exporter-level customs data were not available. LAC = Latin America and the Caribbean.

Cambodia. The global recession was associated with a slight reduction in first-year survival rates of new destinations of incumbent exporters across LAC.

Exports to new destinations were generally small, ranging from less than 5 percent of exports to incumbent destinations in Chile to 12 percent in Ecuador (figure 4.9). As in the case of exports of new products, we can only speculate that the differences between Chile and Ecuador reflect Chile's longer time under an open trade regime, which may have fostered outward-oriented firms with longer exporting experience. During the crisis, the value of exports to new destinations by incumbent exporters to exports to incumbent destinations increased in LAC as a whole and in most individual countries.

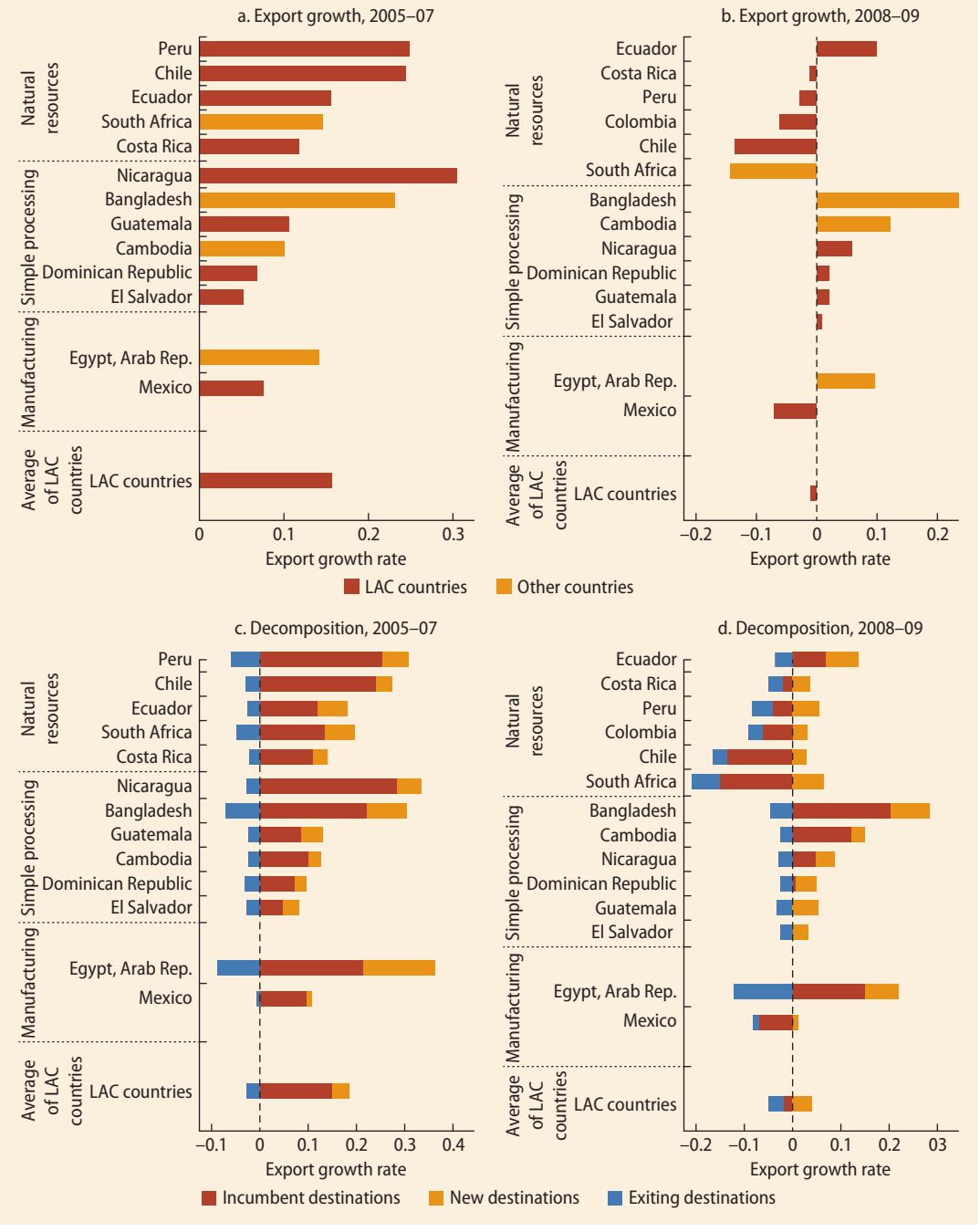
Figure 4.10 shows the average contribution of the three terms in the incumbent exporters export growth decomposition (new, incumbent, and exiting destinations). During the steady growth period, incumbent destinations accounted for the largest share of the growth of incumbent exporters in every LAC country. New destinations contributed a significant share to export growth of incumbent exporters in the Dominican Republic, Ecuador, El Salvador, Guatemala, and Nicaragua. New destinations contributed minimally to annual export growth in the LAC countries whose incumbent exporters experienced the fastest growth (Chile and Peru). In Costa Rica, El Salvador, and Peru the reduction in exports due to destinations dropped by incumbent exporters almost compensated for the increase in exports due to their new destinations. Among incumbent exporters in LAC, new destinations were less important determinants of export growth in processing

FIGURE 4.9 Exports to new destinations as a share of total exports by incumbent exporters in selected countries, 2005–07 and 2008–09



Source: Fernandes, Lederman, and Gutierrez-Rocha 2013, based on data from the World Bank Exporter Dynamics Database.
Note: Data for Ecuador in panel a are for 2006–07. Colombia is not included in panel a because data were not available. Brazil is not included because exporter-level customs data were not available. LAC = Latin America and the Caribbean.

FIGURE 4.10 Export growth of incumbent exporters in selected countries and its decomposition along the destination dimension, 2005–07 and 2008–09



Source: Fernandes, Lederman, and Gutierrez-Rocha 2013, based on data from the World Bank Exporter Dynamics Database.
Note: Data for Ecuador in panel a are for 2006–07. Colombia is not included in panels a, c, and d because data were not available. LAC = Latin America and the Caribbean.

countries than in comparator Bangladesh, and they were less important to countries with broad manufacturing export bases than in comparator Egypt.

During the global recession, exports of incumbent exporters declined in the most developed LAC countries but increased in the processing countries and Ecuador. Incumbent destinations accounted for most of the export decline of incumbent exporters in Chile, Colombia, and Mexico. New destinations played a dominant role in boosting the exports of incumbent exporters in the Dominican Republic, El Salvador, Guatemala, and Nicaragua, and they played as important a role as incumbent destinations in increasing exports of incumbent exporters in Ecuador. For the LAC processing countries and Ecuador, the crisis was associated with an increase in export entrepreneurship by incumbent exporters through the exploration of new export destinations.

Econometric benchmarking of export entrepreneurship

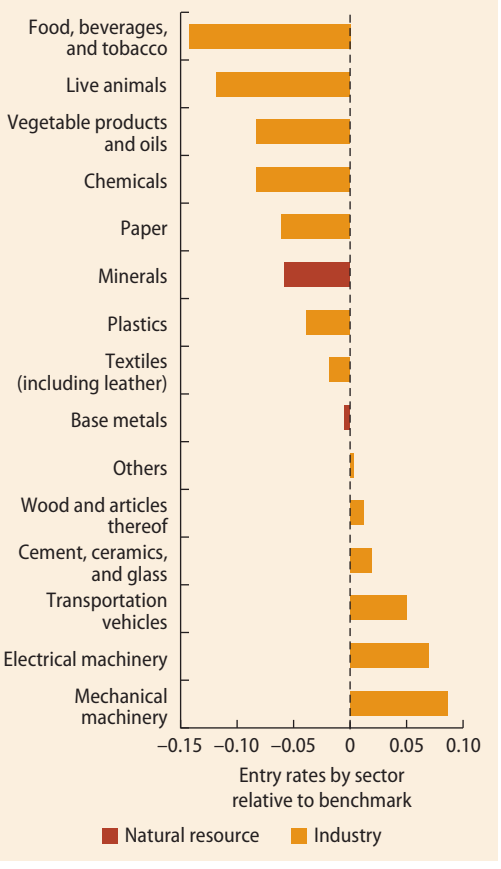
The descriptive benchmarking suggests that both new and incumbent exporters in LAC engaged in export entrepreneurship during the crisis years. It is difficult to derive firm conclusions about LAC's relative standing from descriptive statistics, however, because year, country, and industry characteristics may jointly affect entrepreneurial outcomes. For example, the finding that Chile and Peru had both the highest export growth rates and the smallest number of new exporters during 2005–09 does not necessarily mean that both solely reflect these economies' characteristics (such as relatively open and mining-dependent economies).

This section presents the results of a second set of benchmarking exercises that rely on an econometric decomposition of the sources of international differences in export entrepreneurship indicators. This methodology entails the estimation of industry, country, and year effects on the export entrepreneurship indicators observed at the firm level (full results are available upon request).

Export entrepreneurship across industries

Figure 4.11 presents annual export entry rates for 15 industries. Minerals and base metals appear in the middle of the pack. However, they are outperformed by some eye-catching manufacturing industries (such as transport vehicles) that have been central for the industrial resurgence of certain countries, such as Mexico. Industries related to agriculture—vegetable products and oils; food, beverages, and tobacco; and live animals—tend to have

FIGURE 4.11 Conditional benchmarking of export entry rates by sector, 2005–09

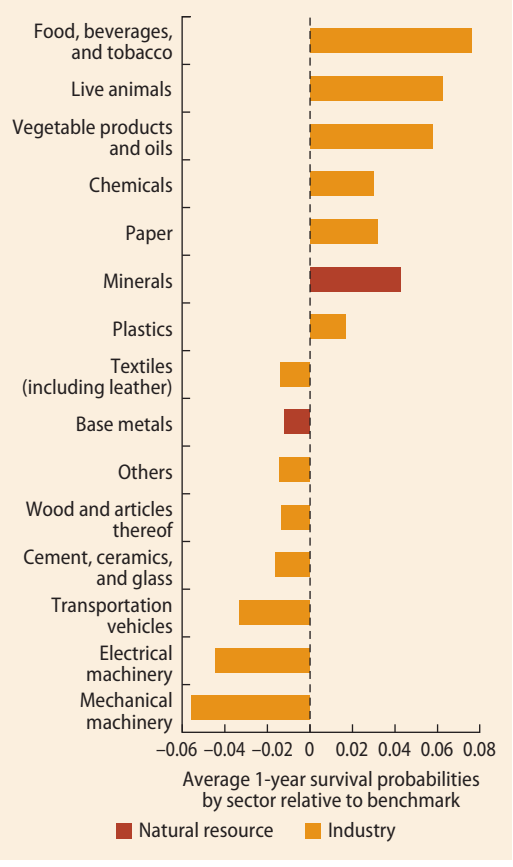


Source: Estimations based on data from the World Bank Exporter Dynamics Database.
Note: Figure shows estimates of each sector's dummy variable coefficient from an econometric model that also includes country and year dummies. Industries are defined at the two-digit level of the Harmonized System. The excluded benchmark industry is apparel and footwear. The vertical axis measures the probability of observing export-firm entry in each sector relative to apparel and footwear in percentage points.

relatively lower entry rates. The data thus do not support the notion that entrepreneurship is relatively weak in mining; to some extent, they support the notion in agriculture.

Figure 4.12 shows the industries' relative standing in terms of average survival rates one year after entry into exporting. The correlation with the rankings for entry rates is –0.977: industries with lower entry rates tend to have higher export survival rates. Mining does not stand out, but agriculture exhibits higher survival rates.

FIGURE 4.12 Conditional benchmarking of one-year export survival rates by sector, 2005–09

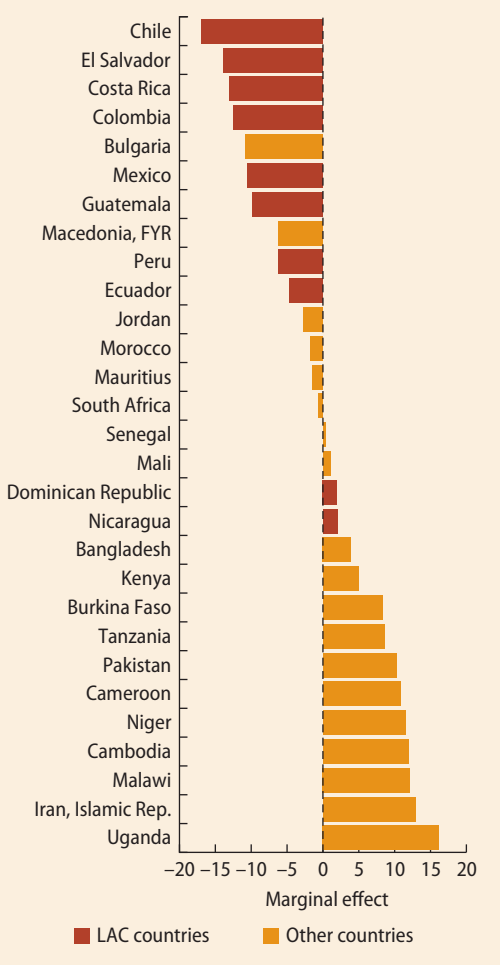


Source: Estimations based on data from the World Bank Exporter Dynamics Database.
Note: Figure shows estimates of each sector's dummy variable coefficient from an econometric model that also includes country and year dummies. Industries are defined at the two-digit level of the Harmonized System. The excluded benchmark industry is apparel and footwear. The vertical axis measures the probability of export-firm survival in each sector relative to apparel and footwear in percentage points.

Export entrepreneurship across countries

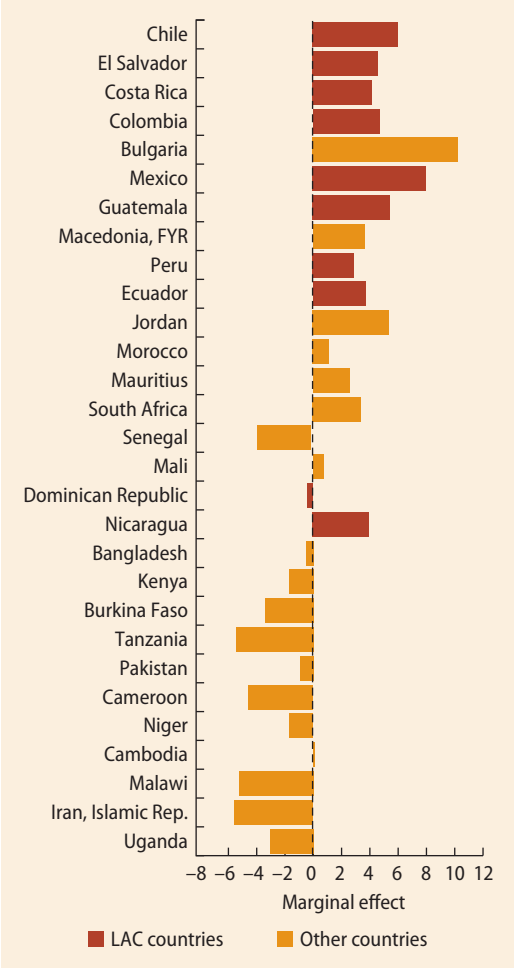
We now turn to the conditional benchmarking of LAC countries. Figures 4.13 and 4.14 present the results for two export entrepreneurship indicators, entry and survival rates. (Results for exit rates and size of exports at entry are available upon request.)

FIGURE 4.13 Conditional benchmarking of export entry rates in selected countries, 2005–09



Source: Estimations based on data from the World Bank Exporter Dynamics Database.
Note: Figure shows estimates of each country's dummy variable coefficient from an econometric model that also includes industry and year dummies. Industries are defined at the two-digit level of the Harmonized System. The excluded benchmark country is Albania. The vertical axis measures the probability of export-firm survival in each country relative to Albania in percentage points. LAC = Latin America and the Caribbean.

FIGURE 4.14 Conditional benchmarking of one-year export survival rate in selected countries, 2005–09



Source: Estimations based on data from the World Bank Exporter Dynamics Database.
Note: Figure shows estimates of each country's dummy variable coefficient from an econometric model that also includes industry and year dummies. Industries are defined at the two-digit level of the Harmonized System. The excluded benchmark country is Albania. The vertical axis measures the probability of export-firm survival in each country relative to Albania in percentage points. LAC = Latin America and the Caribbean.

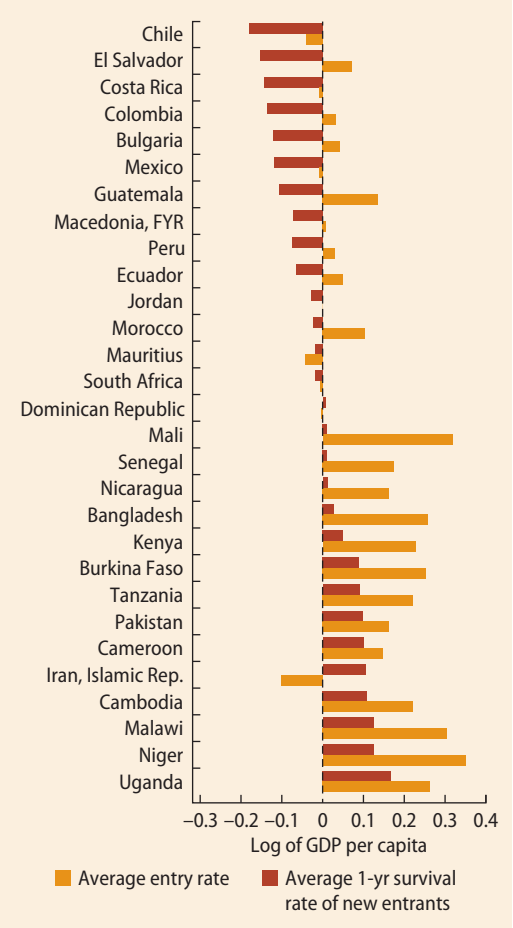
Most LAC economies appear on the left side (in red) of the rankings of entry rates in figure 4.13 (indicating poor performance). Some of the best-performing countries in terms of export growth (including Chile, Costa Rica, Colombia, and Guatemala) are on the left, whereas economies with relatively harsh business environments (such as the Islamic Republic of Iran and Uganda) are on the right. As the descriptive benchmarking suggested, entry rates may be higher in more difficult business environments. Like the subsistence entrepreneurs discussed in chapter 1, entrepreneurs operating in difficult environments may be more likely to take risks and to enter export markets precisely because domestic profits may be relatively low.

The negative correlation between entry rates and survival probabilities (–0.847) is less strong than the correlation for the industry benchmarking (compare figures 4.13 and 4.14). In addition, relatively successful LAC exporters during 2005–09 tend to have relatively low (conditional) entry rates and relatively high (conditional) survival rates. Nicaragua appears to be an outlier in this context: it had the highest conditional entry rate in the sample of LAC countries and a high survival rate for new exporters.

The higher survival probabilities of the LAC countries in this sample are explained by their higher levels of development. Figure 4.15 presents the country-specific export entry and survival rates after controlling for the level of development of each country and comparative advantage. The evidence is clear: after taking into account the level of development, LAC countries underperform in terms of export entry rates and are not overachievers in terms of survival rates. (Comparative advantage did not affect the ranking of countries, however.) In fact, after controlling for GDP per capita, only the Islamic Republic of Iran has lower conditional survival rates than the LAC countries in the sample.

The benchmarking exercises reveal important findings about the nature of export entrepreneurship. Economies that enjoyed relative high export growth rates also tended to have relatively low export entry rates, with entrants coming in at smaller sizes (compared with incumbent exporters), but their survival rates tended to be higher. Survival thus appears to be the dominant variable underpinning export growth; it may also reflect adequate business environments. However, as emphasized earlier, when the going gets tough, as it did during the global crisis of 2008–09, incumbent

FIGURE 4.15 Conditional benchmarking of export entry and one-year survival rate in selected countries after controlling for GDP per capita and comparative advantage, 2005–09



Source: Estimations based on data from the World Bank Exporter Dynamics Database.
Note: Figure shows estimates of each country's dummy variable coefficient from an econometric model that also includes (the log of) gross domestic product (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 classification, industry dummies, and year dummies. Industry dummies are defined at the two-digit level. The excluded benchmark country is Albania. The vertical axis measures the probability of export-firm survival in each country relative to Albania in percentage points. yr = year.

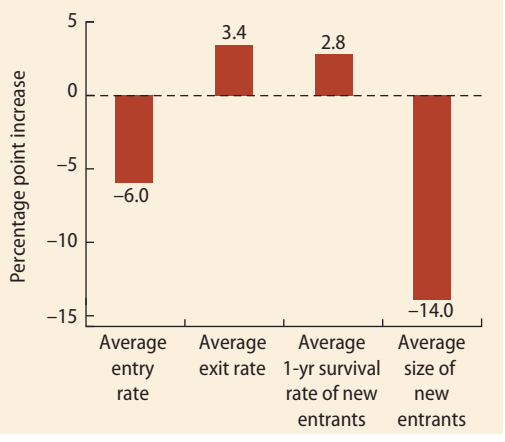
exporters become more entrepreneurial by seeking new products and, to a lesser extent, new export destinations. In addition, analyzing the role of comparative advantage as a determinant of export entrepreneurship outcomes might shed further light on the whether necessity is the mother of innovation.

The role of comparative advantage

To assess the role of comparative advantage, Ana M. Fernandes and Daniel Lederman (World Bank) estimated the models of export entrepreneurship used for the conditional benchmarking by adding an indicator of revealed comparative advantage (RCA) proposed by Vollrath (1991) as well as the level of development. This indicator takes into account the structure of a country's trade on both the export and import sides and data at the HS six-digit level. In addition to country fixed effects, broad industry fixed effects (defined at the two-digit level aggregation), and year effects, the regressions include the Vollrath index of RCA. The results for this variable are shown in figure 4.16.

Consistent with the previous findings on the quality of the business environment and global economic conditions, the RCA has a negative partial correlation with a country's

FIGURE 4.16 Partial effects of 1 percent increase in index of revealed comparative advantage on export entrepreneurship indicators in seven countries in Latin America and the Caribbean, 2005–09



Source: Estimations based on data from the World Bank Exporter Dynamics Database.
Note: Figure shows the estimated coefficients on Vollrath's (1991) index of revealed comparative advantage (RCA). The other variables included in the econometric estimations are (the log of) gross domestic product (GDP) per capita (adjusted for purchasing power parity) and sector, country, and year dummies. Industries were defined at the two-digit level of the Harmonized System; the RCA indexes were computed at the six-digit level. Differences in the magnitudes of the effects across the four indicators of export entrepreneurship reflect differences in the units of measurement: the average size of new entrants is measured as the ratio of average exports of new entrants over average exports of the average incumbent exporter in the sector. yr = year.

average export entry rate—that is, when countries offer favorable conditions, such as endowments or other policy-driven factors, for a given product, entry falls, exit and the probability of survival rise, and the average size of new entrants relative to incumbents falls (by 14 percentage points of the average value of exports of incumbent firms). Overall, the data speak loud and clear: the key for success in export markets is entry combined with survival, which tends to increase when conditions are favorable. LAC appears to underperform poorer economies in terms of entry, and it does not overachieve in terms of survival (after controlling for its level of development). The question about the impact of export promotion policies and how they affect the various dimensions of export entrepreneurship remains.

Export promotion policies

Through what mechanisms do export promotion services affect export growth? Do such mechanisms promote firm entry and survival in exporting activities? Do they help incumbents by increasing the share of exports in total sales? Or do they operate through both channels?

The answers to these questions can shed light on the social desirability of export promotion programs. Indeed, the economic justification for export promotion is often based on the existence of asymmetric information and other externalities associated with the collection of information on market conditions and business opportunities in international markets (Hausmann and Rodrik 2003). Private firms have no incentives to share this information with potential competitors after incurring the costs of discovering how to export profitably. This market failure justifies government intervention. Given the nature of the market failure, such interventions should affect firms' extensive margins (that is, the decision to enter and survive in export markets), not their intensive margins (that is, the decision on how much to export).

The literature on export promotion and firm entry is thin, but the evidence suggests that export promotion does little to explain export growth by increasing firm entry into export activities. Bernard and Jensen (2004) find that export promotion across states has no statistically significant impact on the probability of exporting in a sample of U.S. manufacturing firms. Görg, Henry, and Strobl (2008) find that export promotion grants offered to Irish manufacturing firms had no impact on the probability of exporting but did affect the level of exports. Our results, based on different data, contradict these findings.

There is also a growing body of literature on export promotion and its impact on exporting firms' intensive and extensive margins (where the extensive margin is defined either as the introduction of new products or entry into new export destinations). Based on a sample of Peruvian firms, Volpe and Carballo (2008) conclude that export promotion affects exports mainly along the extensive margin, in terms of both markets and products; it has little impact on intensive margins. Using product-level data, Volpe, Carballo, and Gallo (2011) confirm this finding in a sample of LAC countries for the period 1995–2004.

The finding of Volpe and Carballo (2008) and Volpe, Carballo, and Gallo (2011) that export promotion works mainly through the extensive margins of products and markets does not necessarily contradict the findings of Bernard and Jensen (2004) and Görg, Henry, and Strobl (2008) that export promotion has no impact on the probability of a firm exporting. Volpe and Carballo (2008) used a sample of exporting firms, and the results reported by Volpe, Carballo, and Gallo (2011) are not based on firm-level data. Thus, they cannot address the question of whether export promotion raises the probability of firms becoming exporters.

None of these studies distinguishes the impact of export promotion on entry into export markets from its impact on survival in exporting activities. The distinction is important given the large number of firms that enter and exit export activities after one year, as discussed earlier.

To identify the impact of export promotion activities on firm entry, exit, survival, and export intensity, Lederman, Olarreaga, and Zavala (2013) used firm surveys from seven Latin American countries from 2006 and 2010. They estimated a multinomial logit model to explain the probability of observing four potential paths of the status of a firm: from nonexporting to exporting (entry), continuity in exporting (survival), from exporting to nonexporting (exit), and continuity of nonexport status. The variable of interest is whether the firm used the services of an EPA between 2006 and 2010. The authors also explored the treatment effect of EPA services on the change in the share of exports over total sales (export intensity) within firms, which provide estimates of the effect of EPAs on the intensive margin of exports.

The results, some of which appear in table 4.3, suggest that having used export services significantly increases the probability of entry and survival (with respect to the probability of exiting export markets). It also decreases the probability of remaining a nonexporter. In contrast, firms that use export services do not seem to increase their export intensity. These results appear in the (unconditional) descriptive data and in the estimate of conditional EPA treatment effects; they are robust to the use of three different types of propensity matching to control for the fact that export promotion services are not randomly allocated across firms. Overall, the results suggest that entry and survival margins are the main channels through which export promotion agencies affect export growth and that they tend to be unsuccessful at increasing export intensity, thus highlighting the role of fixed costs of entry in exporting activities.

Concluding remarks

There is good news on the policy front. If the costs of entry into export markets reflect the need to gather information about the characteristics of foreign markets, export promotion policies that focus on providing such information could both increase entry and enhance the chances of survival of entrepreneurs in global markets. Preliminary evidence suggests that LAC export promotion policies are having exactly these effects, but the region's superstars still appear to have relatively low entry rates into exporting, possibly revealing an innovation gap, with unimpressive survival rates to boot. Chapter 5 continues the exploration of high-end entrepreneurs by examining the performance of superstar firms that penetrate foreign markets by exporting capital.

TABLE 4.3 Treatment effects of export promotion agencies in seven countries in Latin America and the Caribbean

Outcome variable	Size of treatment group	Size of control group	Average treatment effect on outcome	Bootstrapped standard errors	*t*-statistic
Exit	401	1,134	0.000	0.018	−0.01
Nonexporter	401	1,134	−0.403	0.034	−11.96***
Survival	401	1,134	0.344	0.038	9.10***
Entry	401	1,134	0.059	0.023	2.58***
Δexp_int	401	1,133	0.014	0.012	1.15
Δexp_int	265	261	0.035	0.018	1.92

Source: Lederman, Olarreaga, and Zavala 2013, based on data from World Bank Enterprise Surveys.
Note: The propensity score was estimated using a logit on Size, FDI, Web, and Email. Size is the log of the firm's full-time employment, FDI is foreign ownership of the firm as a share of total ownership, Web is a dummy for whether the firm has a website, and Email is a dummy for whether the firm communicates with clients via email. Exit is a dummy indicating that the firm exported in 2006 but not in 2010, Nonexporter is a dummy indicating that the firm did not export in either 2006 or 2010, Survival is a dummy indicating that the firm exported in both 2006 and 2010, Entry is a dummy indicating that the firm exported in 2010 but not in 2006, and Δexp_int is the change in the firm's total exports as a fraction of total sales between 2006 and 2010. Separation of firms into treatment and control groups was done using three different matching methods: kernel, stratification (with four blocks), and nearest neighbor. This table reports on the latter. The average treatment effect is reported as the difference in means between treatment and control groups. The last row in the table corresponds to estimations with the subsample of firms that were exporters in 2006. Bootstrapped standard errors were estimated with 50 repetitions. *** $p < 0.01$.

Notes

1. This chapter draws heavily on the work of Daniel Lederman and his coauthors, including Ana M. Fernandes (Development Research Group, World Bank) and Marcelo Olarreaga (University of Geneva).
2. The term *export superstars* was coined by Freund and Pierola (2012).
3. The firm-level data used in Lederman (2010) come from numerous World Bank's Business Environment and Enterprise Performance Surveys (BEEPS) and Investment Climate Surveys (ICS), conducted in various countries between 2000 and 2006. The coverage of these data in terms of the sampling of firms is different. The BEEPS use quota sampling, in which 10 percent of selected firms are small (2–49 employees), another 10 percent are large (250–999 employees), and the rest are randomly selected between these two extremes. The ICS sampling differs across countries. In some cases, quotas by sector and size are used. In others, existing industrial census shares by industries and size are used as benchmark sampling quotas. Thus, there may be some selectivity of the sampled firms, which may raise doubts about the randomness of the sample.
4. The Exporter Dynamics data cover all exporting firms in each country—that is, the database provides a census of exporters but not a census of all firms operating in each country, because it records only export transactions, not domestic sales. The database is available at http://econ.worldbank.org/exporter-dynamics-database.
5. For this analysis, we keep in the sample only the LAC countries with data for all years from 2004 to 2009 so that we can define the cohort of 2005 exporter entrants and follow it until the end of the sample period in 2009.
6. The shares of total exports in figures 4.2 and 4.3 need not add up to 100 percent, because the figures omit the contribution of exporters that began exporting between 2006 and 2009.
7. An important body of literature shows that the survival of new export "relationships" is an important determinant of export growth, at least in developing countries. This literature focuses on products at the tariff-line level. Evenett and Venables (2002) and Besedes and Prusa (2011) show that growth in the value of new export products or new export markets accounts for a large share of export growth in developing countries. A growing body of literature uses tariff (not firm) data showing that the intensive margin (that is, exporting more of the same product) explains most export growth (see Felbemayr and Kohler 2006; Helpman, Melitz, and Rubinstein 2008; and Amiti and Freund 2010).
8. In a study commissioned for this report, Fernandes, Lederman, and Gutierrez-Rocha (2013) show that in Peru, the probability of entry is more or less the same across the months of the year. This lack of systematic seasonality in export entry implies that the first-year exports of the new entrant cohort should probably be multiplied by 2. The reported growth rates of the entry cohort for 2005–06 can therefore be adjusted by subtracting 30.1 percent (the natural logarithm of 2) from the observed rates.
9. This section draws heavily on the study by Fernandes, Lederman, and Gutierrez-Rocha (2013), which was commissioned for this report.
10. The comparators selected are based on the availability of data on export entrepreneurship in the Exporter Dynamics Database.
11. Most LAC countries are net exporters of energy, mining, or agriculture. Costa Rica is a net exporter of various agricultural commodities. It is also a major exporter of Intel superconductors. The data used here exclude Intel exports, following the literature (for example, Lederman, Rodriguez-Clare, and Xu 2011), partly because the story of Intel is well known. Furthermore, although Brazil and Mexico are also net exporters of commodities, they have much more diversified export structures (as measured by standard indicators, such as the Herfindahl index of export revenue concentration) as well as large shares of manufactured exports in total merchandise exports.
12. Although Mexico could be classified as a simple processing country because of the importance of the *maquila* sector for its economy, we classify it as a country with a broad manufacturing base.
13. Brazil, New Zealand, and Spain were not included in the analysis in this section because we did not have the raw exporter-level customs data for those countries necessary to compute the measures used here. Egypt was not used because its exporter-level customs data are provided at the four-digit (not the six-digit) level.

14. The average number of HS six-digit products exported per incumbent exporter in LAC countries ranged from 5.8 in Ecuador to 8.9 in Peru.
15. Brazil, New Zealand, and Spain were not included in the analysis in this section, because the raw exporter-level customs data necessary to compute the measures were not available. The average number of destinations served per incumbent exporter in LAC countries ranged from 2.6 in Mexico and Nicaragua to 4.7 in Chile.

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Foreign Direct Investment, Multinational Corporations, and Innovation

5

*Multinational corporations (MNCs) employ a large share of the labor force, pay higher wages than other firms, are more productive, and have the potential to trigger positive spillovers on local firms through knowledge and technological transfers. Affiliates of foreign MNCs in Latin America and the Caribbean tend to be less innovative than multinational affiliates in other regions, but the productivity gains associated with their entry are greater than in other regions. Multinationals from the region (*multilatinas*) tend to make horizontal investments abroad rather than participate in global value chains and tend to be less innovative than MNCs from other middle-income regions.*

The past three decades were characterized by a dramatic increase in foreign direct investment (FDI) flows across the world. According to data reported by the United Nations Conference on Trade and Development (UNCTAD), the United Nations' trade and development unit, between 1980 and 2011 the dollar amount of global FDI inflows increased at the staggering average rate of 8.7 percent a year.

A number of changes in the world economy lie behind this pattern, changes that have affected investment opportunities in high-income and developing countries alike. They include the sharp reduction in transport and communication costs since the 1970s, the wave of opening to foreign activity triggered by economic reforms, the recovery of economic performance in developing countries since the 1990s, and the fragmentation of the production process. All these processes have played a role in reshaping the global landscape of FDI flows.[1]

A byproduct of the global rise in FDI flows is the consolidation of multinational corporations (MNCs) in the world economy.[2] MNCs earned $12.4 trillion in 2010, almost 20 percent of world gross domestic product (GDP), a larger share than any economy except the United States.[3] Why should policy makers care about MNCs in a report on entrepreneurship? The previous chapters described various dimensions of entrepreneurial acts associated with the process of creation, growth, and consolidation of a firm. Chapter 2 discussed the decision to enter the local market. Chapter 3 described the process of innovation of incumbent firms, including the decision of whether and how much to innovate processes or products. Chapter 4

focused on the decision to export to foreign markets, an entrepreneurial act that is limited to a very small subset of firms, typically the most productive.

This chapter examines MNCs, perhaps the ultimate manifestation of an entrepreneurial firm. These companies enter foreign markets to sell their products and organize their production and distribution processes in a more efficient manner. Firms establishing foreign affiliates must incur a number of costs associated with their activities, such as acquiring information about foreign markets, paying establishment fees, and hiring and training new employees. The magnitude of these costs implies that only firms with the highest productivity will internationalize (Helpman, Melitz, and Yeaple 2004). Going back to the typology of entrepreneurs presented in chapter 2, MNCs represent the very high-end segment of transformational firms.

Transformational firms play a fundamental role in spurring economic growth and development. MNCs employ a large portion of the labor force, pay higher wages than other firms, and are more productive than other firms (Lipsey 2002). More important, the coexistence of MNCs and local non-MNC firms gives rise to the possibility of knowledge and technological spillovers, which can enhance developing countries' growth prospects. Hence, understanding the behavior of MNCs and the factors that allow them to excel is highly relevant for policy makers in LAC.

This chapter characterizes some of the defining traits of two types of MNCs in the region: foreign MNCs and emerging Latin American MNCs—the so-called *multilatinas*. It uses new data sources that reveal the types of markets MNCs enter, the way they interact with their foreign affiliates, and their innovation efforts.[4]

Four main findings emerge from this chapter:

- Multinational affiliates operating in Latin America and the Caribbean (LAC) are less innovative than multinational affiliates operating in other middle-income regions in several dimensions. In particular, MNCs in LAC are less likely to introduce new products and to have international quality certifications. Evidence from U.S. MNCs shows that the share of research and development (R&D) performed by subsidiaries operating in LAC is smaller than the share of R&D performed by Asian subsidiaries. Moreover, whereas the shares of R&D performed by subsidiaries in Asia and the Middle East have increased over time, the share performed by subsidiaries in LAC has contracted.
- Despite the relatively low levels of innovation undertaken by multinational affiliates operating in LAC, the entry of foreign MNCs appears to have increased productivity in the region—more, in fact, than in any other region. This a priori surprising result is likely a result of the low productivity levels of firms in LAC compared with firms from other regions—LAC firms start from a lower base, making the relative impact of productivity gains larger. Most of these productivity gains are a result of knowledge and technological transfers from multinational affiliates to local firms, especially through local suppliers.
- *Multilatinas* tend to focus on horizontal investments abroad rather than participation in global value chains. The leading reason why MNCs from LAC cross borders is to serve foreign markets. In contrast, MNCs from other emerging regions internationalize to take advantage of lower labor costs and access export promotion zones.
- *Multilatinas* tend to be less innovative than other MNCs. Their R&D expenditure per $1,000 of revenue is low relative to their counterparts in other developing countries, and their management practices are far from best practices.

The rest of the chapter is organized as follows. The first section explores some salient characteristics of MNCs operating in LAC and quantifies the productivity spillovers on local firms. The second section describes some of the characteristics of *multilatinas*. The last section provides some concluding remarks.

Foreign multinational corporations in Latin America and the Caribbean

After some decades of adjustments, LAC sailed through the wave of globalization in the first decade of the 21st century with unprecedented economic strength. A series of institutional and policy changes undertaken over the past two decades, especially but not exclusively in the macrofinancial terrain, allowed the region to enjoy a decade of solid growth and macroeconomic stability during the 2000s.

Not surprisingly, these factors made LAC an appealing destination for foreign investors. Almost 70 percent of the countries in the region show levels of FDI inflows in 2010 above those predicted by their GDP and population (figure 5.1, panel a). [5] A similar picture emerges when looking at the revenues of multinational affiliates in the region (figure 5.1, panel b).

Two groups of countries in LAC deserve special attention. Brazil and Mexico, LAC's largest economies, have not only achieved levels of FDI that exceed those predicted by their country characteristics, they also place among the world's top 15 recipients of FDI flows, above India and South Africa. In contrast, Guatemala, Haiti, and República Bolivariana de Venezuela appear to be lagging in terms of attracting foreign firms.

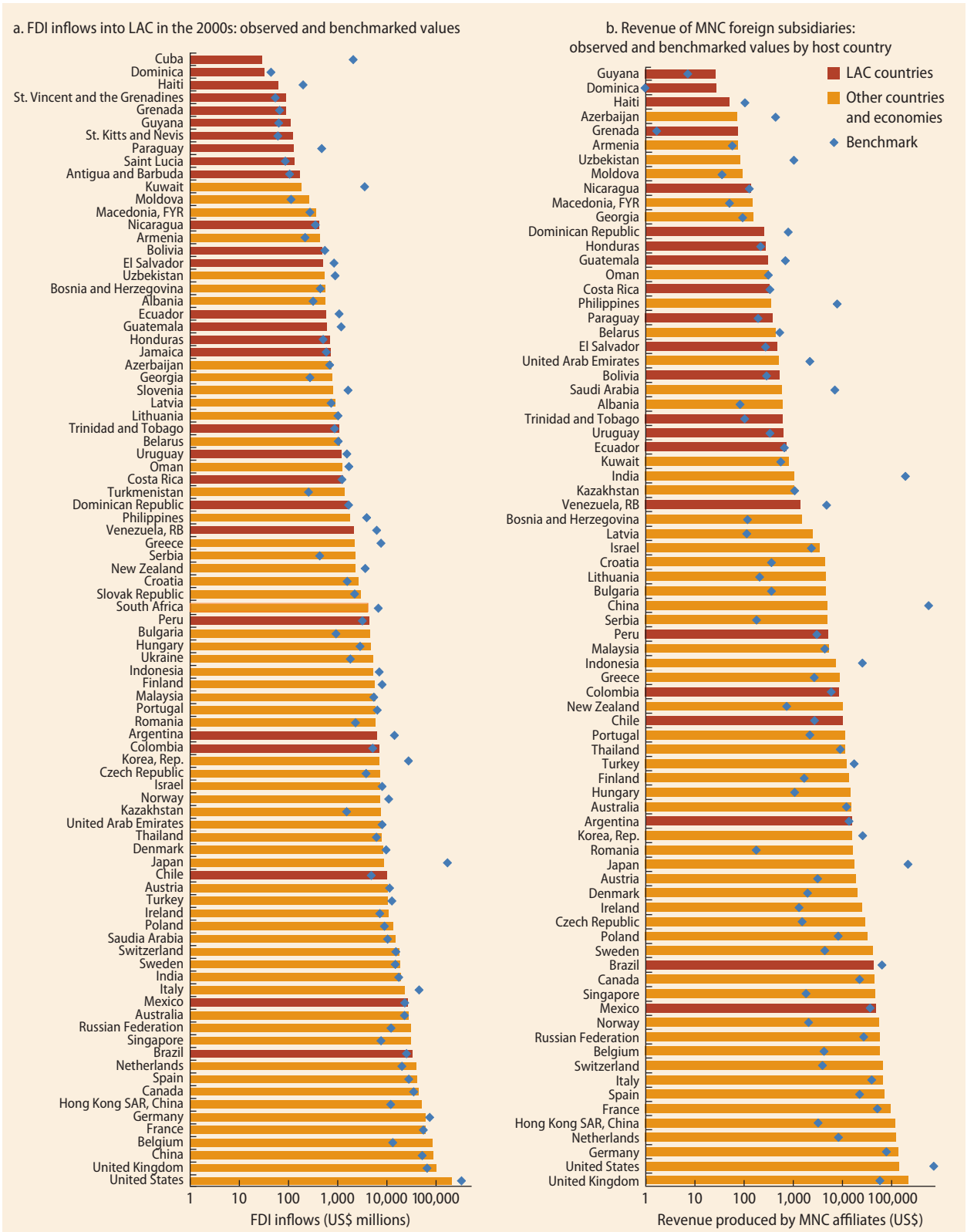
Policy makers in developing countries place attracting FDI and MNCs high on their agendas. They use incentives such as income tax holidays, tariff exemptions, and subsidies for infrastructure to attract foreign firms. According to a census of investment promotion agencies carried out by the World Bank in 2004, 78 of 110 countries were actively offering fiscal or financial concessions to foreign companies that decided to set up production or other facilities within their borders (see Harding and Javorcik 2011, 2012, for a description of the census).

Are these policy choices justified? Is the relatively large number of MNCs operating in LAC beneficial for the region? Luring foreign firms into developing economies is potentially appealing for two broad reasons. The first, and perhaps more obvious one, is enhancing factor accumulation. Foreign firms are likely to add to the capital stock of the host economy by building factories and investing in machinery and equipment. This reason alone hardly explains the vigorous efforts exerted by countries to attract MNCs, however. Policy makers believe that the overall benefits of foreign presence go beyond factor accumulation. Proponents of attracting FDI suggest that foreign presence benefits the host country in a second and more important way: by bringing advanced technologies and know-how that lead to aggregate productivity improvements and positive externalities to local firms through technological spillovers.[6]

This discussion makes the crucial assumption that MNCs are technologically superior to local firms, an idea that is supported by at least three arguments. First, most of these corporations come from high-income economies, which are closer to the technological frontier. The theory of MNCs goes beyond mere country advantages; it argues that MNCs rely heavily on intangible assets, such as firm-specific technologies, well-established brand names, and know-how or management techniques that give them an "ownership advantage" over other organizations (see Dunning 1988). Subsidiaries operating in developing economies could therefore potentially benefit from aggregate technological advantages from the MNC as a whole.[7]

Second, recent theoretical work highlighting firm heterogeneity points out that only the most productive establishments can afford the extra cost of setting up production

FIGURE 5.1 **Inward foreign direct investment and multinational activity in Latin America and the Caribbean**



Source: World Bank, based on data from UNCTAD's FDI database and Orbis.
Note: Diamonds in panel a represent the predicted value of a regression of log foreign direct investment (FDI) inflow, after controlling for log average gross domestic product (GDP) and average population in the 2000s using all countries and economies with available FDI data. Only comparable countries are displayed in the graph. Diamonds in panel b represent the predicted value of a regression of log revenue, after controlling for log average GDP and average population in the 2000s. Panel b uses the latest available information of firms that were active in 2011. LAC = Latin America and the Caribbean, MNC = multinational corporation.

facilities in a foreign country. MNCs are thus predicted to come from the upper tier of the productivity distribution of firms in the home country (Helpman, Melitz, and Yeaple 2004).

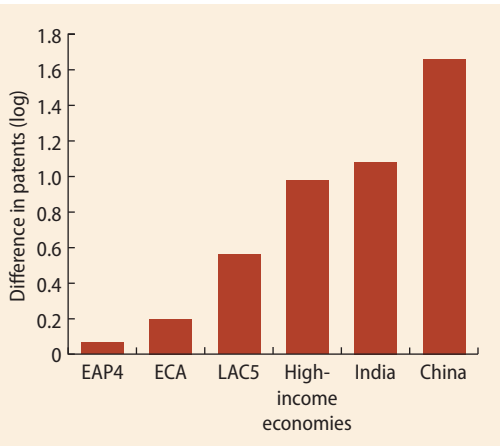
Third, by definition MNCs are multiplant, multilocation organizations and thus typically larger than non-MNCs. Their size advantage allows them to operate more efficiently by benefiting from economies of scale and scope. Origin, selection, and economies of scale all point in the direction of higher efficiency and better technologies from MNCs.

The data support the view that on average, MNCs are more productive and innovative than other firms. In 2002, for example, MNCs accounted for almost half of total R&D expenditure and almost 70 percent of business R&D (Javorcik 2010).

Patenting is another area where MNCs have a clear advantage. Across regions, headquarters of MNCs hold more patents than local firms in the country where the headquarters is located. Figure 5.2 shows the average difference between the number of patents held by parent firms of MNCs and local firms in the country origin of the MNC, controlling for country, firm, and sectoral characteristics. Thus, in Chile, it compares the number of patents of Concha y Toro, a multinational wine company, with the number of patents held by nonmultinational winemaking companies in Chile. These data reveal very large differences in the patent gap between MNCs and local firms across regions. China and India have the largest gaps, followed by high-income and LAC5 countries; Eastern Europe and Central Asia (ECA) and East Asia and Pacific (EAP4) have the smallest differences.[8] These differences do not necessarily mean that MNCs from ECA or EAP4 countries have fewer patents than MNCs from LAC5 countries; they could reflect the poor performance of local firms in LAC relative to their counterparts in ECA and EAP4 (see chapter 3). Later in this chapter we return to the comparison of MNCs from different regions.

More important to developing countries is the extent to which the overall technological and productivity advantage of MNCs translates into technological advantages of their affiliates in the developing world. The empirical literature shows evidence of such an effect. Studies on Mexico (Blomström 1983); Uruguay (Kokko, Zejan, and Tansini 2001); and República Bolivariana de Venezuela (Aitken and Harrison 1999) find evidence of higher labor productivity in foreign-owned firms than local firms. Although part of this productivity advantage is explained by higher capital intensity, differences in other inputs may also be responsible. Work by Bloom and others (2012), for example, shows that foreign-owned firms in Argentina, Brazil, Chile, and Mexico have better management practices than local firms and that the quality of management practices by foreign-owned firms in LAC is much closer to best practices than to local practices, giving support to the idea that multinational affiliates "import" knowledge from headquarters.[9]

FIGURE 5.2 Difference in number of patents held by multinational parent and local firms in home country in selected country groups, countries, and economies, 2010–11



Source: World Bank, based on data from Orbis.
Note: Calculations based on the latest available information of firms that were active in 2011. Bars represent estimated coefficients of a dummy variable taking the value 1 if the firm is a multinational parent firm in a regression of ln (1 + patents in 2010) using all firms from a given country (excluding foreign-owned firms). Additional controls include the firm's revenue in 2006, industry fixed effects, and country fixed effects. Standard errors are clustered at the industry level. For countries and economies included in each group, see note 8.

Multinational affiliates in the region appear to be more innovative than local firms in almost every dimension. Figure 5.3 shows the difference between the proportion of foreign-owned and local manufacturing firms that engage in a number of entrepreneurial activities after controlling for country and sectoral characteristics.[10]

Everything else equal, the likelihood of a firm in LAC introducing or producing a good that is new to the market is about 11 percentage points higher for foreign-owned firms, and the likelihood of introducing a new process is about 5 percentage points higher (figure 5.3). Foreign-owned firms are also about 5 percentage points more likely to file for a patent, trademark, or copyright or to collaborate with other institutions for innovation purposes; 6 percentage points more likely to invest in R&D (although this difference is not significant from a statistical point of view); and almost 13 percentage points more likely to adopt foreign technologies. The differences are even larger when comparing efforts to improve quality. MNCs are 21 percentage points more likely to engage in quality-improving investments and almost 25 percentage points more likely to have international quality certifications than local firms, perhaps indicating their higher likelihood of exporting.

FIGURE 5.3 Difference in innovation between multinational affiliates and local firms in the host economy in Latin America and the Caribbean, 2010

Source: World Bank, based on data from Enterprise Surveys.
Note: 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. Countries include Antigua and Barbuda, Argentina, Chile, Colombia, Costa Rica, Dominica, the Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Uruguay. Standard errors are clustered at the industry level. MNC = multinational corporation.

The evidence so far appears to suggest that multinational affiliates operating in LAC are able to overcome the obstacles that deter innovation by local firms in the region. Is this really the case? A comparison of multinational affiliates across regions suggests it is not: although multinational affiliates are more productive than local firms, foreign-owned firms in LAC are less innovative than their counterparts in other regions.

Figure 5.4 uses data from World Bank Enterprise Surveys to compare the likelihood that manufacturing multinational affiliates in different country groups introduce a new product. Foreign subsidiaries in non-Caribbean LAC countries are on average almost 20 percentage points less likely to introduce new products than foreign subsidiaries of high-income countries. The picture is even gloomier for multinational affiliates in the Caribbean, which are almost 40 percentage points less likely to introduce new products than their high-income counterparts. Countries in ECA and EAP4 have an average propensity to innovate that is close to that of affiliates operating in high-income economies.

The underperformance of subsidiaries operating in LAC relative to subsidiaries operating in other regions is also evident from their participation in the production of knowledge. In 2008, the share of total R&D by foreign affiliates of U.S. MNCs coming from LAC countries was almost 70 percentage points lower than that coming from subsidiaries operating in Europe and Canada (figure 5.5). Differences in characteristics between Canada and countries in LAC and Europe explain part of these differences.

A broader comparison shows equally discouraging results, however. LAC's participation was 16 percentage points lower than that of Asia and only 1 percentage point higher than that of the Middle East. Moreover, the share of R&D undertaken by subsidiaries of U.S. MNCs operating in LAC has fallen over time: in 2008, only 3 percent of total R&D by overseas affiliates of U.S. MNCs came from LAC, down from 5 percent in 1998. In contrast, between 1998 and 2008, the share of overseas R&D by Asian affiliates increased 9 percentage points and the share by Middle Eastern affiliates rose 2 percentage points.[11]

In sum, the presence of multinational affiliates appears to benefit countries in LAC by raising their productivity and innovation activities, albeit less so than in other regions. The factors that deter innovation by local firms also appear to constrain the ability of foreign-owned firms to tap the pool of intangible assets held by the MNC and to innovate in the host country. (Chapter 6 explores the factors that are likely to be behind this lack of innovation in the region.)

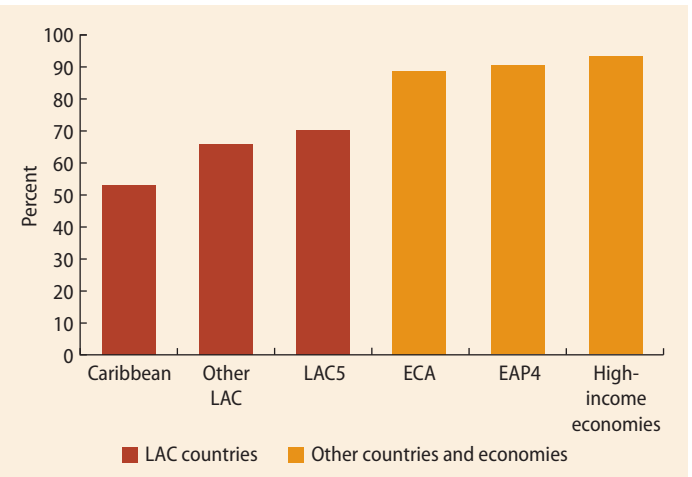
Spillovers and aggregate productivity gains from foreign-owned firms

Although the direct impact of innovation by multinational affiliates is an important channel through which MNC activity fosters growth and innovation in the host country, efforts by policy makers to attract foreign firms are based on the belief that MNCs can lead to productivity improvements in local firms and, through this channel, at the aggregate level. This motivation is of particular importance in LAC, where low productivity is widely recognized as the region's Achilles heel (Pagés-Serra 2010; de la Torre and others 2011).

Has multinational entry in LAC led to positive productivity spillovers to local firms and aggregate productivity improvements? If so, how large are these effects?

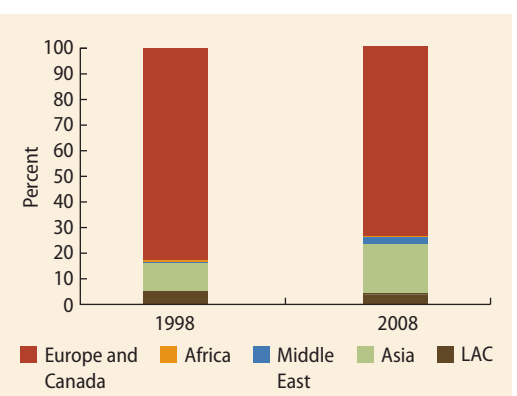
Before trying to answer these questions, it is important to point out two economic channels through which MNCs could affect domestic productivity and entrepreneurship.

FIGURE 5.4 Product innovation by foreign multinational affiliates in selected country groups and economies, 2010



Source: World Bank, based on data from Enterprise Surveys.
Note: Bars represent the coefficient regional dummies in a regression of innovation variables using only foreign-owned firms. Additional controls include industry fixed effects. Standard errors are clustered at the industry level. All coefficients are significant at the 10 percent level. For countries and economies included in each group, see note 8.

FIGURE 5.5 Research and development by foreign affiliates of U.S. multinational corporations in selected regions, 1998 and 2008



Source: National Science Board 2012.
Note: LAC = Latin America and the Caribbean.

The first is competition in product and factor markets. The arrival of MNCs clearly affects the profitability of local firms. The presence of MNCs most likely increases product and factor market competition, which may depress goods prices and exert upward

pressure on factor prices.[12] Greater competition should lead to a reduction in profits among local firms, perhaps even precipitating the exit of less productive firms.[13] This shutdown of inefficient firms is not necessarily bad news for the aggregate economy: in a healthy economic environment, it leads to the reallocation of resources toward the most productive firms, increasing aggregate productivity (see Alfaro and Chen 2013).[14]

The second channel is direct and indirect knowledge transfers. Direct knowledge transfers could arise, for instance, through the engagement of MNCs with local suppliers to raise the quality of inputs. Employee training, quality control, the lending or leasing of machinery, and the provision of advice on the firm's business strategy are some of the commonly observed support activities provided by MNCs to local suppliers (Moran 2001; Javorcik and Spatareanu 2005).

An often cited case is that of Intel's plant in Costa Rica. Larrain, Lopez-Calva, and Rodriguez-Clare (2001) show that 35 percent of local service providers and 17 percent of input providers received training from Intel. Doing business with Intel Costa Rica also appears to have led to organizational changes: 18 percent of the goods providers reported changes in their organizational structure because of their activities with Intel, and 10 percent reported being associated with foreign firms after the arrival of the semiconductor manufacturer.

Knowledge transfers from multinational presence are not limited to transfers arising from their dealings with local suppliers: intangible assets of MNCs, such as management practices, business models, or special inputs and services, may also become available to local firms outside the MNCs' production chain. MNCs may require local suppliers to provide inputs or services new to the host economy that in turn can be sold to other local firms (Rodriguez-Clare 1996; Blalock and Gertler 2005). Larrain, Lopez-Calva, and Rodriguez-Clare (2001), for example, document that local firms in Costa Rica unrelated to Intel gained access to a variety of inputs produced by Intel's suppliers that were previously unavailable in the local economy. MNCs are also a useful conduit to inform local firms about new technologies, new marketing techniques, and export markets (see Aitken, Hanson, and Harrison 1997; Javorcik and Spatareanu 2005; Chen and Swenson 2008).

Worker turnover is yet another way in which local firms may appropriate part of the MNCs' intangible assets. The accumulation of experience and the training received during workers' tenure at an MNC can enable them to take part of the firm's stock of knowledge with them if they decide to move (Fosfuri, Motta, and Rønde 2001). Using employer-employee matched data for Brazil, Poole (2013) finds a positive correlation between the share of former MNC employees and the wages paid to incumbent workers with no prior MNC affiliation, suggesting that the presence of employees with former MNC experience raises the productivity of other workers in the firm.[15]

Local firms can also benefit from public goods arising from the presence of MNCs. For instance, part of the commitments made by local governments to attract foreign firms may include public investments, which then become available to local firms. Similarly, the presence of MNCs may induce skill upgrades in the local economy that could benefit indigenous firms (box 5.1).

Although aggregate productivity increases with MNC activity irrespective of the channels at work, the effect on local firms depends on whether competition or knowledge transfers dominate. Local firms with more exposure to the competition channel, such as firms in the sectors in which the MNCs operate, typically suffer from negative spillovers, whereas firms with more exposure to the knowledge channel, such as local suppliers, are more likely to benefit from positive productivity spillovers.[16] Quantifying the relative importance of the competition and knowledge transfer channels is crucial to assessing the impact of MNC entry on firm-level and aggregate productivity.

BOX 5.1 Can a whale in a swimming pool create a splash? Intel and the upgrading of tertiary education in Costa Rica

In November 1996, Intel, the world's largest semiconductor producer, announced that it would construct a new $300 million assembly and test plant in Costa Rica. The investment community was initially stunned by Intel's announcement. After all, Costa Rica, a relative small economy, was chosen over some of LAC's biggest economies. Even Intel officials recognized that the decision was bold. Bob Perlman, an Intel vice-president, stated that bringing Intel to Costa Rica was "like putting a whale in a swimming pool." The country's economic and political stability, its proximity to the United States, and its pro-business environment were all important factors in Intel's decision (Spar 1998).

Some bottlenecks and limitations in the Costa Rican economy raised concerns for Intel. One was education. Costa Rica had a high literacy rate and a good education system, but the low number of engineers and workers with technical skills was considered a constraint on Intel's operation.

To overcome this hurdle, the Costa Rican government, Intel, and major academic institutions and technical schools joined forces to help strengthen the country's educational system. They developed a series of programs and relationships designed to increase both the number of graduates in engineering and technical degrees and the proficiency of the graduates. These programs and relationships included the following:

- Programs and enhanced curricula at the three major educational institutions—Tecnológico de Costa Rica (ITCR), Universidad de Costa Rica (UCR), and Instituto Nacional de Aprendizaje (INA)—especially during 1999–2003
- English reinforcement program at ITCR
- A one-year certificate program and a one-year associate degree at ITCR focused on new technical fields, such as semiconductor manufacturing and microelectronics, and, later, materials science
- Links with UCR's School of Physics and technological and vocational schools for electronics
- Support for the electrical, electronics, computing, and industrial engineering fields.

The benefits of these programs have exceeded those that came directly from Intel. A survey of 20 Costa Rican firms identified by CINDE, Costa Rica's investment promotion agency, as potential competitors of Intel in the labor market revealed that all but one saw the arrival of Intel as positive for the accumulation of human capital. Of these firms, eight had hired a graduate from ITCR's one-year certificate, and all reported benefiting from the creation of this program.

The spillovers of Intel's presence can also be seen in the stock of engineers in Costa Rica. The number of graduates from engineering programs in Costa Rica reportedly increased by almost 40 percent between 2002 and 2011, from 1,580 to almost 2,200 (UNESCO [United Nations Educational, Scientific and Cultural Organization]).

In sum, Intel's presence has played an important role in increasing the stock and the quality of workers with technical skills in Costa Rica. The benefits associated with these achievements go beyond the boundaries of Intel. To put it in Bob Perlman's words, the whale in the swimming pool created a big splash.

Sources: Spar 1998; Larrain, Lopez-Calva, and Rodriguez-Clare 2001; World Bank Group 2006.

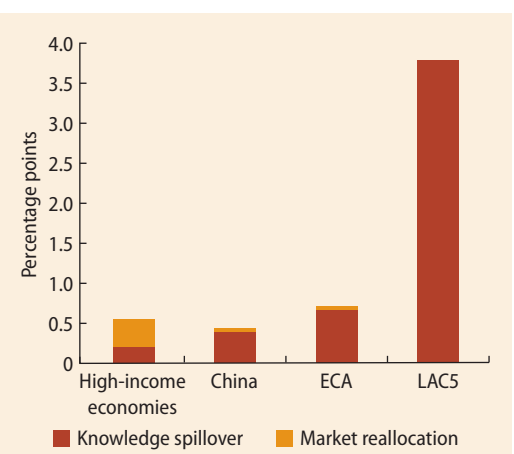
This is precisely what Alfaro and Chen (2013) do. They use a standard economic model of MNC activity similar to the one presented in Helpman, Melitz, and Yeaple (2004) to estimate the aggregate productivity gains from MNC entry as well as the relative weight of knowledge transfers and competition in explaining these gains. They use a sample of manufacturing firms taken from Orbis from 60 countries, 5 of which (Argentina, Brazil, Chile, Colombia, and Mexico) are in LAC.

The results are striking: doubling MNC entry into LAC countries would increase

aggregate productivity by 3.8 percent (figure 5.6). This number is six times higher than in ECA or high-income economies and seven times higher than in China. More important, and in contrast to other regions, knowledge spillovers run the entire show in LAC, explaining 100 percent of the estimated aggregate productivity gains from MNC entry.[17]

Although the large spillovers Alfaro and Chen (2013) find for LAC may seem at odds with the poor performance of the region in terms of productivity and the underperformance of MNCs operating in LAC in terms of innovation, all these pieces are consistent. Indeed, the marginal productivity gains for local firms from MNC entry through knowledge spillovers are expected to depend on both the technological gap between local firms and multinational affiliates and the productivity level of local firms: spillovers are likely to be larger, the larger the technological gap between local and foreign firms and the lower the productivity of local firms. The evidence in LAC points to a large gap between foreign-owned and local firms and to low productivity by local firms (Pagés-Serra 2010), suggesting a large potential for spillovers in the region even in the absence of vigorous innovation activity from MNCs operating in the region. In contrast, in other regions there appears to be a smaller gap between multinational affiliates and local firms.

FIGURE 5.6 Sources of predicted productivity gains associated with entry of multinational corporations, by country groups, countries, and economies, 2002–10



Source: Alfaro and Chen 2013.
Note: Bars represent total productivity gains from doubling the probability of entry by a multinational corporation, estimated though a structural model. For countries and economies included in each group, see note 8.

Capitalizing on the spillovers from multinational activity: Scope for policy intervention

The policy implications of this surprising result are immense. In particular, it highlights the large premium of policies that foster the attraction of MNCs and their spillovers to local firms. What types of policy interventions could yield these goals?

Policy makers have typically pursued three sets of policies to achieve these objectives. The first are policies aimed at attracting FDI and MNCs, such as tax holidays or cash incentives. One policy tool that has proven very effective in attracting FDI is the establishment of investment promotion agencies (IPAs). IPAs actively look for foreign investors and provide them with valuable sectoral and country information during their decision process.

Using information from a survey of actual and potential foreign investors, Kenyon and Margalit (2012) show that the information provided by IPAs about local markets to foreign investors is crucial in their decision-making process. Harding and Javorcik (2011) show that FDI into sectors targeted by IPAs is larger than FDI to other sectors.

These agencies have flourished in LAC since the 1990s. Are they working? More efforts are needed to improve the quality of these institutions, as suggested by the results of the 2012 Global Investment Promotion Best Practices (GIPBP) report prepared by the World Bank Group. The GIPBP assesses two aspects of the information facilitation role of IPAs: their ability to handle inquiries from foreign investors in a professional

and speedy manner and the clarity and content of their websites. Harding and Javorcik (2013) find that countries with IPAs that are better able to handle queries and have clearer information on their websites tend to attract more FDI. The 2012 GIPBP highlights that IPAs from LAC still suffer from weaknesses in handling inquiries from potential investors and serious deficiencies in their websites, especially in countries in South America. As a result, IPAs from LAC score 48 on a 100-point scale—far from the 64 scored by IPAs from high-income Organisation for Economic Co-operation and Development (OECD) countries.

A second set of policies concentrates on improving the general business environment. Policies that improve human capital or institutions fall in this category. These policies typically seek to achieve multiple objectives at the same time. They are good ways to attract FDI while reducing the barriers that hinder both the ability of multinational affiliates to innovate and the capacity of local firms to absorb knowledge transfers from MNCs.

These policies are of tremendous importance in achieving the goals mentioned above because LAC still suffers from substantial deficiencies in areas such as human capital and financial access, some of which are likely to prevent it from exploiting the full potential of MNC activity.[18, 19, 20]

These barriers have implications for the allocation of the productivity gains from knowledge transfers in the host economy. Indeed, many studies find that MNC spillovers in LAC are concentrated among the largest firms.[21] As a result, barriers in the absorptive capacity of local firms could cause MNC activity to accentuate productivity differences across firms in a region that suffers from a very uneven productivity distribution (Busso, Madrigal, and Pagés-Serra 2012), something that can create political economy constraints to the attraction of FDI.

A third set of policies attempts to strengthen the links between foreign-owned firms and the local economy. They include minimum local content requirements, labor requirements, and import substitution policies. This set of policies is more complex to evaluate at a regional or even country level, because doing so requires in-depth analysis of their detailed characteristics and interactions. Their characterization goes beyond the scope of this chapter.

Fine-tuning the balance among these three policy areas is fundamental and constitutes a serious challenge for policy makers, as policies aimed at strengthening one objective may end up weakening the other. Take, for, instance, minimum content requirements. Such requirements strengthen the link between multinational affiliates and local firms and could generate larger knowledge spillovers. But in countries where the quality of inputs produced by local firms is poor, they could discourage new MNCs from entering the host country and limit the incentives of incumbent multinational affiliates to innovate. The balance among the three types of policies will depend on the specificities of each country.

Multilatinas

Foreign presence is an important aspect of globalization and economic integration for developing countries, but not the only one. An equally important feature of the increase in global FDI flows is the role played by developing countries as a source of FDI and the rise of MNCs from these countries.

Aggregate FDI outflows from LAC grew at an annual rate of 16 percent from 1980 to 2011, rising by a factor of 15 as share of GDP over the same period (from 0.13 percent of LAC's GDP to 1.9 percent). LAC's weight in total FDI outflows also increased. In the 1980s, a meager 1.2 percent of total FDI outflows came from LAC countries; in the 2000s, this number reached 5.2 percent. Many *multilatinas* are now global players, with 18 of them among Boston Consulting Group's list of top 100 firms from emerging markets to watch (BCG 2006; Santiso 2008).

Can *multilatinas* be another vehicle for innovation upgrades in LAC? The internationalization of these firms could give them access to technologies and know-how available in foreign markets, which they can import back home. In addition to giving *multilatinas* access to existing top technologies, the internationalization of these firms can boost their own innovation potential. For instance, access to a large pool of skilled workers and more developed financial markets may allow these firms to overcome some of the constraints to innovation they face at home.[22] Good knowledge of the workings of the home country's economy (institutions, markets, and so forth) and the tight connection with local firms might suggest that the potential for knowledge spillovers from *multilatinas* to the local economy is large.[23]

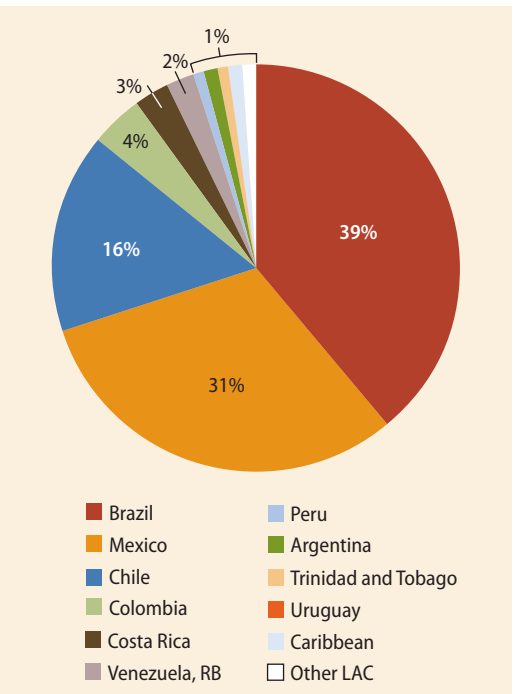
In fact, the evidence indicates that the potential for *multilatinas* to bring widespread productivity and innovation gains into the region is limited, for a few reasons. First, the emergence of *multilatinas* is heavily tilted toward a very small number of countries. Indeed, *multilatinas* from Brazil, Chile, Colombia, and Mexico account for 90 percent of the revenue earned by these firms (figure 5.7). Interestingly, MNCs from Costa Rica, a relative small country in the region, have positioned themselves as important players, accounting for about 3 percent of total revenue and standing above their counterparts from countries such as Argentina, Peru, and República Bolivariana de Venezuela.

To be sure, country characteristics such as GDP and population partly explain the heterogeneity in the performance of *multilatinas* from different countries. Figure 5.8 takes these differences into consideration by presenting both the observed dollar amount of the revenue produced by MNCs from different countries and the level predicted by GDP and population by means of a multivariate regression.

The picture that emerges from figure 5.8 is discouraging. Revenues of *multilatinas* from most LAC countries are lower than predicted by their income and population. Even LAC's two top performers in absolute numbers, Mexico and Brazil, are far from their benchmark level. There are, however, some bright spots. Chile and Colombia are not only among the top four *multilatina*-producing countries, they also overperform relative to their country characteristics. *Multilatinas* from the Caribbean countries also appear to excel once the size of their economies is taken into account.

Anecdotal evidence suggests that there are large differences in the origins of *multilatinas* and MNCs from other regions. In the United States—and to a lesser extent East Asia and the Pacific and the Republic of Korea—most MNCs are private firms that took the leap and started operating in foreign markets. In contrast, many *multilatinas*, especially the

FIGURE 5.7 Share of total revenues of *multilatinas* by country or country group of origin, 2010–11



Source: World Bank, based on data from Orbis.
Note: Calculations are based on the latest available information of firms that were active in 2011. For countries included in Other LAC, see note 8. LAC = Latin America and the Caribbean.

larger ones, were public sector companies that were privatized in the wave of liberalization of the 1990s and enjoyed monopoly power for long periods of time (Casanova and others 2009).

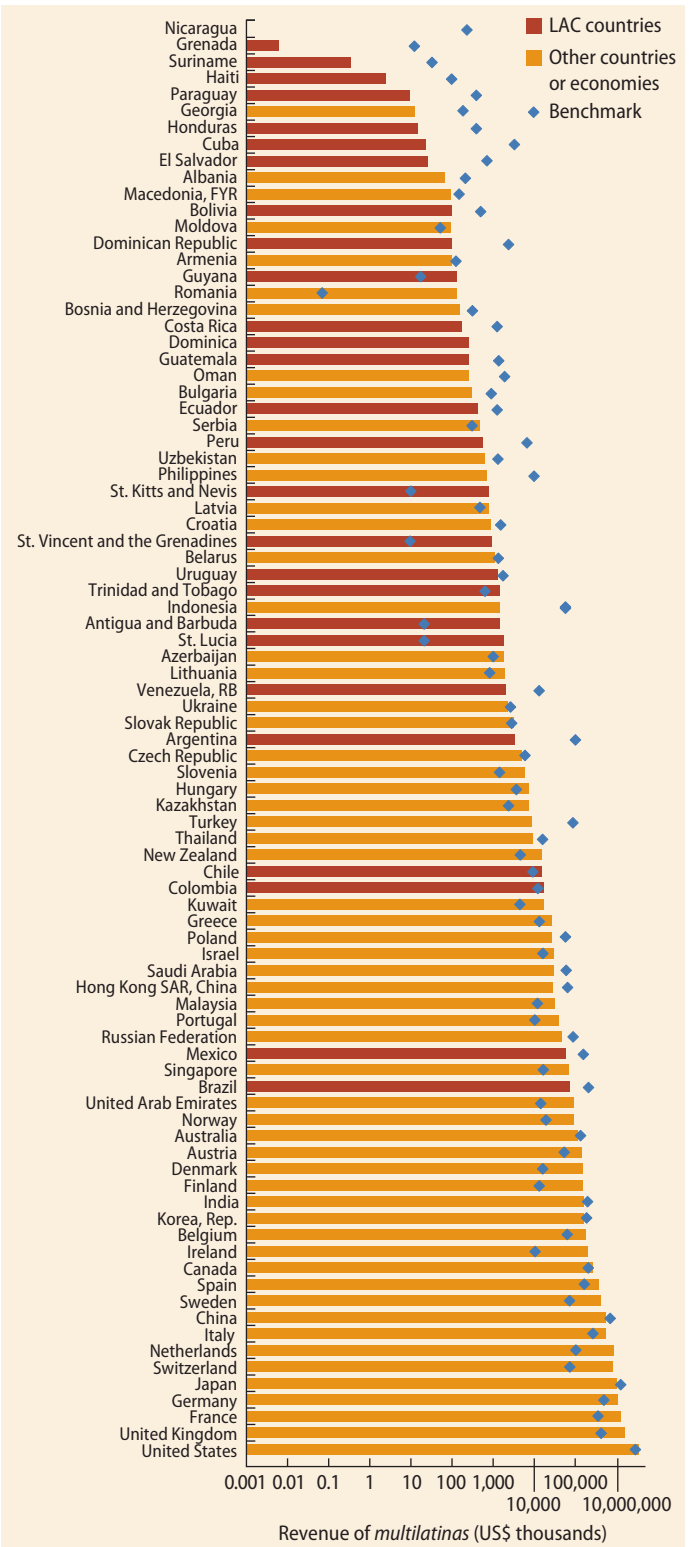
Drivers of internationalization

In addition to differences in origin, there also appear to be differences in the motivation for internationalization of *multilatinas* and MNCs from other regions. Tapping into foreign countries to open up new markets and to diversify country risk is one of the leading reasons why LAC firms cross borders (Alfaro and Hammel 2006; Casanova and others 2009). Kenyon and Margalit (2012) asked firms in four emerging market countries—Brazil, India, Korea, and South Africa—about the main motivations for investing in other emerging markets. The firms were randomly drawn from registries that included all firms in each country with annual revenues of at least $25 million and that operated in one of five sectors: finance and insurance, manufacturing, wholesale trade, retail trade, and transportation and warehousing.

The results yield two conclusions. First, the decision by Brazilian firms about where to invest is driven primarily by market opportunities. In particular, the presence of key customers and attractive domestic markets are key factors (figure 5.9, panel a). Second, Brazilian firms are much more focused on the opportunities offered by the domestic market than are firms from other countries. They are significantly less concerned than their counterparts about the quality of the workforce, labor costs, and regulatory transparency of the host country (figure 5.9, panel b).

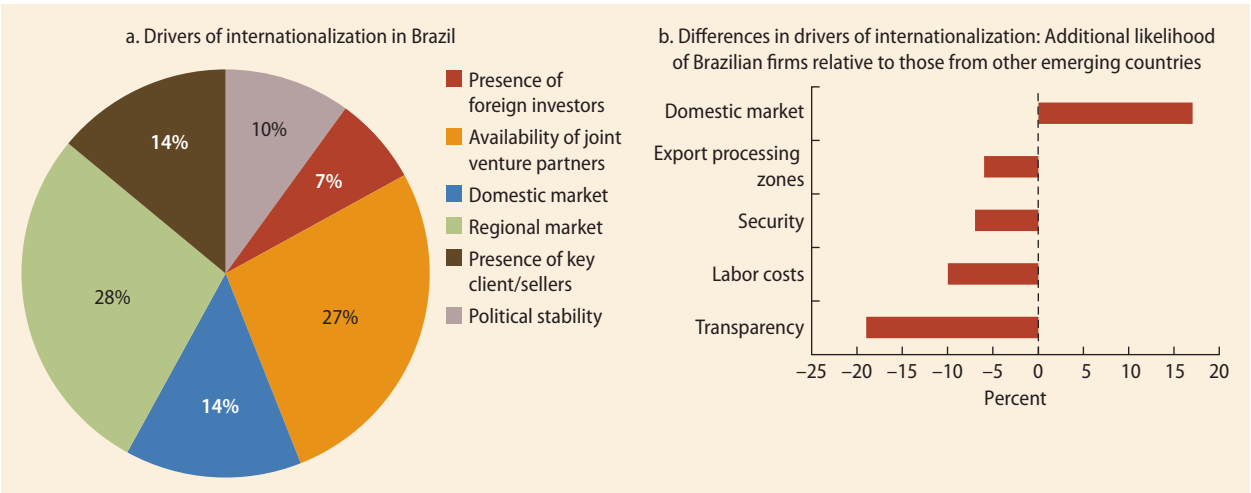
The fact that *multilatinas* internationalize in order to expand markets implies that their foreign subsidiaries tend to operate in the same sector as the headquarters. Figure 5.10 divides the subsidiaries of MNCs from different regions into three groups: firms operating in the same sectors as the headquarters (horizontal), firms providing inputs to the headquarter (upstream of headquarters), and

FIGURE 5.8 Actual and benchmarked revenue of multinational corporations in selected countries and economies, relative to given characteristics, 2010–11



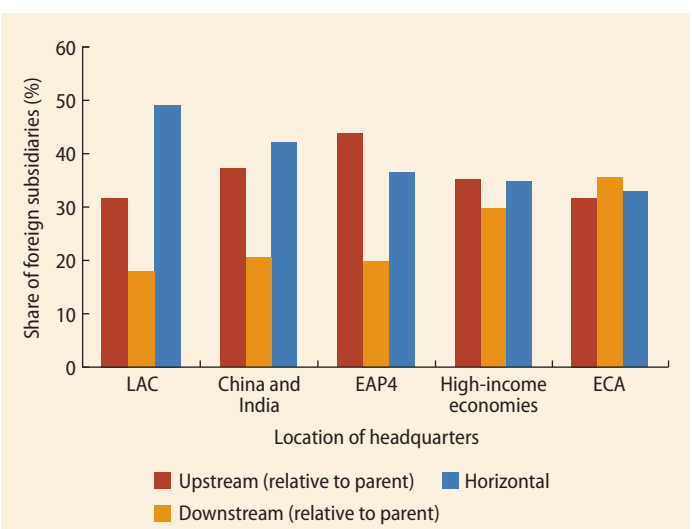
Source: World Bank, based on data from Orbis.
Note: Calculations are based on the latest available information of firms that were active in 2011. Diamonds represent the predicted value of a regression of log revenue, after controlling for log average gross domestic product and average population in the 2000s. LAC = Latin America and the Caribbean.

FIGURE 5.9 Factors driving Brazilian firms to cross borders, 2010–11



Source: Kenyon and Margalit 2012.
Note: Comparator countries are India, the Republic of Korea, and South Africa.

FIGURE 5.10 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: Calculations are based on the latest available information of firms that were active in 2011. 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 8.

firms obtaining inputs from the headquarters (downstream from headquarters).[24]

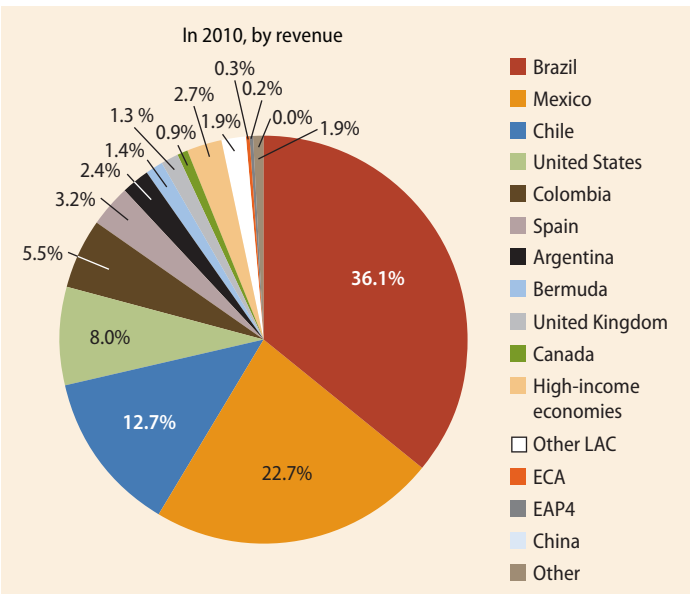
The results show that the pattern of linkages between headquarters and subsidiaries observed for *multilatinas* stands in sharp contrast to that observed in other regions. By and large, *multilatinas* establish horizontal links with their subsidiaries: almost half of their foreign subsidiaries operate in the same sector as their headquarters. In contrast, foreign subsidiaries of MNCs from other regions tend to establish vertical linkages with their headquarters. For example, about 40 percent of foreign subsidiaries of Asian MNCs operate in the same sector as the headquarters. This number is even lower in ECA and high-income countries, where only 35 percent of subsidiaries operate in the same sector as the parent company.

An implication of this pattern is the limited scope for *multilatinas* to transfer knowledge to the home economy through their involvement in global value chains. Global value chains are the ultimate manifestation of the fragmentation of the production process of MNCs, whereby each subsidiary in the organization produces inputs based on its comparative advantage.[25] This fluid movement of tangible and intangible inputs within

MNCs leads to enhancements in the transfer of a wide array of technologies and knowledge across borders.

The market-driven orientation of *multilatinas* has also led to a specific sequence of geographical expansion in which firms establish operations in neighboring countries before crossing beyond regional borders. In fact, most subsidiaries of *multilatinas* remain constrained to LAC: nearly 85 percent of the revenues of their subsidiaries come from within the region (figure 5.11). Although this pattern leads to regional integration, which could have important benefits, it prevents *multilatinas* from seizing some of the potential innovation boosters from operating in non-LAC, especially high-income, countries.

FIGURE 5.11 Origin of revenues of *multilatinas*, 2010



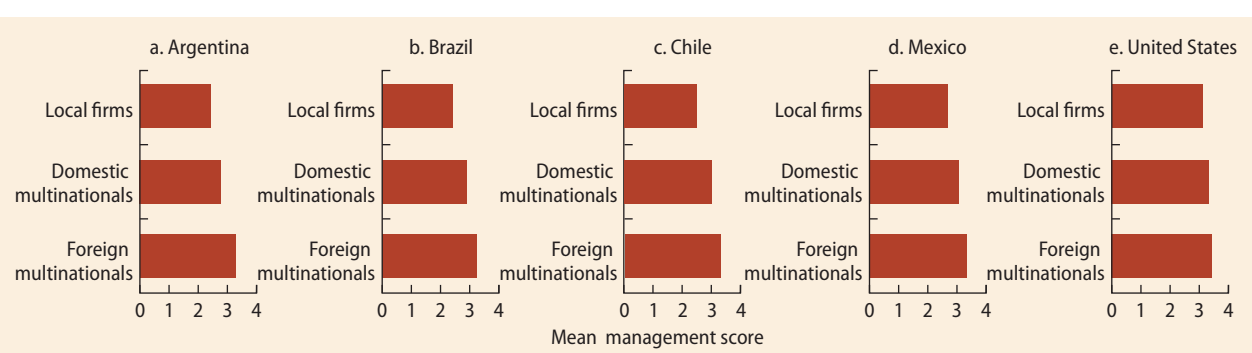
Source: World Bank, based on data from Orbis.
Note: For countries and economies included in each group, see note 8.

Innovation deficit

The scope for productivity gains from the emergence of *multilatinas* is hindered by their underperformance in terms of innovation. Maloney and Sarrias (2013) show that although they engage in better management practices than local firms, *multilatinas* lag foreign-owned firms in all LAC countries for which data were available (figure 5.12) (See chapter 3 for a detailed description of the management practices data.)

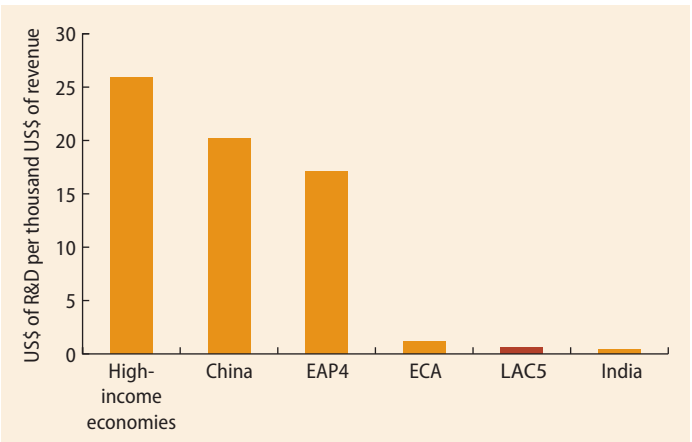
Multilatinas also fall behind their counterparts from other regions in terms of R&D investments. *Multilatinas* from the manufacturing sector invest on average only $0.06 per $1,000 of revenue (figure 5.13). This spending stands in sharp contrast with R&D intensity by manufacturing MNCs from high-income economies and even other developing countries and regions, such as China and EAP4. For example, MNCs from EAP4, the region with the lowest average R&D intensity among the three regions

FIGURE 5.12 Management practices by firms in the United States and selected countries in Latin America and the Caribbean, by type of firm



Source: Maloney and Sarrias 2013.

FIGURE 5.13 Research and development by multinational corporations in selected country groups, countries, and economies, 2010–11



Source: World Bank, based on data from Orbis.
Note: For countries and economies included in each group, see note 8.

mentioned earlier, invest $1.70 on R&D for every $1,000 of revenue—almost 30 times the R&D intensity of *multilatinas*.[26]

In sum, the picture emerging from this analysis is that the scope for *multilatinas* to generate technological and productivity spillovers to LAC countries is limited. *Multilatinas* are concentrated among very few countries (Brazil, Chile, Colombia, and Mexico), and the size of these firms is smaller than predicted by the level of development of their country of origin. Moreover, the expansion of *multilatinas* is horizontal and oriented toward regional markets, limiting the scope for technological gains from participating in global value chains and serving high-income, technologically advanced, economies. *Multilatinas* are also less likely than their counterparts from other regions to innovate.

Concluding remarks

The results presented in this chapter lead to one important conclusion: something in the business environment in LAC deters innovation even among the high-end segment of transformational firms. Affiliates of foreign MNCs and *multilatinas* alike are constrained by some LAC–specific characteristics that prevent them from excelling.

Understanding the exact causes hampering innovation in LAC or the exact policy interventions to relax these constraints is a daunting task that goes beyond the scope of this report. However, chapter 6 discusses and characterizes the key factors that may be hindering LAC's innovation potential and puts on the table broad policy areas of intervention.

Notes

1. Freund and Weinhold (2002) document the positive effect of the expansion of the Internet on trade in services. Hummels (2007) documents the effect of reductions in transport costs on trade. Sachs and Warner (1995) describe the economic reforms undertaken in the 1990s.
2. Many parts of this chapter treat FDI and MNCs as if they were the same thing. There are, however, important differences to keep in mind when analyzing the effects of the two variables. FDI is a form of investment that creates an asset held by the home economy. This asset can come from the creation of a new firm or project or from the acquisition of an existing firm or project. FDI does not necessarily imply control over the firm or project. In contrast, multinational activity is associated with control of production and employment decisions in the host economy by a foreign-owned firm.
3. This calculation was made using Bureau van Dijk's Orbis dataset. For more information on the data, see box 2.1 in chapter 2.
4. This chapter relies on two primary data sources: the World Bank's Enterprise Surveys and Orbis. For more information on these datasets, see box 2.1 in chapter 2.
5. For each variable of interest, we ran a regression using all countries for which information was available, controlling for the natural logarithm of GDP in constant 2000 U.S. dollars and the natural logarithm of population.
6. Romer (1993), for instance, argues that MNC presence can lead to a narrowing of the "object gap" and "ideas gap" in developing countries. The "object gap" refers to the shortage of physical goods, such as factories and roads, in developing countries. The "ideas

gap" refers to the shortage of knowledge used to create value added in the modern economy.

7. Following the literature in international economics, we label the country that receives the MNC or FDI the "host country" and the country of origin of the capital the "home country."
8. Throughout this chapter 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* include 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 chapter varies according to data availability.
9. MNC affiliates have a productivity and managerial advantage over local firms in other developing and high-income regions as well. Lipsey (2002), for instance, provides a thorough review of the empirical work on productivity differences among foreign-owned and local firms. He finds that foreign-owned firms are more productive than local firms almost everywhere. Bloom and others (2012) examine management differences in 16 non-LAC countries. Their results are similar to the results for LAC countries.
10. Country fixed effects are included to take account of the fact that on average, some countries may have a larger share of MNCs or a greater propensity to, say, conduct R&D. If this is the case, differences in R&D between MNC affiliates and local firms may be reflecting differences in the propensity to conduct R&D instead of capturing differences across types of firms. Industry fixed effects correct for the fact that MNC affiliates may have a propensity to locate in sectors that have a natural bias toward, say, conducting R&D.
11. Distance to headquarters may also be a factor explaining these patterns. For instance, Keller and Yeaple (2013) explore the relation between trade costs, which are expected to be associated with distance, and the way in which knowledge is produced and transferred within the boundaries of MNCs. The theoretical model they present predicts that subsidiaries in locations farther away from headquarters will rely less on imported knowledge, embodied in sophisticated goods, and more on knowledge produced in the host economy. This may be one reason why U.S. MNCs have located their R&D more in Asia or the Middle East and less in LAC.
12. For instance, industry wages in Mexico and República Bolivariana de Venezuela have been shown to increase with foreign production (Aitken, Harrison, and Lipsey 1996).
13. Ramondo (2009) shows that exit rates among the least productive firms in Chile increase with foreign presence.
14. In addition, competition could lead to dynamic changes in productivity. The expectation of lower future profits causes the productivity of new entrants to be higher. Competition also reshapes the innovation decision of entrants. The direction of this change depends on whether the "escape competition" effect faced by incumbents outweighs the potentially lower postinnovation profits and higher costs of innovation these firms face.
15. Other empirical studies find similar results. Görg and Strobl (2005) find that firms in Ghana run by owners with past MNC affiliation have higher productivity than comparable local firms. Balsvik (2011) finds that the productivity of local producers in Norway is positively correlated with the share of employees with prior MNC experience.
16. The empirical literature finds almost complete support for the presence of productivity spillovers of MNCs through backward linkages (to local suppliers); such spillovers have been found in Brazil (Lopez-Cordova and Mesquita Moreira 2004), Colombia (Kugler 2006), and Mexico (Lopez-Cordova 2003). The evidence for horizontal spillovers

and spillovers through forward linkages is less conclusive. Evidence of horizontal spillovers from MNC activity has been found in Brazil (Lopez-Cordova and Mesquita Moreira 2004) and Mexico (Lopez-Cordova 2003) following periods of trade integration. Ramondo (2009) finds positive horizontal spillovers on Chilean firms. Kugler (2006) finds no significant horizontal spillovers from MNC activity on Colombian manufacturing firms. Lopez-Cordova and Mesquita Moreira (2004) find positive and significant spillovers for Mexico but not Brazil. (For a comprehensive review of the literature on spillovers, see Harrison and Rodriguez-Clare 2010.)

17. The estimated contributions of knowledge transfers to aggregate productivity from Alfaro and Chen (2013) are likely to have an upward bias, because small firms in LAC, which are more prone to suffer from factor market competition, are underrepresented in Orbis. Taking into account that the negative impact of MNC is underestimated in the analysis, we could consider the above estimates as upper bounds of the true effects.
18. Borensztein, De Gregorio, and Lee (1998) find that the relation between inward FDI and growth is positive and significant only for countries with a minimum level of education. Alfaro and others (2003) find a similar result for financial development. They show that the effect of FDI on growth is higher in countries with a higher level of financial development.
19. Aedo and Walker (2012) show that LAC high school students score below their peers from other countries on the standardized math and reading Programme for International Student Assessment (PISA) tests. Chapter 2 discusses the region's underperformance in terms of financial development.
20. Javorcik and Spatareanu (2005) use a survey of firms in the Czech Republic and Lithuania to show that the likelihood of a local firm acting as a supplier for a foreign-owned firm increases with the local firm's access to financing.
21. Blyde, Kugler, and Stein (2004) find that spillovers from MNC activity in República Bolivariana de Venezuela are concentrated among large firms. Kokko, Zejan, and Tansini (2001) find a similar result for Uruguay.
22. Alfaro and Hammel (2006) suggest that access to finance is one of the motivations for firms from LAC to start operating in foreign markets.
23. Van Pottelsberghe de la Potterie and Lichtenberg (2001) use data for 13 industrial economies and show that the growth effect of knowledge spillovers from outward FDI is positive and greater than that of inward FDI.
24. Classification of sectors as upward or downward relative to the headquarters was done using U.S. input-output tables. We assumed that the sectoral linkages observed in the United States are similar to those in other countries.
25. A consequence of the emergence of global value chains is the increased importance of intrafirm trade in the global economy.
26. The low average R&D intensity observed in *multilatinas* is driven partly by the prevalence of *multilatinas* with zero R&D. Although the average R&D intensity of *multilatinas* is much higher once firms with zero R&D are excluded, it remains much lower than other regions.

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Toward an Enabling Environment for Innovative Entrepreneurs

6

Creating an enabling environment for innovative entrepreneurship is difficult because it involves multiple policy areas that interact in complex ways. Of the usual suspects—inadequate protection of intellectual property rights and contracts, access to finance, competition, openness to international trade, and human capital—the region appears to underperform other regions most clearly on the human capital front and the lack of competition in nontradable industries. More research is needed before definitive conclusions can be reached, but some evidence suggests that the small share of engineers in the population and excessive concentration of domestic nontradable markets in a few firms may be major factors behind the region's innovation deficit. Intellectual property rights might also be important, but more research is definitely needed on this complex policy area.

In an op-ed piece in the *New York Times,* Nobel Prize laureate Robert Shiller argued that innovation remains the engine of growth in market economies. His opening salvo was "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" (Shiller 2013).

Shiller was writing as both an academic and an entrepreneur, narrating his attempts to secure financing for a new business venture that would commercialize an idea that emerged out of his academic research. He expressed frustration with the lack of interest shown by potential investors until he mortgaged his home to help finance the young firm. Eventually, Shiller and his two partners sold the company (and the rights to use his economic ideas about how to measure the evolution of the real estate market in the United States) for an undisclosed but presumably attractive sum. His emphasis on the spirit of capitalism—a Weberian idea–and his lukewarm tribute to laws and institutions, however, suggest that Shiller is a bit skeptical about the ability of public policies to become drivers of innovation.

Javier—the fictional entrepreneur introduced in chapter 1—caught the Weberian spirit early on, making choices that were qualitatively different from those of his siblings. He took financial risks, which paid off handsomely. As suggested in chapter 2,

entrepreneurs like Javier are rare but important for the development of Latin America and the Caribbean (LAC): although their numbers are small, they employ more than half of all formal sector salaried workers in the region. If LAC had more entrepreneurs like Javier, the number of formal salaried jobs would probably be larger and the number of low-growth entrepreneurs smaller.

Chapter 3 argued that LAC can be characterized by both its large number of entrepreneurs and by their underperformance in terms of innovation. Shiller seems to believe that entrepreneurship and innovation go hand in hand, drawing little distinction between the two. But some dimensions of entrepreneurship (such as firm creation and survival) are clearly present in LAC even as there is a deficit along the innovation dimension. Although we embrace the presumption that the spirit of innovation is a driver of modern market economies around the world, not just in the United States, a challenge for policy makers remains figuring out how to shape policies, including laws and institutions, to enhance the incidence of transformational entrepreneurship so that surviving entrepreneurs become true innovators.

Chapters 4 and 5 focused on the region's top high-end entrepreneurs—namely, large formal enterprises that compete in global markets through exports of goods and capital. They show that LAC economies tend to underperform in terms of export entrepreneurship and that multinational corporations headquartered in LAC (*multilatinas*) tend to be less innovative than similar firms elsewhere.

What should leaders and policy makers in LAC focus on? Where should they look for insights into the fundamental drivers of both entrepreneurship and innovation by high-end entrepreneurs in the region? Perhaps looking at the region's laws and institutions is not a bad place to start. This chapter examines elements that might be the cornerstones of an enabling environment to foster innovative entrepreneurs.

What are the elements of an enabling environment for innovative entrepreneurs?

Chapter 1 concluded that regulatory barriers to entry are unlikely to be a major constraint for LAC entrepreneurship and that it is difficult to find conclusive evidence that the region's culture is less inclined toward entrepreneurship than other cultures. Rather, we must search for answers in Shiller's "laws and institutions." Chapter 2 provided some additional clues. It identified important correlates of innovation by incumbent firms, such as regulation of entry, competition, access to finance (especially by young enterprises), and entrepreneurial skills.

Interactions and complexity

Pinpointing the enablers of innovative entrepreneurship is fraught with complexity. The difficulty may stem from the intricate interactions between the various dimensions of the enabling environment that matter for innovation; it may also reflect the fact that both entrepreneurial innovation and its possible determinants may be affected by common factors and, hence, jointly determined. For instance, an economy's laws and institutions—its contractual environment—might simultaneously affect firms' access to credit and innovation. Young firms considering whether to invest in research and development (R&D) to develop new products or services might have access to credit in economies where intellectual property rights are well established in law. Similarly, an institutional and legal environment in which contracts are unevenly enforced or economic transactions depend on informal enforcement mechanisms might limit access to finance for young firms and reduce risky investments in innovation. A long history of macroeconomic and financial instability might undercut both the incentives to innovate—by, for instance, widening the gap between downside risks and upside potential—and the availability of suitable financial services for firms. Furthermore, in

economic environments in which a few firms enjoy economic rents because of the lack of antitrust laws or competition laws that lack teeth, one might observe little innovation, because high-end entrepreneurs might be able to make hefty profits with little innovative effort and would thus see little benefit to changing the mix of products or services they offer. The numerous potential elements of an enabling environment for innovative entrepreneurship mean that any analysis must remain speculative but comprehensive.

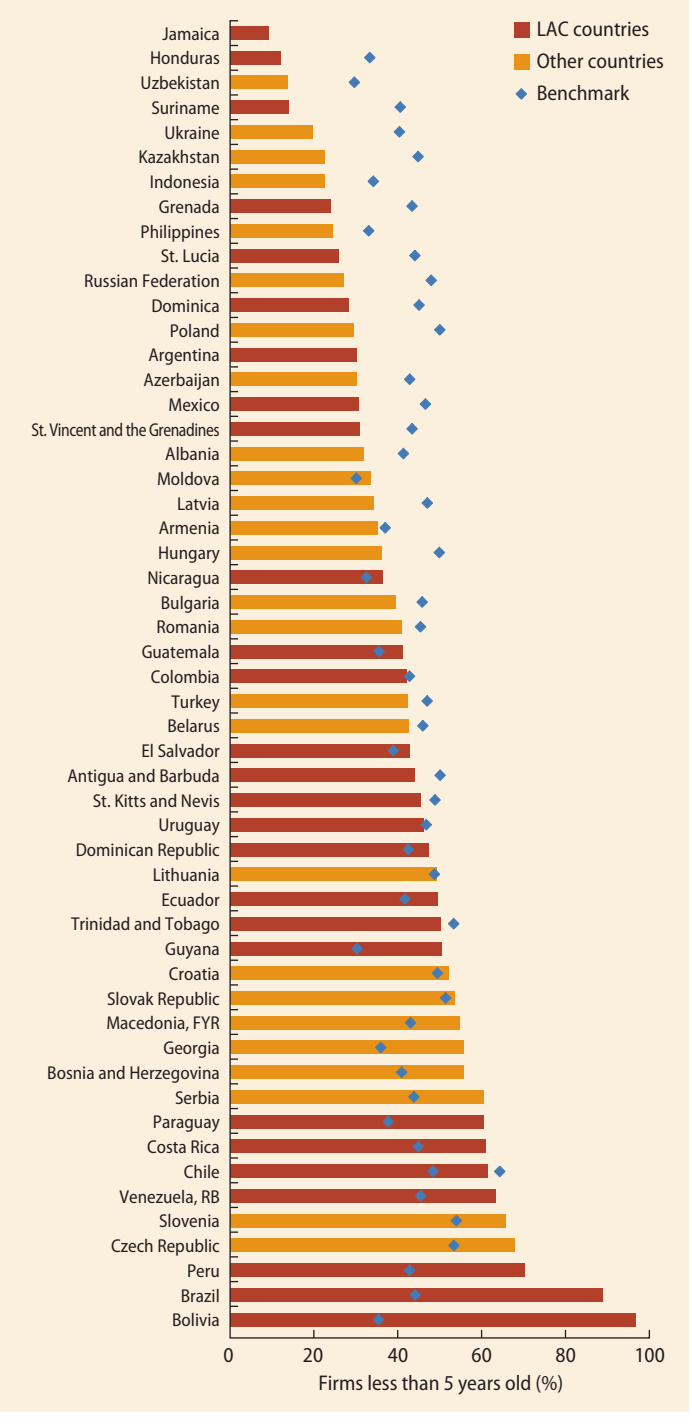
The following sections discuss potential elements of such an enabling environment. They cover a broad swath of economic and institutional characteristics, including access to finance, intellectual property rights, contractual certainty, competition in nontradable industries, competition in tradable industries, and human capital. The discussion focuses on each topic separately before summarizing the main findings of the benchmarking exercises.

Access to finance by young firms

Entrepreneurs decide whether to invest in innovation and, if so, how much to invest. A key consideration is the costs of the necessary investments in innovation (investment in R&D). Financial markets play a role in determining this cost. In some environments, young firms may be credit constrained or financial institutions may lend to them only at exorbitant interest rates, thus raising the costs of innovation investments. Lack of access to financing was Shiller's main obstacle to commercializing his ideas.

To push the debate forward without offering country-specific policy prescriptions, we rely on simple international benchmarking. Figure 6.1 presents evidence compiled from the World Bank's Enterprise Survey database. It shows the percentage of surveyed firms in each country that reported being less than five years old and having access to credit. The bars represent the actual share of firms that meet these criteria; the dots represent the share of firms predicted by country

FIGURE 6.1 Actual and benchmarked access to credit by young firms in selected countries



Source: World Bank, based on data from World Development Indicators and 2006–10 World Bank Enterprise Surveys.
Note: Bars show the percentage of firms that are five years old or younger and have access to credit. Dots show the predicted percentage of firms from a regression that includes (the log of) population and gross domestic product (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.

characteristics. The LAC economies in the sample (the dark bars) tend to be above the median and in most cases near or above their predicted shares. Some notable exceptions are several small Caribbean economies plus Jamaica and Mexico.

It is difficult to conclude that for the region as a whole, lack of access to finance is a main driver of the underperformance in innovation. To be sure, as documented in the World Bank's flagship report on financial development in LAC (de la Torre, Ize, and Schmukler 2012), the region's gap in bank credit to the private sector (relative to a carefully constructed international benchmark) is not only significant but appears to have 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 a shortage of promising productive projects (that is, a shortage of innovation) rather than by credit rationing and credit supply-side constraints per se. Moreover, a relevant constraint for bank credit supply in LAC may be weaknesses in the contractual (rather than the informational) environment, and contractual weaknesses and property rights may be a common factor that undermines both the supply of bank credit and entrepreneurial innovation, as discussed below.

Finance can come from various sources, not just from banks but also from venture capital and capital markets. Chapter 3 discussed recent data on the size and destination of venture capital deals in LAC, concluding that such transactions are large and pursue traditional (natural resource–related) sectors, presumably because expected profits are high. Ongoing research by Didier, Levine, and Schmukler (2013) in a sample of six countries (Argentina, Brazil, Chile, Colombia, Mexico, and Peru) shows that firms that issue bonds or equity tend to be much larger than those that do not (3,484 versus 859 employees on average). This relationship is also apparent in the authors' global sample of 51 countries, however. Thus, although it is plausible that financial markets do not meet the financing needs of small and young firms, the problem may affect many developing countries, not only countries in LAC.

Property rights and contractual certainty

The expected payoff from an investment in innovation affects an entrepreneur's decision to take the necessary risk. It depends on the probability of discovering a profitable idea as well as on the ability of inventors to appropriate the commercial windfalls of their investments in innovation. The most directly relevant set of laws and institutions is arguably related to intellectual property rights (IPRs) and contractual certainty.

Laws and regulations define the number and types of industries subject to IPRs, the number of international agreements on IPRs to which a country is a signatory, and the legal recourse available to patent holders in case of an alleged infringement of their IPRs. Figure 6.2 displays the benchmarking of Park's (2008) index of IPRs. This index is the sum of five components: coverage of patents in eight industries; participation in five international 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. As of 2005, the Park index scores of all LAC countries in the sample except Chile were below the median. Some of these countries appear to have de facto IPRs that exceed those predicted by their size and level of development, however. These countries include (in ascending order of the index score) Haiti, Jamaica, Bolivia, El Salvador, Colombia, Ecuador, and Argentina. Although LAC does not underperform relative to the predicted levels of IPR protection, it lags comparator countries in actual terms, which may explain why it also lags in innovation by high-end entrepreneurs. The IPR policy area might therefore be a potentially fruitful avenue to explore.

Intellectual property rights, however, are complex relative to other legal areas. Hence, the establishment of well-defined and enforceable intellectual property rights is

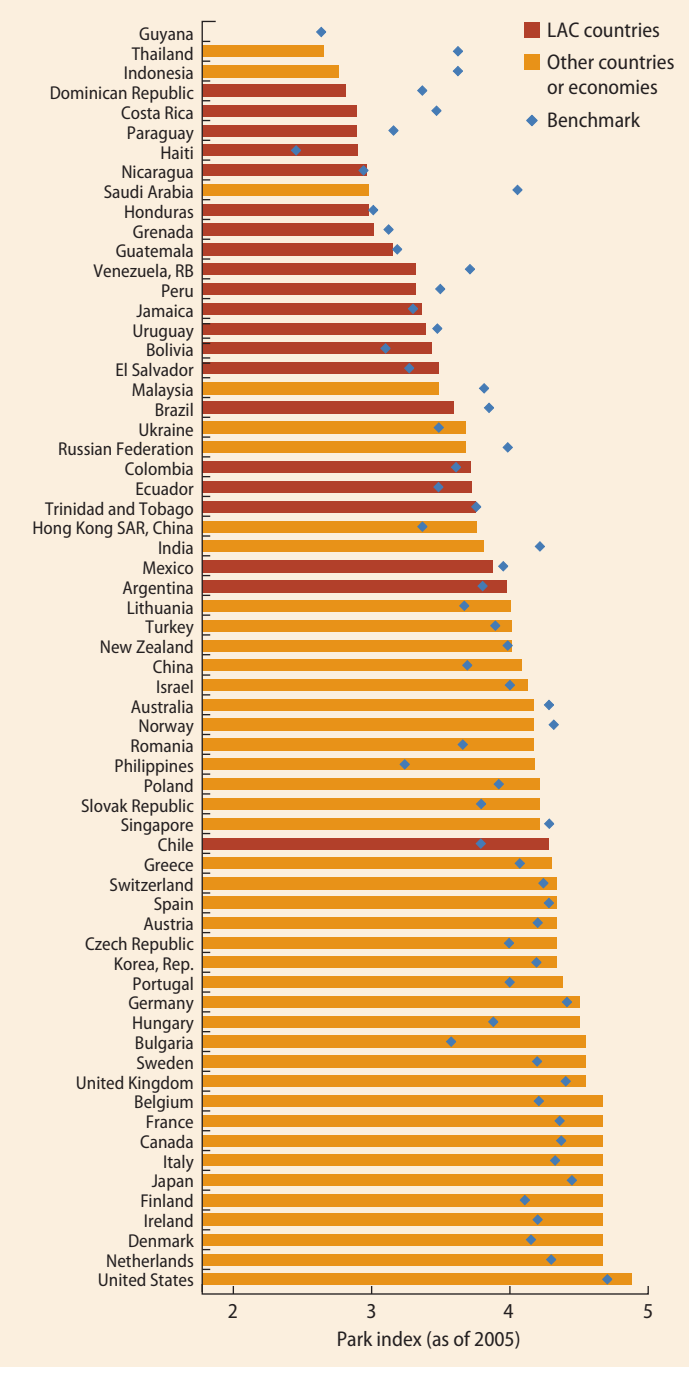
inextricable from the quality and functionality of the broader legal and judicial system. If there are deficits in the legal definition and enforcement of more tangible property rights, the difficulties in setting up a suitable intellectual property right system are a fortiori going to be greater. Thus, fixing intellectual property right regimes is in many cases likely to involve accompanying broader reforms to the legal and the judiciary frameworks.

Like the potential effects of IPRs on the expected payoff of investments in innovation, an economy's contractual environment can affect economic incentives for private investments, including in R&D. The contractual environment can also affect other elements of the enabling environment for innovative entrepreneurship, such as access to finance.

Figure 6.3 presents international comparisons for an indicator of contract certainty from the International Country Risk Guide (ICRG), a private firm that assesses the sources of country risk for international investors and other private sector clients. This type of "expert" indicator is imperfect; it is used because it is difficult to find alternative indicators of such a complex phenomenon.

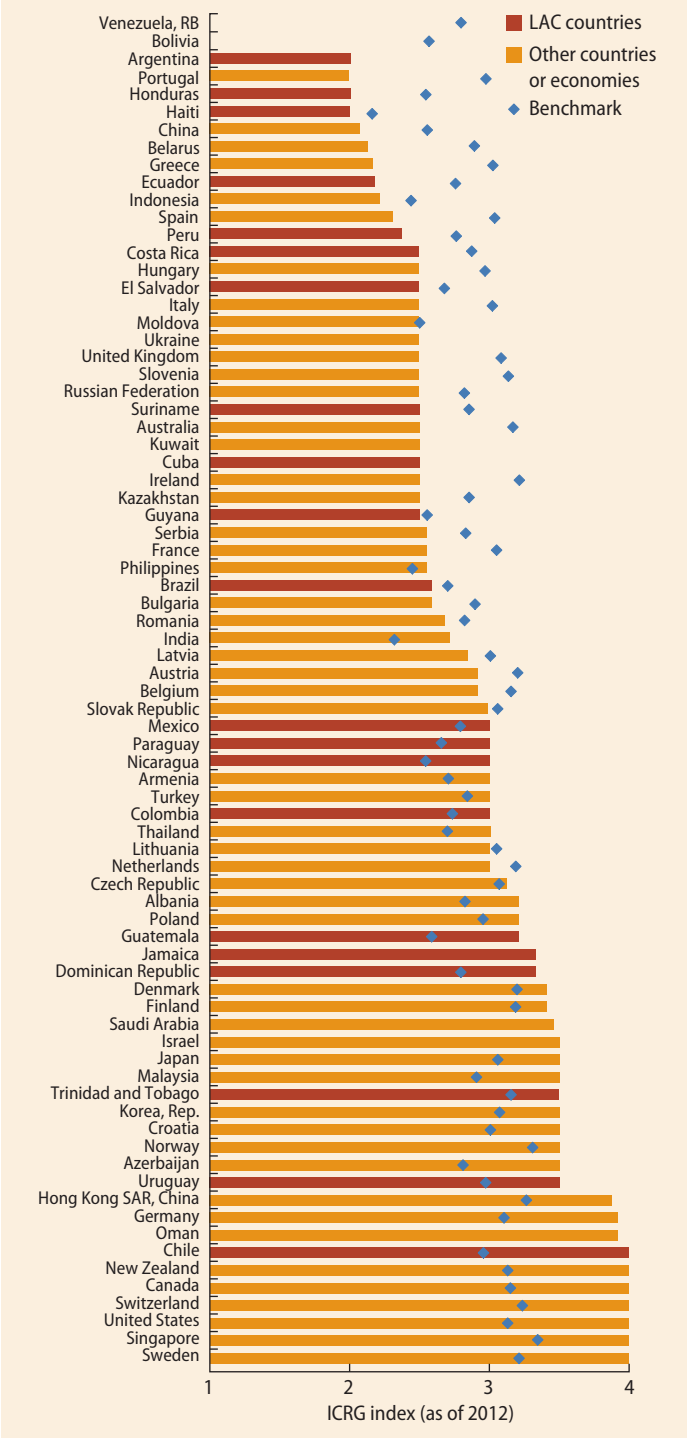
Figure 6.3 suggests that LAC as a whole does not underperform in terms of contract certainty. It suggests that there are two types of LAC countries: those with high contract viability and those that underperform. The high contract viability group includes Chile, the Dominican Republic, Mexico, Trinidad and Tobago, and Uruguay, among others. The underperformers include Brazil, Costa Rica, and El Salvador, among others. This bifurcated picture contrasts in part with the findings of the 2011 flagship report on financial development in LAC (de la Torre, Ize, and Schmukler 2012), which identifies contractual weaknesses as an important driver of credit depth and access to long-term finance, which itself may affect entrepreneurship. These nuances suggest that more research needs to be done to understand the complex and multifaceted relation between the contractual environment (in particular the governance side), access to finance, and entrepreneurship.

FIGURE 6.2 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: 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 gross domestic product (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.

FIGURE 6.3 **Actual and benchmarked contract certainty in selected countries or economies, 2012**



Source: World Bank, based on data from World Development Indicators and the International Country Risk Guide (ICRG).
Note: Bars show the 2012 contract viability index for each country, as reported by ICRG. Dots show the benchmark predicted by a regression with (log of) population and gross domestic product (GDP) adjusted for purchasing power parity as the explanatory variables. The regression used all available countries. The figure presents only comparator countries. Bolivia and República Bolivariana de Venezuela are not covered by the ICRG data. LAC = Latin America and the Caribbean.

Competition in nontradable industries

Potential innovators assess the potential payoff from innovation relative to the profits from continuing to produce the same set of products or services with the same level of quality, technology, and management practices. When competitive pressures are low, enterprises may choose to invest little in innovation, enjoying the rents from market power. Although it is plausible that too much competition can actually reduce incentives to innovate by firms, especially for firms with low capabilities, it is likely that most of LAC suffers from too little competition (see chapter 3).

This section benchmarks LAC economies in terms of market concentration in industries that are arguably not subject to international competition (the following section discusses the role of competition in tradables). 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. To avoid this problem, we examine data from 17 sectors that seem to be nontradable service industries (and for which there is sufficient information across countries to conduct the benchmarking exercises).[1]

The results are shown in figure 6.4.[2] LAC countries seem to have excessively concentrated domestic markets in nontradables; most countries appear at the upper end of the distribution of the market concentration index. Moreover, all but two LAC countries (Colombia and Brazil) exhibit average levels of market concentration that are higher than the levels of countries with similar populations and gross domestic products (GDPs). (Argentina appears to have a relatively low level of concentration, but it did not appear in the regression analysis because of data limitations.) Consequently, lack of competition appears to be a strong candidate for explaining the region's lackluster innovation.

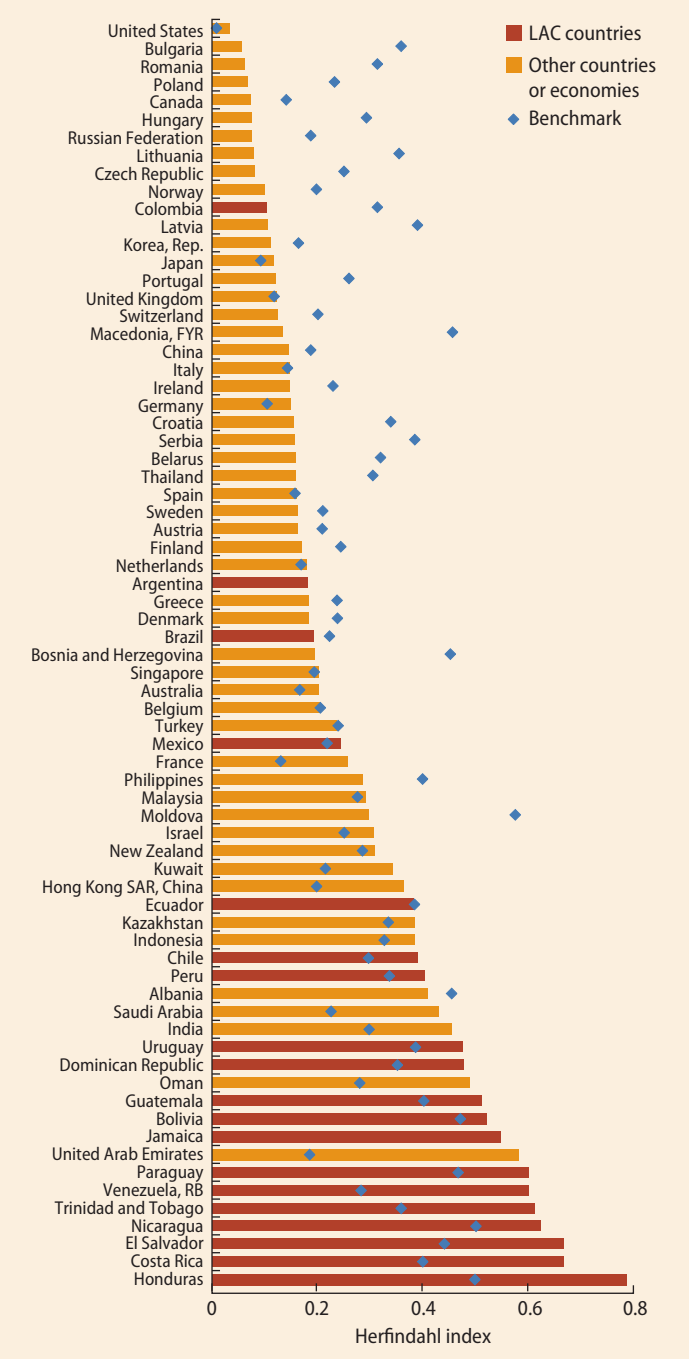
Competition in tradables

Some industries face competition from foreign competitors. The literature on international trade and growth has tended to focus on the ratio of international trade flows (the sum of imports plus exports) to GDP. This variable tends to rise with the share of domestic consumption that is satisfied by imports from abroad and with the share of domestic production sold to consumers in foreign countries. We use this ratio—usually called the "openness" ratio—as the proxy for the extent of competition affecting tradable industries.

Figure 6.5 benchmarks the region's level of openness as of 2012. By and large, LAC countries are either above the median country in the sample or have trade shares above what is expected given their geographic characteristics and size. There are two important exceptions, Brazil and Colombia. Brazil has the lowest level of openness in the sample; it is underperforming by about 3–5 percentage points of GDP. Two of its Mercosur (Southern Cone Common Market) partners also appear to be unexceptional. Argentina seems to have the level of trade that is expected given its characteristics, and Uruguay should be trading more than it was in 2012. Hence, it is potentially relevant for future research to assess whether the South American trading bloc could be opened further.

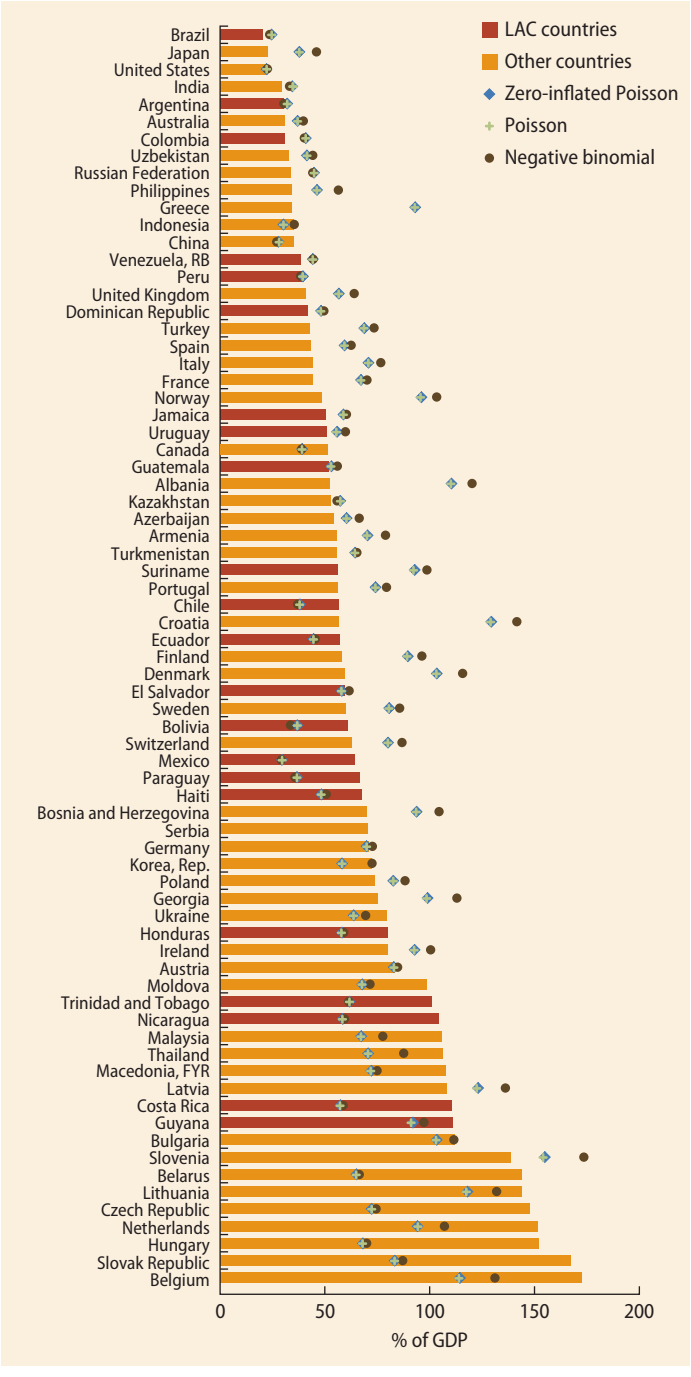
Colombia is an interesting case, as it belongs to the much touted recent trade initiative called the Pacific Alliance (*Alianza del Pacifico*, in Spanish). This initiative, launched in 2012, includes Chile, Mexico, and Peru. Chile and Mexico are extremely open to trade, given their geographic characteristics and size. Peru is performing according to expectations. The Alliance, however, is supposed to be a group of countries oriented toward free trade and deep economic integration. Colombia has become such a country, but only in recent years. Its free trade agreement (FTA) with the United States was approved by the U.S. Congress only in 2011. Colombia also has an FTA with Canada,

FIGURE 6.4 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 gross domestic product (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 6.5 Actual and benchmarked index of openness to trade in selected countries, 2012



Source: World Bank, based on data from International Monetary Fund; Rose 2004; World Development Indicators; and Penn World Tables 7.1.
Note: Bars show the openness ratio, calculated as the sum of exports and imports of merchandise over GDP. Dots are benchmarks predicted by the gravity model of openness proposed by Frankel and Romer (1999). The regression included the following explanatory variables: log of the area of the reporting country, log of the area of the partner country, landlocked, common border, and interaction with border. Fitted values of openness are the sum across partner countries. Models exclude the following economies: (a) Liberia; Hong Kong SAR, China; and Singapore (outliers); (b) major oil producers with production exceeding 200,000 barrels of oil per day in 1985 (following Alcala and Ciccone 2004): Angola, Gabon, Congo, Iraq, Oman, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates; and (c) countries with populations of less than 500,000. Following Santos Silva and Tenreyro (2006) on the estimation of the gravity model of trade, the figure includes benchmarks from three estimators: zero-inflated Poisson, Poisson, and negative binomial. LAC = Latin America and the Caribbean.

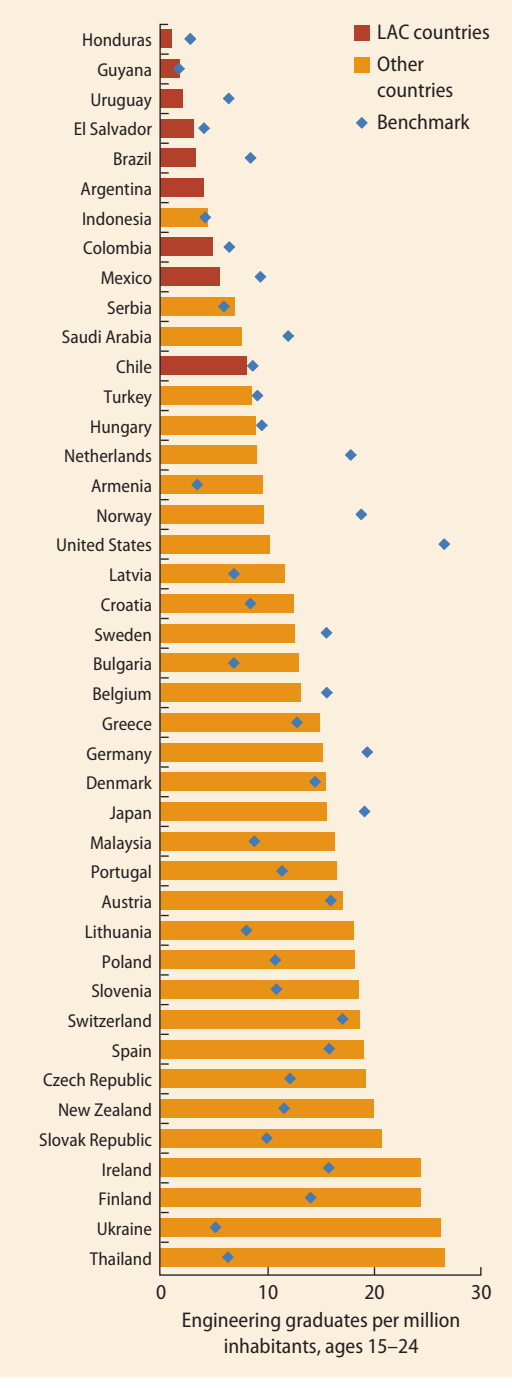
which was implemented in August 2011. An FTA with the European Union was signed in August 2013 but has not yet been implemented; an FTA with the Republic of Korea is expected by 2014. Hence, Colombia's rapid move toward free international trade is a recent phenomenon that may take time to be reflected in the data. Broadly speaking, however, LAC does not appear to systematically underperform in terms of openness. Thus, tradable industries are presumably facing tougher competitive pressures than nontradable industries.

Human capital for innovation

The broad agenda of human capital formation in LAC and elsewhere is well known (see, for example, Aedo and Walker 2012). A country's stock of human capital is often measured by the average years of schooling of the labor force (that is, the adult population). Because the quality of education also matters for economic performance, researchers often look at evidence of quality of education, as reflected in student scores on internationally standardized scholastic tests. The few countries in the region that participate in such tests tend to perform below high-income countries and a handful of fast-growing emerging market countries.

Human capital for entrepreneurship and innovation needs to be assessed with some nuance, as it only partially overlaps with general curricula, as discussed in chapter 3. Since at least the early 20th century, LAC has had a relatively low number of engineers per capita. More recent data from UNESCO (United Nations Educational, Scientific, and Cultural Organization) show the average number of engineers per capita from 2008 to 2010 (figure 6.6). The few LAC countries included all have fewer engineers than the median country and fewer than expected given their level of development. This finding holds even for the region's relatively large middle- and high-income countries, such as Brazil, Chile, Colombia, and Mexico.[3] Indeed, if these limited data are reflective of the region as a whole, this constraint may be the single most

FIGURE 6.6 Actual and benchmarked share of engineers in selected countries, 2008–10



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

important barrier to innovative entrepreneurship found in this brief empirical tour.

What factors underlie the inclination of LAC students toward nonscientific studies? Two stand out: path dependency and the broader socioeconomic context. For historical reasons, LAC universities have been locked into an emphasis on the humanities and law, as well as social, economic, and political fields. This tendency may constrain the ability to switch rapidly to educating more engineers and scientists. Such a switch would require very aggressive public policy, such as the United States adopted when it developed mining and engineering studies in the early 20th century. 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 more macro than micro economists and sociologists. Given the progress the region has made in taming macroinstability, there may be more incentives for students to embark on scientific careers.

What explains the region's innovation gap? The leading suspects

At least 13 LAC economies underperform in terms of patenting activity (see chapter 3). Table 6.1 indicates the areas in which each country underperforms relative to both the median in the global sample and the expected level of performance given its size and level of development, among other issue-specific relevant factors.

The first place to look is human capital. The evidence is not ironclad; because of the 13 LAC economies that have a deficit in innovation (measured by their patenting activity), data are available for only 6. But all six countries exhibit a deficit in the number of engineers per capita. (Honduras, which does not have a deficit in patenting, because of its relatively low GDP per capita, also has a deficit in engineers.)

Another place to look is competition. Of the 13 countries with a deficit in innovation, 10 have a deficit in competition in

TABLE 6.1 Factors that may account for innovation deficits in 13 countries in Latin American and the Caribbean, 2005

Country	Patenting	Access to finance	Intellectual property rights	Contractual certainty	Competition in tradables (openness)[a]	Competition in nontradables	Human capital for innovation (number of engineers per capita)
Bolivia	1	0	0	1	0	1	—
Brazil	1	0	1	1	1	0	1
Chile	1	0	0	0	0	1	1
Colombia	1	1	0	0	1	0	1
Dominican Republic	1	0	1	0	1	1	—
Ecuador	1	0	0	1	0	0	—
El Salvador	1	0	0	1	0	1	1
Guatemala	1	0	1	0	1	1	—
Mexico	1	1	1	0	0	1	1
Paraguay	1	0	1	0	0	1	—
Peru	1	0	1	1	0	1	—
Uruguay	1	0	1	0	1	1	1
Venezuela, RB	1	0	1	1	1	1	—

Note: A 1 indicates a variable in which a country is below the median country and below the level predicted by its level of development and size or other benchmarking explanatory variables (see notes to figures 6.1–6.7). The median country is calculated within the sample of Latin American and Caribbean and comparator countries; samples vary with data availability. — = Not available.
a. A value of 1 on this measure indicates only that the country is below the predicted level.

nontradable industries. This finding is in stark contrast with openness, in which only 6 have a deficit. Simply put, the challenge lies in enhancing the level of competition in sectors that are not exposed to international competition. This implication is consistent with the call in chapter 3 to take a second look at the unfinished agenda of competition policy in the region.

A third element of the enabling environment that might pose obstacles for innovation is IPRs. Of the 13 countries with a deficit in innovation, 8 lagged in IPR protection.

More research needs to be undertaken to understand how contractual enforcement and viability may affect access to credit and entrepreneurship. Although the ICRG indicators indicate that the region is not necessarily underperforming in contract viability, other research finds that contractual weaknesses are an obstacle to access to finance. The specific aspects that indicators measure therefore matter; it may be too generic to speak about "contract viability."

Our hope is that the evidence presented in this report will feed debate in the region about why it has so many entrepreneurs and so little innovation. Issues that warrant examination include human capital, competition, and intellectual property rights.

Notes

1. The 17 sectors are electricity, gas, steam, and air conditioning supply; construction of buildings; civil engineering; specialized construction activities; wholesale and retail trade and repair of motor vehicles and motorcycles; wholesale trade, except of motor vehicles and motorcycles; retail trade, except of motor vehicles and motorcycles; land transport and transport via pipelines; air transport; warehousing and support activities for transportation; accommodation; telecommunications; insurance, reinsurance, and pension funding, except compulsory social security; real estate activities; architectural and engineering activities; technical testing and analysis; other professional, scientific, and technical activities; and travel agency, tour operator, reservation service, and related activities.
2. These findings should be interpreted with some caution, because the concentration indicators were constructed from the Orbis

firm-level database, which contains information for all firms on which it collects data. Sample selection biases could play a role in the ranking, as better and more numerous data may have been collected in some countries than in others. To cope with this potential risk, we averaged revenues for each firm between 2007 and 2010 (which increases the likelihood that a firm was sampled in these four years); we included only firms with revenues of more than $1 million (which are more likely to be surveyed); and we included only countries for which information was available for at least 30 firms (thus dropping several Caribbean countries). However, some measurement errors and selection biases may persist. The selection of firms with revenues of more than $1 million does not seem to affect concentration much: in LAC, for instance, the correlation between the Herfindahl index with all firms in Orbis and only firms with more than $1 million in revenues is 0.95.

3. Chile was reclassified as a high-income country in 2013.

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Entrepreneurship is a fundamental driver of growth, development, and job creation. While Latin America and the Caribbean has a wealth of entrepreneurs, firms in the region, compared to those in other regions, are small in size and less likely to grow or innovate. Productivity growth has remained lackluster for decades, including during the recent commodity boom. Enhancing the creation of good jobs and accelerating productivity growth in the region will require dynamic entrepreneurs.

Latin American Entrepreneurs: Many Firms but Little Innovation studies the landscape of entrepreneurship in Latin America and the Caribbean. Utilizing new datasets that cover issues such as firm creation, firm dynamics, export decisions, and the behavior of multinational corporations, the book synthesizes the results of a comprehensive analysis of the status, prospects, and challenges of entrepreneurship in the region. Useful tools and information are provided to help policy makers and practitioners identify policy areas governments can explore to enhance innovation and encourage high-growth, transformational entrepreneurship.

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