THE BUSINESS OF GROWTH

ECONOMIC AND SOCIAL PROGRESS IN LATIN AMERICA 2001 REPORT

Inter-American Development Bank

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Competitiveness: The Business of Growth

Economic and Social Progress in Latin America

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Preface

Over the past decade, the countries of Latin America and the Caribbean have made great strides in modernizing their economies. Macroeconomic problems have been controlled, and mechanisms that once protected industrial sectors from foreign competition have been dismantled. The region has been a leader in reforming such sectors as electricity, telecommunications and ports, which as recently as a decade ago were reserved for the public sector. Many other forms of state interference in economic activities have been eliminated.

Despite these reforms, however, economic growth in Latin America is still not sufficient to reduce income gaps with respect to the developing world and to solve the region's problems with poverty. Although substantially better than in the 1980s, growth in the region reached an annual average of only 3.3 percent in the 1990s.

Does this mean that Latin America should abandon these efforts in order to explore a new model of development? This question is being posed by the very constituents to whom government policy must respond on a daily basis. And it is also capturing the attention of analysts and researchers throughout the continent, including the Inter-American Development Bank. Through publications such as *Economic and Social Progress in Latin America*, the IDB aims to clarify the problems faced by countries in the region, as well as the possible options available to address them.

The causes of slow economic growth can be viewed from various social, economic and political perspectives. This Report concentrates on problems that affect the markets of principal factors of production, and on the conditions that influence the ability of businesses to efficiently use those factors. Increasing the supply and making more productive use of financial resources, physical capital, human resources and technology is at the heart of "the business of growth," which should be profitable as much for workers and for society as a whole as it is for firms themselves.

Economic growth is also the business of the Inter-American Development Bank, whose principal objective is to provide governments with the financial and technical support they need to adopt the policies that best contribute to economic and social progress. Private investment and the creation of high-productivity jobs are essential to that task.

> Enrique V. Iglesias President Inter-American Development Bank

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Introduction

Economic growth in Latin America has been disappointing. Annual growth was only 3.3 percent in the 1990s, despite a relatively benign world economic setting and the fact that many countries were posed for recovery, since their economies had stagnated or been in recession during the previous decade. The region's modest growth enabled Latin Americans to increase their average incomes by only 1.5 percent annually, less than in the developed countries, where it increased 2 percent annually, or in some groups of Asian countries, where incomes grew at rates near 3.5 percent. The rate of income growth in Latin America is so slow that it would require about a century for the region to attain the current income levels of developed nations.

Latin America is not a monolithic region, and income gaps between its richer and poorer countries are increasing as well. While in the eight wealthiest countries per capita income grew at about 2 percent annually in the 1990s, in the eight poorest countries this figure was only 0.7 percent.¹ To make matters worse, the concentration of income increased in the 1990s in practically all countries of the region, limiting the favorable impact of growth on poverty. Currently, 170 million Latin Americans—one of every three people live on less than \$2 a day. That number would be 45 million lower if the distribution of income had been maintained without change in the 1990s. And it would be 80 million lower if, in addition, per capita income had grown by 3.5 percent annually instead of 1.5 percent.

The Problem of Competitiveness

There has been considerable interest in recent years among governments and the private sector in identifying policies that can improve "competitiveness"—so defined as the quality of the environment for investment and for increasing productivity in a climate of macroeconomic stability and integration into the international economy. Strictly speaking, this is an inappropriate use of the term, since, as Paul Krugman (1994) has warned, it is businesses rather than countries that compete with one another. This confusion can make competitiveness "a dangerous obsession," to use Krugman's expression, because it leads to the notion that a country's economic strength is measured by its external trade surplus, that imports are undesirable because they displace national employment, and that the low salaries of poor countries are a threat to the growth of rich countries.

The most internationally disseminated competitiveness indicator—*The Global Competitiveness Report* produced by the World Economic Forum—avoids this confusion by concentrating on the quality of the business environment. In the 2001 edition, which includes 20 Latin American economies, nine of them for the first time, competitiveness is evaluated on the basis of the quality of the macroeconomic environment, the quality of public institutions, and technological capability. According to these indicators, most Latin American economies rank very low by international comparison. Only Chile and Costa Rica are in positions above the median, while Latin American countries occupy seven of the lowest 11 positions worldwide.

Considering that the ranking in this competitiveness index tends to reflect countries' level of development, these results should not be surprising. Nonetheless, given the income level of their economies, 10 of the 20 Latin

 $^{^{\}rm 1}$ The countries considered are the 26 members of the Inter-American Development Bank.

American economies have competitiveness indicators much lower than what would be expected. This is troubling in that the potential for future growth depends not so much on absolute positions in the index as on how favorable a country's conditions of competitiveness are in relation to its income level. In effect, countries with a macroeconomic and institutional environment and technological capabilities that are comparatively high given their level of development are able to grow more rapidly. Many Latin American countries do not fall into this category.

There are only two possible sources of economic growth: the pace at which machinery, education and other factors of production are accumulated, and the productivity with which these factors are used. In both respects, Latin American economies have serious deficiencies. The region has the lowest levels of physical investment of all major areas of the world. Although Latin America has ceased to be a region of unskilled labor, educational levels are growing at a much slower pace than in more educated regions, such as Southeast Asia, or others with lower levels of education, such as the Middle East or the rest of the countries of Asia. On the basis of the accumulation of factors of production alone, Latin America could sustain a growth rate of only 4 percent annually. But more serious is the fact that growth in the last decade was even lower, as declines in productivity subtracted 0.6 points from this modest rate. In contrast, in the developed countries, productivity gains contributed 0.6 points to growth. As a consequence, the growing income gaps between Latin America and the developed countries are the result of growing gaps in productivity. The same can be said within Latin America itself. The only countries where total factor productivity increased substantially in the 1990s were Chile, Argentina and Uruguay, which are among the most developed. Some of the poorest countries in the regionsuch as Haiti, Honduras and Nicaragua-experienced severe losses in productivity, which cost them more than one percentage point of annual growth over the decade. In an era of such important technological improvements, declines in the productivity of poor countries seem paradoxical. It is just this paradox that underlies the principal themes of this study.

The Entrepreneurial Angle

Information on the quality of the Latin American business environment—such as the World Business Environment Surveys produced jointly by the World Bank and the Inter-American Development Bank—presents an outlook for the region that is just as disturbing as that which results from comparisons of productivity. The obstacles to business development most frequently cited in Latin America have to do with the economic and institutional environment, problems that Latin American business communities consider more severe than do business people in other regions of the world.

In the business world, comparisons of the size of large firms in the various sectors in different countries are given considerable attention because they reflect in a simple form the growth capacity of some firms in relation to others. Not surprisingly, the larger the size of an economy, the larger its firms. The large firms of Latin America are much smaller than would be expected for the size of their economies. Large firms in Brazil and Mexico, for example, are smaller than those of Taiwan, a country whose business strategy is directed very much toward small businesses. The small size of Latin American firms is not the result of a similar strategy, but rather the result of insufficient provision of key productive resources such as credit and infrastructure in transportation, energy and telecommunications. These deficiencies represent even greater barriers for the development of small and medium-sized enterprises, which have fewer links with national and internal financial markets and lack the scale to undertake investments to compensate for deficiencies in public infrastructure.

Scope of the Study

The objective of this Report is to identify deficiencies in the markets of the principal productive factors that limit the functioning and productivity of Latin America's private sector, and that can be corrected through public policies. These productive factors are credit (Part II), human resources (Part III), infrastructure for ports, electricity and telecommunications (Part IV), and new information technologies (Part V). The Report discusses the policy options open to governments given the characteristics of the markets and the institutional context in which they operate. Consequently, although the Report presents indicators to compare the supply of productive resources and the policy and regulatory framework in which factor markets operate, it is not presumed that there is a single or ideal recipe to make each of these markets function properly. Options also extend to industrial and investment policies oriented toward creating comparative advantages, increasing the supply of resources that offer positive externalities (and as such are produced in suboptimal quantities by the market), taking advantage of the government's capacity for coordination to develop complementary investments or create economies of scale, or simply attracting foreign direct investment (Part VI). Of course, developing the productive sectors by making policies more effective also depends critically on macroeconomic stability. But that area is not one of the themes of this Report.

Productive factor markets are rarely perfect markets where there are numerous buyers and sellers with precise information on the good traded and where transactions occur repeatedly and on the spot. This description better fits markets for certain basic consumer or primary goods. The characteristics common to productive factor markets are the limited number of suppliers (and occasionally buyers), incomplete information regarding the good traded or the intentions of the other party, and deferred delivery of goods or services previously agreed upon. These conditions imply problems in terms of lack of competition, rationing or exclusion of some buyers, and the risk that providers might not deliver.

Given the nature of markets for productive factors, their functioning depends critically on institutions; that is to say, the formal and informal rules and enforcement mechanisms that shape the behavior of organizations and individuals in a society (North, 1990). Institutions have a profound influence on the supply, quality and utilization of productive factors. Evidence throughout this Report shows that the quality of institutions is one of the principal reasons why productivity gaps between countries are widening. In Latin America, the quality of regulations and the functional norms of factor markets have improved substantially over the past decade, particularly credit and infrastructure services such as ports, electricity and telecommunications. Regulations have improved as well, although in many countries their implementation and efficacy continue to be affected by other deficiencies in the institutional environment, such as a weak rule of law, corruption, and ineffective government entities.

Another cause of growing productivity gaps is education, since the capacity for technological innovation and assimilation of new technologies is mediated by the knowledge and capacity of workers to learn. In the absence of adequate systems for training and reassigning workers, modern technologies may have contributed to the obsolescence and underutilization of human capital, and consequently to declines in productivity in countries with low levels of education.

Growing productivity gaps can also be the result of demographic factors as well as patterns of world technological development, which have tended to concentrate research efforts on the products and needs of the most prosperous markets. These areas will not be explored here, however, because they were analyzed in the previous edition of this Report.

Credit Markets

The scarcity of credit is the principal problem faced by firms in Latin America. This is not surprising, given that the supply of private credit as a proportion of GDP in the region is only a third that of the developed countries or Southeast Asia. Although the inadequate depth of the financial sectors of many Latin American countries is due in part to macroeconomic circumstances, the institutional framework is equally or more important, and it can aggravate instability of a macro origin. The functioning of credit markets requires an institutional framework that makes it possible to alleviate problems typical of financial contracts, such as the asymmetry of information, adverse selection, moral hazard, contract enforcement and temporal inconsistency.

Part II of this Report reviews the state of the institutions that are confronting these problems. Although uneven among countries, the greatest reforms in the last decade were in prudential regulation and the opening of financial sectors to foreign investment. The most severe institutional deficiencies that persist are the lack of protection for financial creditors and the various forms of interference by governments in financial contracts. The lack of protection for creditors involves limitations on the use of collateral and the lack of guarantees for the recovery of claims in the event a firm goes bankrupt. Interference in the credit operations of the financial system includes fixing limits on interest rates, restricting methods of payment, and requiring investment in or lending to certain activities and sectors. When these difficulties are combined with uncertain legal frameworks, as is the case in many Latin American countries, the result is a limited supply of credit, and credit that is highly susceptible to macroeconomic cycles.

Despite widespread privatization during the 1990s, there is still considerable public sector participation in the financial sectors of several Latin American countries relative to other countries of the world. This is cause for concern, as public banking rarely succeeds in widening access to credit or improving the stability and efficiency of the financial sector, since countries do not meet the institutional conditions that would be required for this purpose. Progress has also been limited in developing universal banking, that is, eliminating the segmentation of financial markets according to products or sectors, which in the past was the norm in Latin America.

To compensate for these deficiencies, which particularly affect smaller firms, other institutions have successfully developed in the region. Two outstanding examples are credit information centers and microcredit systems. They have made it possible to alleviate asymmetrical information and credit monitoring problems, consequently reducing credit rationing. Consolidating these successes still requires improving the regulatory and supervisory environment and reducing the uncertainty of the legal frameworks in which these institutions operate.

Labor Markets

Contrary to popular belief, Latin America does not have a relative abundance of unskilled labor. If it did, the region would be best advised to concentrate on the production of unspecialized labor-intensive goods, where international competitiveness depends above all on the cost of labor. However, while Latin America has not attained an educational structure comparable to that of the leading Southeast Asian or developed countries—where production is oriented toward knowledge-intensive goods and goods intensive in technological development—the bulk of the region's labor force has some primary education (complete or incomplete), and some countries have a relatively respectable number of workers with a university education. While this may diminish the region's ability to compete with regions that have a less educated labor force available to produce unskilled labor-intensive goods, it offers the opportunity to more rapidly improve productivity and to penetrate market segments for goods with a medium or high level of technological content. Mexico, Brazil and Costa Rica have already done so.

No productive sector can expect its competitiveness to be based on diminishing the well being of its workers. Even in the most labor-intensive sectors, the possibility of competing and expanding depends not on workers' salaries but on unit labor costs; that is to say, on the combination of the effective cost per worker and the productivity of labor. In many countries of Latin America, the effective cost per worker could be reduced without sacrificing the well being of workers because legislation provides for excessive mandatory benefits that are costly for firms but of little utility to the workers they supposedly aim to help. Legislation also imposes high firing costs that reduce employment, especially for the youngest workers, and minimum wages that in some countries are excessive for the productivity of the least-skilled workers, thus limiting their possibilities for employment.

Working against labor productivity are low educational levels in many Latin American countries, deficiencies in training systems, and the quality of labor relations. The number one priority should be to universalize secondary education through a mix of supply and demand incentives. Better education is essential for improving the future possibilities of labor training systems, yet a profound institutional redesign is necessary in many countries if they are to meet the needs of businesses, improve prospects for employment, and raise the productivity of workers. The elements of success of some new training systems in the region have been greater private sector participation, separation of regulatory functions, and development of mechanisms to compete for public funds. Finally, public policy can improve labor relations by encouraging dialogue between employers and workers and by establishing compensation mechanisms for workers who stand to lose their jobs or their job standing as a result of the introduction of more productive technologies.

Infrastructure

Investments in infrastructure are sensitive to the institutional environment and depend on such elements as well-defined property rights, a predictable regulatory environment, and sufficient transparency in public decision-making to enable investors to commit assets that are immovable and whose profitability depends on a future flow of revenues. Latin America has been a leader in involving the private sector in infrastructure sectors. Investments with private participation in Latin America represent over 43 percent of the total invested in all developing regions. But privatization has not always brought improvements in service coverage, quality and cost.

Despite notable progress over the past decade, Latin American **ports** are still among the most inefficient in the world. For an exporter, the costs of the inefficiencies of a typical port in the region are comparable to being 9,000 kilometers farther away from its customers. It is a matter not only of the slowness of loading and unloading operations, but also of various inefficiencies that depend more on the institutional framework than on physical investments in ports.

Among the several different models of port management, those that are successful share common ingredients that include private participation in port operations, flexible labor restrictions, and control of monopoly power, either through regulation or competition between operators or ports.

Latin America has been a leader in the restructuring of **electricity sectors**, but these reforms have not been consolidated throughout the region. In many countries, competition remains limited and prices high, except for large industrial consumers. In others, rationing has cast doubt on the sufficiency of the incentives being used. In almost all countries, the regulatory system has been criticized for lack of transparency or certainty. These problems, of course, are not unique to Latin America. They are due in part to the technical characteristics of electricity markets, which demand a complex regulatory and operative structure. But in Latin America, these difficulties are exacerbated because many countries lack the legal and institutional framework within which regulatory systems must function.

There is no single ideal organizational and regulatory system for an electricity sector, but the factors that can improve results include separating the principal market segments and opening them to potential competitors, public sector leadership in expanding the power grid (access to which should not be restricted), and the gradual design of the framework of regulatory and operating entities, taking into account the sector's institutional capabilities and limitations.

Two of every three Latin American countries have totally or partially privatized their principal **telecommunications** operator, and half the countries of the region have introduced major regulatory reforms to bring competition to the sector. Even though telephone penetration in developed countries is still five times greater than in developing countries, this gap has been reduced more rapidly in Latin America than in the rest of the developing world. In recent years, international telephone traffic in Latin America has increased at an annual rate of 15 percent. Reforms in the sector have stimulated penetration and improved the quality of service. Nonetheless, limited competition has prevented efficiency gains from being transferred to consumers, who in many countries are paying higher prices than before the reforms.

In spite of recent progress, Latin America has a long way to go in improving its telecommunications sectors. Gaps in basic telephony must be reduced with respect to other countries and among different social strata within countries. More advanced and critical services such as data transfer and Internet access must be made more widely available to businesses. These challenges require a regulatory framework that facilitates competition within each product and among products. Regulations should facilitate access to networks and promote inter-operability among them. In many countries, this implies integrating regulatory systems into telecommunications sectors that currently treat similar products in a different manner, which constrains the adoption of new technologies.

Technological Innovation

The global revolution in information technology is putting every country's capacity for technological innovation to the test. The new technologies bring the promise of greater productivity by reducing information and transaction costs in all types of sectors. But in Latin America, only one of every 20 persons has Internet access, while in the United States that ratio is one of three. And Latin America has only three Internet hosts for every 10,000 inhabitants, compared to 173 in developed countries. Of course, Internet access may be limited by telephone service coverage. But this is only one of many constraints to reaping the benefits of new technology. Limited levels of education, poor access to credit, and a weak rule of law can also constrain the capacity to assimilate technology.

The fact that information technology is still in its diffusion stage provides an opportunity to determine

the relevance of these variables and to understand in a more general way the causes of Latin America's technological backwardness. Subsidizing computers or the creation of Internet hosts is not going to resolve that problem. In fact, the information technology revolution poses a number of specific policy questions, including government's leadership role, adoption of new technology for government activities, the viability of the government promoting relatively unsophisticated versions of new technologies for poor or marginalized users, and the need to address tax erosion problems implied by widespread use of electronic commerce.

Technological innovation occurs in specific institutions that are not adequately reflected by variables such as those considered above, and in which there is also a scope for the government. The evaluation in this Report of innovation systems in the region shows that Latin America's research and development spending is very limited, that personnel dedicated to these activities are scarce and under-utilized, that the links between businesses and research centers are incipient at best, and that information flows are weak. Each of these areas is open to interventions for improving the technological innovation environment.

Industrial and Investment Policies

Ensuring that productive factor markets function smoothly is a demanding task for governments, since each of those markets requires institutional support. But the government's scope can be extended to supporting in a more direct way the development of certain sectors or investments. The import-substitution strateqy was an extreme version of this orientation. Latin American countries are currently experimenting with more moderate approaches to industrial policy that take into account the capabilities of government, avoid creating rents in favored sectors, and aim to firmly integrate the productive sectors into the currents of international commerce and technology. The most important component of these policies is the promotion of exports by means of specialized financial instruments, exemption mechanisms, drawbacks of taxes, and export processing zones. Although a few export subsidies remain, the tendency in the region is toward their elimination. Judging by export performance in the 1990s, export promotion policies have been much more effective than the more selective policies of the past. Sixteen of the 26 Latin American countries increased the share of world markets in their baskets of export products, and in the region as a whole the share of exports of products with medium or high technological content reached 40 percent of total export value, due in large part to performances by Mexico and Brazil. Investment promotion policies also encompass a variety of financial and fiscal instruments authorized by means of public corporations or development banks. Surprisingly, the sectors most favored by fiscal incentives are not high technology sectors but rather tourism and various primary sectors. The outlook for these policies is mixed, and little is known about their efficacy or, hence, their policy implications.

Changes in the region's treatment of foreign investment have been much more profound. Since the dismantling of restrictions on income and repatriation of foreign investment capital at the start of the 1990s, Latin America has been a major recipient of foreign direct investment (FDI). These resources have served as a channel for technology transfer and as a mechanism for increasing and diversifying exports. Much of what is attractive to foreign investment is not the direct object of public policythe size of the economy, and distance from and cultural links with the countries that are the source of investment. The tax treatment of investment is a policy variable that is effective in attracting foreign investment, but its widespread use could prove destructive for the region. This leaves the quality of public institutions as the sole but powerful policy instrument to attract investment. This particularly involves the regulatory framework, the rule of law, and control of corruption, variables that occupy a prominent place throughout this Report.

The governments and private sectors of the Latin American countries are quite justified in their focus on the quality of the economic and institutional environment in which firms operate. The obstacles most difficult to overcome to unleash the region's economic growth potential are not the lack of capital or technological knowledge. Rather, they are obstacles that are deeper and more difficult to change, such as the norms, regulations and practices that make up the institutional system of each society. The goal of this Report is to help governments and private sectors identify and overcome these institutional obstacles that constrain the efficient use of productive resources and the generation of new productive capabilities.



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Summary

The notion that a country is more competitive if its currency is depreciated or its trade surplus heftier has been displaced in recent years by a more comprehensive view of the factors that generate value at both microeconomic and aggregate levels. An economy is more competitive when companies operate in an environment that is conducive to the sustained growth of productivity and per capita income. Being competitive in a global economy demands that countries create conditions for business development that are beyond what would be expected considering the countries' income levels.

In the past decade, Latin America made great progress in several areas essential for competitiveness, particularly macroeconomic discipline. While this helped the region return to the path of growth, the pace was not satisfactory for the people of the region. Nor was it sufficient to reduce the productivity and income gaps that separate Latin America from the developed countries. Considering their income levels, most Latin American countries have serious shortcomings that constrain them from achieving productivity and per capita income growth, as shown by an analysis of competitiveness indices in the 2001 edition of The Global Competitiveness Report. Only Chile has conditions substantially better than might be expected for its income level, and is therefore in a position to post rapid growth. Deficiencies in the other countries stem mainly from problems with the quality of the macroeconomic environment, the quality of public institutions, and technical capacity.

The business communities of Latin America are all too aware of these problems. In their view, the greatest obstacles to business development in Latin America involve the economic and regulatory environment in which companies have to operate. One of three business people thinks that the most serious problem is the lack of financing, followed by excessive regulations and taxes, and policy instability. The opinions tend to parallel the severity of these problems as shown in objective national data. Considering the wide disparities between the economies, it is not surprising that the opinions of business communities vary greatly from one country to another. More surprising is that although many of these problems mostly affect smaller firms, business people from companies both large and small generally perceive themselves to be facing similar constraints. The policy implication is clear: the major problems of competitiveness should preferably be dealt with through overall policies. Policies that differentiate by type of firms should play a subsidiary role.

Given the severity of many of the problems affecting business growth in Latin America, one would expect companies in the region to be quite small by worldwide standards. This is true of the countries' larger companies, which are significantly smaller than in developed countries and in developing countries as a whole. This is not simply because of the size of Latin American economies, although that is a crucial factor, but more so because companies in most countries in the region have serious constraints in terms of access to productive resources, particularly credit and transportation, electric power, and telecommunications infrastructure. These constraints even affect the largest companies, despite their links to international financial markets and the advantages that operating on a large scale affords them for offsetting gaps in public infrastructure with their own investments. Despite globalization, business development remains essentially determined by country-specific factors. Promoting competition, therefore, depends on government efforts to address those factors.

Export performance and competitiveness are different but related. Export success tends to be a consequence of competitiveness—that is, of the quality of the environment in which companies operate, and the facilities available to them to develop innovations and exploit market opportunities. Latin America's export performance during the 1990s was remarkable compared to the poor performance of the previous decade. Numerous countries increased their participation in world markets, and several exported more goods with higher technology content. By the end of the 1990s, around 40 percent of exports from the region were goods with a medium or high technology content. Particularly successful was Mexico, which took advantage of access to North American markets. However, although many of the more dynamic goods were the result of new technologies, not all such goods fared so well, and a number of raw material goods also performed well. Progress in exports with a technology content was not so much the result of policies of "picking winners," which would have entailed a high risk of failure, but more the result of generally improved conditions for competitiveness in various countries. CHAPTER

1

Growth, Productivity and Competitiveness in Latin America

Criticizing the obsession with competitiveness in developed countries, Paul Krugman argued several years ago that it is not countries that compete with one another, but rather the businesses in those countries that compete.¹ Confusing countries with companies leads to the mistaken notions that a nation's economic strength is measured by its foreign trade surplus, that imports are undesirable because they displace domestic employment, or that low wages in poor countries are a threat to the growth of rich countries.

Concern over competitiveness has increased even more in recent years in developing countries. But Krugman's warnings have not been forgotten. The mercantilist concept of competitiveness is giving way to a more comprehensive vision of the environment in which companies must operate, including the quality of macroeconomic management, the availability of financial resources, infrastructure services and human capital, and the innovative capacity of firms and research centers. An economy is now understood to be more competitive when the business environment is conducive to the sustained growth of productivity and per capita income, in a context of integration into the world economy.

Strictly speaking, the term "competitiveness" is inadequate to encompass all the areas it is said to cover. Usage has made it a synonym for the more precise term— "productivity," which is the capacity to generate value, whether at the micro or aggregate level. As we will see in this chapter, countries compete primarily with themselves to be more competitive: as a rule, a country grows more rapidly if it succeeds in creating a business environment better than the one that would be expected for its own income level. As one might expect, the availability and quality of productive factors, the level of technology, and organizational ability are best in wealthier countries. But regardless of its level of development, any country that is able to improve these variables expands its economic potential.

To judge by the results, Latin America and the Caribbean exhibit serious problems of competitiveness. In the 1990s, average growth of the countries in the region was just 3.3 percent, a rate much lower than that of other groups of developing countries, such as East Asia (5.1 percent), the Middle East (4.0 percent), or the rest of Asia (5.2 percent). When population growth is taken into account, the average income of Latin Americans rose only 1.5 percent a year over the past decade, lower not only than several regions of the developing world, but even than countries that are more mature demographically, such as the developed countries and those of Eastern Europe. If the comparison is limited solely to the working population, the average income generated by each worker in Latin America grew at a rate of only 0.7 percent a year during the 1990s. Only the countries of the Middle East and Africa had more modest growth in average labor productivity. Elsewhere in the world, worker incomes rose by more than 1.7 percent a year, and in East Asia and the rest of Asia, by some 3 percent a year (Table 1.1).

At the same time, Latin America's growth and productivity indicators improved by 2 percent, a significant improvement over the previous decade. No other region of the world had a comparable gain, undoubtedly because the slump of the "lost decade" of the 1980s was easy to improve upon. Even prior to the "lost decade," however, Latin America's performance was not outstanding in comparative terms. Indeed, during the

¹ Krugman (1994).

	1	GDP g	rowth ar	nd produ	ctivity				F	actor ac	cumulat	ion		
	G	DP	Per	capita GDP	Per	worker 5DP	Inve	stment ate	Ca st	pital tock	La	abor orce	Yea	ars of cation
	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990
Developed countries	2.69	2.55	2.17	1.99	1.59	1.68	22.38	19.93	2.84	2.49	1.11	0.88	0.87	0.86
East Asia	5.93	5.13	4.02	3.30	3.23	2.72	28.85	32.32	8.47	7.96	2.71	2.41	2.56	2.49
Middle East	2.97	3.98	0.08	1.25	-0.23	0.19	22.98	23.58	4.75	3.69	3.19	3.76	5.14	3.32
Eastern Europe	3.80	3.48	3.10	2.77	3.21	2.26	23.52	23.18	5.01	3.83	0.59	1.22	1.70	0.8
Latin America	1.33	3.34	-0.68	1.50	-1.40	0.74	18.70	19.19	2.63	3.71	2.73	2.59	1.93	1.48
Rest of Asia	4.77	5.15	2.75	3.49	2.50	2.86	22.15	21.94	5.93	5.31	2.28	2.28	2.99	1.7
Africa	3.04	3.15	0.19	0.52	0.28	0.41	18.55	21.43	4.76	3.31	2.75	2.76	3.40	2.9

 Table 1.1
 Growth, Productivity and Factor Accumulation

Note: All figures are annual growth rates, except the investment rate, which is gross fixed investment as a percentage of GDP. All data are countries' simple averages. Source: Appendix 1.1.

second half of the 20th century all regions of the world except Africa surpassed Latin America in per capita growth. Accordingly, the region fell from second place in terms of average per capita income in the 1950s, surpassed only by the developed countries, to fifth place in the 1990s, ahead only of the poor countries of Asia and Africa.²

From an accounting standpoint, economic growth can be viewed as the result of accumulating factors of production and using those factors productively. Total growth is simply the weighted sum of these sources of growth.³ Latin America's modest economic growth is due both to the low rate of accumulation of productive factors and to a very poor performance in productivity. Indeed, because Latin America has had low investment rates over the last two decades, capital stocks have grown at modest rates: 2.6 percent annually in the 1980s and 3.7 percent in the 1990s. Both rates are lower than those elsewhere in the developing world. Moreover, even though the labor force grew at similarly high rates in the 1980s and the 1990s, the rate of increase in education slowed in the past decade and was substantially less than in the countries of the Middle East and East Asia. With no changes in productivity, the rates of accumulation of productive factors would have made it possible to sustain a growth of no more than 4 percent. But to make things worse, total factor productivity fell 0.6 percent annually.⁴ It should be noted that total factor productivity also fell elsewhere in the developing

world, but it continued to rise at a vigorous pace in the developed world (Table 1.2). 5

A rather widespread drop in productivity in a time of such rapid technological change like the 1990s, when production and trade opportunities expanded so dynamically, may seem paradoxical. But the paradox diminishes when it is noted that what actually happened was that the productivity gaps grew between the wealthy countries, where productivity did increase, and the poor countries, where it fell (Figure 1.1). This happened also within Latin America, where only a handful of countries

 $^{^2}$ For a more detailed analysis of the development patterns of Latin America in comparison with the other regions of the world see IDB (2000, Chapter 1).

³ The contribution of factors of production to growth is usually weighted according to its estimated participation in total income, under the assumption that the production function has the Cobb-Douglas form. Although arbitrary, this is a simple assumption. Other alternative forms are discussed in Hall and Jones (1999).

⁴ Note that although average productivity of labor rises, total factor productivity may fall if labor is combined with a greater quantity of physical and human capital, and if the product per worker increases, but not at a pace sufficient to compensate proportionally for this increased capital.

⁵ The conclusion that total productivity of factors fell in Latin America but rose in the developed world in the 1990s is borne out if different coefficients are used in weighting productive factors in a range between 0.3 and 0.7; if instead of the capital depreciation rate of 6 percent, lower depreciation rates are used; or if the human capital index used by Hall and Jones (1999) is employed. See a summary of alternative calculations in Appendix 1.1.

le 1.2 Grov	wth Decompo	osition								
(Ani	nual rates in ,	percent)								
					Contrib	ution of:				
Region	GDP g	rowth	Car	oital	Labor	force	Educ	ation	Total produ	factor ctivity
	1980s	1990s	1980s	1990s	1980s	1 990s	1980s	1990s	1980s	1990
Developed countries	2.69	2.55	0.95	0.83	0.74	0.59	0.58	0.58	0.43	0.56
East Asia	5.93	5.13	2.82	2.65	1.81	1.61	1.70	1.66	-0.40	-0.80
Middle East	2.97	3.98	1.58	1.23	2.13	2.51	3.43	2.21	-4.17	-2.00
Eastern Europe	3.80	3.48	1.67	1.28	0.39	0.82	1.14	0.57	0.60	0.82
Latin America	1.33	3.34	0.88	1.24	1.82	1.73	1.29	0.98	-2.65	-0.62
Rest of Asia	4.77	5.15	1.98	1.77	1.52	1.52	1.99	1.17	-0.72	0.69
Africa	3.04	3.15	1.59	1.10	1.83	1.84	2.27	1.94	-2.65	-1.71

Note: All data are countries' simple averages.

Source: Appendix 1.1.





Source: IDB calculations.

had productivity gains, most notoriously Chile, Argentina and Uruguay, which are among the most developed within the region (Figure 1.2).

The reason for the productivity decline in most countries may have been that technological changes could be assimilated only by those countries that had a labor force sufficiently educated to take advantage of them. Figure 1.3 sustains this hypothesis, which is also supported more rigorously in econometric analyses.⁶ In countries without sufficient education, the new technologies may have raised productivity of some types of human capital while rendering others obsolete or underused. Deficiencies in training systems and the limited mobility of workers between occupations may have contributed to this outcome.

For Latin America, where there is just such a concentration of education among small groups, as well as education gaps, the connection between productivity and education is particularly relevant. Over the last three

⁶ See Appendix 1.1.



Note: Each dot represents a country. Latin American countries are shown in red. Source: Appendix Table 1.1 and Barro and Lee (2000).



Source: Barro and Lee (2000).

decades, East Asian countries have cut the education gaps of their labor force vis-à-vis the developed countries by at least one half. The countries of the Middle East have also made rapid gains since the 1960s, doubling the average number of years of schooling of their labor force. By contrast, Latin America has gone from an average of three years of education four decades ago to around five years today (Figure 1.4). What is worse is that the pace of increase has slowed as a result of the economic crises of the 1980s and 1990s. While initial access to education is high in Latin America, the completion rates for secondary schooling are very low, and as a

Figure 1.5 Productivity and Institutional Quality



Note: Each dot represents a country. Latin American countries are shown in red. Source: Appendix Table 1.1 and Kaufmann, Kraay and Zoido-Lobatón (1999a and b).

result, higher education is very concentrated in a small group of the population. This limits the ability of workforces to assimilate new technologies and ways of organizing production.⁷

Another hypothesis (which does not necessarily rule out the previous one) is that productivity increases were limited in the poorer countries because of the fragility of their public institutions. In the absence of a stable and respected system of laws, there may not have been sufficient incentives to assimilate new technologies that require long-term investments, whether in infrastructure or other areas. This may also have limited the capacity of the financial system to support the development of new investments. The ineffectiveness of government, or the presence of an environment that encourages corruption, may have discouraged foreign investment and technology transfer, and diverted productive resources toward rent-seeking activities. The absence of institutions for social protection and for the resolution of distribution conflicts may have hindered or prevented investment in highly productive activities because of the impossibility of compensating the losers.

Figure 1.5 and the econometric analysis in Appendix 1.1 provide support for this suggestion. During the 1990s, productivity rose substantially faster in countries

⁷ For an analysis of trends in education and their distributional effects, see IDB (1998-99). Behrman, Duryea and Székely (1999) have analyzed the reasons for slow educational progress in Latin American countries.



with better institutions. The institutions indicator used here is the synthetic index developed by the World Bank, which uses information from a variety of sources, giving more weight to those of greater consistency.⁸ The index examines four central aspects of the quality of government: the rule of law, the control of corruption, the effectiveness of public administration, and the quality of the regulatory framework. Latin America has serious deficiencies in the first two areas-that is, the degree of respect of citizens and the state for the institutions that govern relations between them. There are also striking deficiencies in the effectiveness of public administration. Most Latin American countries are below the world average in this area due to problems with delivering public services, the efficiency of the bureaucracy, the competence of government employees, political independence of the civil service, and credibility of government policy commitments. The most advanced aspect of institutions in Latin America is the regulatory framework, which covers the legal environment in which markets operate and the degree of government interference in economic decisions. In this regard, the region's indicators are well above the world average, although lower than the averages of the developed countries and East Asia (Figures 1.6a and b).

Indices of Competitiveness

What factors explain a country's ability to efficiently produce goods and services at international standards



of technology and guality, and consequently raise productivity and incomes? The purpose of competitiveness indicators is to answer this guestion, and the best-known indicators are those produced by the World Economic Forum and published in The Global Competitiveness Report. The 2001 edition of the report states that the three most important factors for competitiveness are the quality of the macroeconomic environment, the quality of public institutions, and technological capacity. In each of these areas, The Global Competitiveness Report constructs indices based on a combination of objective information and indicators of the opinions of business leaders (based on surveys of approximately 100 managers per country).⁹ The average of the three indices constitutes the competitiveness index, on the basis of which countries are ranked.¹⁰ The rankings are not directly comparable with previous years because the 2001 edition includes new countries. In all, the edition encompasses 75 countries, among them 20 Latin American countries, nine of which did not appear in previous

⁸ Kaufmann, Kraay and Zoido-Lobatón (1999a and b). For a description of the main results of these indices in terms of Latin America see IDB (2000, Chapter 1).

⁹ Appendix 1.2 lists the variables and methods of construction of the indices and reports the main results for Latin American economies.

¹⁰ Simple averages of the three indices are used for developing countries. For developed countries and other economies that are important technological innovators, the technology index receives a weighting of 50 percent and the other two indices 25 percent. For economies in technological transition (Hong Kong, Singapore and Ireland), the competitiveness index is an average of the two previous methods.





editions.¹¹ Nor are the indices strictly comparable for each country with respect to previous years because of changes in methodology, often substantial ones. For example, the principal areas of the competitiveness index in the 2000 edition were international openness, financing and innovation. Although these important changes reflect the lack of a consolidated methodology, they are in large part the result of the reorganization of a basic body of variables (especially between the areas of finance and the quality of the macroeconomic environment, on the one hand, and between innovation and technological capacity, on the other).

In addition to assembling the variables that enter into the index, *The Global Competitiveness Report* contains objective information and opinions on a wide range of issues related to both the macro environment and the microeconomic dimensions of competitiveness.

Based on the results of *The Global Competitiveness Report* for 2001, Latin America occupies fifth place among the seven major regions of the world in terms of competitiveness, only slightly ahead of the poor countries of Asia and the small group of African countries that are included (see Figure 1.7).¹² Given that the competitiveness index reflects the capacity to produce goods and services according to international standards of technology and quality, it is not surprising that the index tends to reflect countries' income levels.¹³ Latin American countries are in intermediate or low positions, due in part to this association. Chile, Costa Rica and Trinidad and Tobago—relatively high-income countries within the region—occupy the best positions: 27th, 35th and 38th, respectively. At the other extreme, seven of the 11 lowest positions worldwide are occupied by Latin American countries, some of which have very low income levels, such as Honduras and Nicaragua (see Figure 1.8).

In contrast to their extensive association with income levels, indices of competitiveness do not present a high correlation with economic growth.¹⁴ This may seem surprising, given the objective of these indices. The explanation is that what is relevant for growth is the country's conditions of competitiveness *relative to its income level*. In effect, when these conditions are better than expected for an income level, the country in question tends to grow more rapidly, and vice-versa.¹⁵ The countries with the greatest per capita growth dur-

¹¹ The nine countries are Guatemala, Honduras, Jamaica, Nicaragua, Panama, Paraguay, the Dominican Republic, Trinidad and Tobago, and Uruguay. Their inclusion is the result of a joint effort of the Inter-American Development Bank and the World Economic Forum.

¹² The poor countries of Asia are Bangladesh, China, India, Sri Lanka and Vietnam. The African countries included in the index are Mauritius, Nigeria, South Africa and Zimbabwe.

¹³ There is a correlation of 0.91 between the 2001 competitiveness index and per capita income in 1999 dollar parity.

 $^{^{14}}$ For example, the correlation between the 2001 competitiveness index and growth in per capita income of countries during the 1990s is only 0.28, and over 1997-99 it is 0.34.

¹⁵ This argument has also been developed by Porter (2000).



Note: Each dot represents a country. Latin American countries are shown in red. Source: IDB calculations based on World Bank (1999) and World Economic Forum (2001). See Appendix Table 1.3.

ing the 1990s—China, Ireland, Singapore and Chile, whose income levels encompass an extremely wide range—display conditions of competitiveness substantially above what would correspond with their income levels (see Figure 1.9). At the other extreme are several countries of Eastern Europe that performed poorly over the past decade and have very low conditions of competitiveness for their per capita income levels. It is important to note that the relationship between growth and conditions of competitiveness relative to income level is econometrically solid and not due simply to endogeneity between the two variables.¹⁶

The modest economic growth of Latin American countries in recent years is in keeping with their conditions of competitiveness, which are generally lower than their income levels would suggest. Of the 20 countries included in The Global Competitiveness Report for 2001, only Chile presents conditions of competitiveness outstanding for its income level per capita. Nine other countries present conditions approximately equivalent to their income level, while the 10 remaining countries present unfavorable competitiveness conditions (see Table 1.3). The average growth rates of these three groups of countries in the 1990s were 5.3 percent, 1.8 percent and 1.2 percent, respectively, and over 1998-2000 their respective growth rates were 1.4 percent, 2.2 percent and -0.7 percent. Consequently, the patterns of growth among Latin American countries confirm the relevance of competitiveness conditions relative to income level.



Figure 1.10 Macroeconomic Environment Index

Quality of the Macroeconomic Environment

The fragile competitive position of most Latin American countries is manifested in the three areas that make up the index of The Global Competitiveness Report. Consider the index of the quality of the macroeconomic environment, which summarizes objective indicators of price stability, cost of internal and external financing, tendencies in the real exchange rate, savings rates, and levels of public spending, along with opinions on prospects of recession and ease of access to credit (see the list of variables in Appendix 1.2). When the index was computed in early 2001, Chile and Trinidad and Tobago had the highest positions (21st and 25th), but 16 of 20 countries occupied positions below the world average (see Figure 1.10). If the association between the quality of the macroeconomic environment and income level is isolated, it is found that only Chile, Trinidad and Tobago and Brazil had a relatively favorable macro environment, while eight countries had macro environments that were very adverse to competitiveness. These results indicate that the understandable emphasis the

¹⁶ The relation holds when totally exogenous instruments are used (such as origins of legal codes and geographic factors) in a regression of per capita income growth as a function of competitiveness conditions relative to income (these being, in turn, the residuals of a regression of the competitiveness index of *The Global Competitiveness Report* as a function of the per capita income level). See Appendix 1.3.

Table 1.3	Competitiveness	Levels	Relative	to	Income	Levels

Country	Growth competitiveness index	Macroeconomic environment index	Public institutions index	Technology index	
Chile	Outstanding	Outstanding	Outstanding	Normal	
Bolivia	Normal	Deficient	Outstanding	Normal	
Brazil	Normal	Outstanding	Deficient	Normal	
Costa Rica	Normal	Normal	Normal	Outstanding	
Dominican Republic	Normal	Normal	Normal	Outstanding	
El Salvador	Normal	Normal	Normal	Normal	
Jamaica	Normal	Deficient	Outstanding	Outstanding	
Mexico	Normal	Normal	Deficient	Normal	
Peru	Normal	Normal	Normal	Deficient	
Trinidad and Tobago	Normal	Outstanding	Normal	Deficient	
Argentina	Deficient	Deficient	Deficient	Deficient	
Colombia	Deficient	Deficient	Deficient	Deficient	
Ecuador	Deficient	Normal	Normal	Deficient	
Guatemala	Deficient	Normal	Deficient	Deficient	
Honduras	Deficient	Deficient	Deficient	Normal	
Nicaragua	Deficient	Deficient	Normal	Normal	
Panama	Deficient	Normal	Deficient	Deficient	
Paraguay	Deficient	Deficient	Deficient	Deficient	
Uruguay	Deficient	Deficient	Normal	Deficient	
Venezuela	Deficient	Normal	Deficient	Deficient	

Note: In order to classify countries in each of the columns, a regression was made between the values of the corresponding index and the logarithm of the 1999 GDP per capita adjusted by purchasing power parity. Countries that had residuals between 0.5 and -0.5 times the standard error of the regression were classified as average. Those with errors above 0.5 were considered outstanding, and those with errors below -0.5 were classified as deficient. Source: IDB calculations based on World Economic Forum (2001).

countries of the region have placed on improving their macroeconomic management is still incomplete. While high inflation and major fiscal deficits have been contained, the macroeconomic environment for competitiveness remains adverse. This is due in particular to the high cost of and unstable access to internal and external financing for the private sector, which will be explored in later chapters of this Report. Major swings in market perceptions would imply significant changes in the macroeconomic environment index of *The Global Competitiveness Report*, a point that is particularly relevant to countries such as Argentina and Brazil, where shifting market sentiments since mid-2001 are not fully captured in the index.

Quality of the Institutional Environment

With regard to public institutions, *The Global Competitiveness Report* summarizes the opinions of business communities as to the rule of law and control of corruption. Although only seven questions are used to construct this index, their correlation with recognized indicators such as those of Kaufmann, Kraay and Zoido-Lobatón (1999a and 1999b) is remarkably high.¹⁷ The foremost positions in the quality of institutional environment in Latin America and the Caribbean are occupied by Chile (21st), Uruguay (31st), Trinidad and Tobago (36th) and Costa Rica (37th), as shown in Figure 1.11. The rest of the countries are in positions below the world average, many of them among the lowest in the world. Taking into account the differences in income levels, only three countries have better relative positions than what could be expected, while nine countries among the 20 Latin American countries present indicators that are highly deficient.

Technological Capacity

The quality of the environment for technological progress and innovation occupies a prominent place among the

¹⁷ The correlation is 0.92 between indicators of rule of law in both sources, and 0.97 between indicators of corruption.





studies and indicators of *The Global Competitiveness Report.* The technology index was introduced in the 2000 report, and it has been substantially modified in the 2001 edition. The new version combines three sub-indices that measure the quality of the environment for innovation, the capacity to receive international technology and export goods with technological content, and the degree of assimilation of new information and telecommunications technologies. The three sub-indices combine objective information and the opinions of business leaders.

In the technology index, the Latin American countries that occupy the highest positions are Costa Rica (32nd) and Mexico (36th). The rest of the countries are in below-average positions (see Figure 1.12). In isolating the relation between technological capacity and income level, only Costa Rica, the Dominican Republic and Jamaica have a more favorable environment for technological development than would be expected for their income level. On the other hand, 10 of the 20 Latin American countries are in a precarious position for technological development, given their income levels.

In sum, the indices of *The Global Competitiveness Report* confirm that Latin American countries have serious deficiencies in critical areas of competitiveness, such as the quality of the macroeconomic environment, the quality of public institutions, and the ability to assimilate and generate technological change. These deficiencies suggest that most countries of the region currently are unable to substantially and sustainably raise their productivity and income levels.

It is necessary to caution that the competitiveness indices described here are not exempt from criticism.¹⁸ It can be argued that the indices should be limited to sectors or activities that are directly subject to international competition in order to avoid their dispersion among areas that bear more of a relationship with productivity and growth in general. Without a doubt, that would be the consistent focus of a strict definition of the concept of competitiveness. Even so, the competitiveness of activities that face international competition depends not only on sectoral factors, but also on general factors of the environment that affect other businesses as well. Given the gravity of many of the problems of the macro and institutional environment of developing countries, it is guite possible that the ability to compete internationally depends more on general factors than those that are specific to particular sectors. The evidence we present in the following chapter indicates as well that the seriousness of the problems for business development differs much more among countries than among sectors or types of firms. Consequently, it would prove of little advantage to limit information (objective or subjective) to firms directly exposed to international competition.

¹⁸ See, in particular, Lall (2001).

The index of The Global Competitiveness Report can also be criticized for not concentrating on studying the market failures that affect competitive capacity, particularly those factors that influence the creation of dynamic comparative advantages. The rationale for these criticisms is that any competitiveness strategy should ultimately lead to identifying the policies that governments should implement to resolve or take advantage of those failures. Presumably, those actions should be selective among sectors and different between some countries and others according to the characteristics of markets, the capacity of governments, and the social and institutional context. Competitiveness indices do not take these differences into account: they treat all countries in the same manner and maintain a basic focus on freedom of the market. This criticism was much more valid in previous versions of the competitiveness index, when international openness was included as one of the principal areas of competitiveness. In the current version, there is not in strict terms any variable that implies a bias for the freedom of the market, but it is certain that it does not measure the presence or efficacy of active policies that can contribute to taking advantage of externalities and creating comparative advantages.

In the selection and management of information, the competitiveness index can be criticized for the subjective character of a large portion of the information utilized, for the limited selection and the interpretation of various variables, and for the arbitrary weight assigned to the components of the index. Nonetheless, even a critic such as Lall (2001) has observed that "there is a useful role for competitiveness indices to benchmark national performance. Indices can help policy-makers to evaluate the shortcomings of their economies, in the same way that technical benchmarking helps enterprises to assess themselves against rivals and undertake appropriate strategies. Indices can also help investors to allocate resources between countries, researchers to analyze important issues in comparative terms, aid donors and international institutions to judge economic performance, and domestic industries to measure themselves against competitors. The justification for using benchmarks (rather than theoretical norms) is simple: many aspects of performance can only be assessed with reference to actual practice. Theoretical norms are often difficult to construct with the precision needed to allow evaluations in a complex and fast changing world" (pp. 6-7).

Conclusions

Latin America and the Caribbean face serious problems of competitiveness. If one judges by the results of economic growth and productivity over the past decade, only Africa presents worse results. Rates of accumulation of physical and human capital in Latin America are low, sufficient only to sustain average growth on the order of 4 percent. In the 1990s, growth did not even reach that figure, as declines in productivity in the use of factors in most countries of the region subtracted 0.6 percent from that modest potential. As a consequence of poor productivity, the per capita income gap between Latin America and the developed countries is widening. Gaps in productivity between the rich and poor countries within the region are widening as well. Two factors that appear to be clearly associated with this phenomenon are the educational levels of the workforce and the quality of public institutions. The countries of Latin America present serious deficiencies on both fronts.

The competitive landscape is not much different when judged not by results but by the quality of the conditions that determine countries' competitiveness. According to the indices of The Global Competitiveness Report for 2001, the countries that offer the best conditions are Chile, Costa Rica and Trinidad and Tobago. The remaining countries of the region are below the world average, many of them in the lowest positions among the 75 countries considered. This is not surprising, given the extensive association of these indices with countries' income levels. The capacity for growth depends not so much on these absolute positions as on their level relative to countries' incomes. The countries that tend to grow more rapidly are those that have better conditions of competitiveness than what would correspond to their income levels at a given time. Currently, only Chile presents such conditions, while 10 of the 20 countries in the region included in the index have conditions significantly worse than what would correspond to their income levels. The deficiencies originate in the three basic areas considered by the indices: the quality of the macroeconomic environment, the quality of public institutions, and technological capacity. Thus, the region faces a serious challenge in terms of competitiveness: most countries lack the foundation to substantially improve growth in productivity and incomes.

Appendix 1.1 Calculation of Productivity Growth

Data on annual growth of productivity were constructed following the traditional method of breaking down output into contributions of factors and productivity. Productivity was obtained residually starting from a standard production function, and utilizing data on product, labor force, education, and capital by country. The series of productivity and growth rates by decade were obtained through regressions of the annual observations of these variables against a lineal trend, so as to isolate the effects of the business cycle.

The sensitivity of the estimates to variations of the parameters was analyzed to assure that the conclusions on productivity trends were not the result of the assumptions used in the production function and in constructing the series (see Appendix Table 1.1).

The Production Function

A Cobb-Douglas type production function was used:

$$Y = AK^{\alpha}(HL)^{1-\alpha}$$

where Y is the output, A is total factor productivity, L the labor force, H human capital and α the technical coefficient. The calculations presented in the text were carried out assuming an α of 1/3, the standard value found in the literature. The results also assume an α of 2/3, a value more in accordance with the national accounts of developing countries.

Series

Series were used for the 1970-99 period, expressed in 1985 purchasing power parity prices to facilitate comparisons between time periods and between countries. The series of output growth, labor force growth, and investment were drawn from the World Bank's World Development Indicators. The indicator of human capital was the average education of the population over 25, obtained from the Barro-Lee database. Following Hall and Jones (1999), years of education weighted by education returns according to level was used as an alternative index of human capital. The returns were those estimated by Psacharopoulos (1994): 13.4 percent for the first four years, 10.1 percent for the next four, and 8.3 percent from eight years onward. The perpetual inventories method was used for constructing the capital series, assuming a 6 percent depreciation rate. Calculations were also done with a rate of less than 4 percent. Initial capital was constructed by applying to the first year for which investment data are available an equation that relates the capital-output ratio to the per capita income level. This was estimated with cross-sectional data for 1988, the year for which capital data obtained from Hall and Jones (1999) are available.

pendix 1.1-Tabl	el Pr	oductivit	y Growt	th Estima	ates in	the 1990	s					
	(11	n percent)					<u> </u>				
	d = α = H =	6%, 1/3, Years	d = α = H =	4%, 1/3, Years	d = α = H =	= 6%, = 2/3, = Years	d = α = H =	= 6%, = 1/3, Return	d = α = H =	= 4%, = 1/3, Return	d = α = H =	= 6%, = 2/3, Return
Region	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Developed countries	0.56	0.35	0.45	0.09	0.35	0.17	0.77	0.50	0.66	0.40	0.46	0.30
East Asia	-0.80	-0.53	-0.84	-0.60	-1.88	-2.36	-0.12	-0.37	-0.16	-0.44	-1.55	-2.15
Middle East	-2.00	-1.10	-2.12	-1.23	-0.95	-0.84	-0.86	0.02	-0.99	0.06	-0.38	-0.81
Eastern Europe	0.82	1.03	0.68	0.99	0.24	0.15	1.09	1.29	0.94	1.25	0.37	0.28
Latin America	-0.62	-0.61	-0.67	-0.71	-0.50	-0.27	-0.14	-0.09	-0.19	-0.16	-0.27	0.04
Rest of Asia	0.69	0.18	0.62	0.05	0.26	-0.09	1.38	1.01	1.31	0.93	0.61	0.45
Africa	-1.62	-1.33	-1.81	-1.61	-0.89	-0.62	-0.39	-0.09	-0.66	-0.56	-0.30	-0.16

Notes: d = Annual depreciation rate of fixed capital; α = capital share in a Cobb-Douglas production function; H = Human capital (measured as either labor force average years of education [years] or average returns of labor force education [return]). Source: IDB calculations.

Appendix 1.1-Table 2 Productivity, Education and Institutions: Cross-Section Regression Results

		Dependen Annual produc	t variable: ctivity growth	
Independent variables	Reg. 1	Reg. 2	Reg. 3	Reg. 4
Per capita GDP (log), 1990	0.0145 (-4.42)***	0.0028 (1.79)**		-0.0158 (-3.77)***
Education				
Average years of education, 1990	0.0039 (3.15)***			0.0035 (2.38)***
Excess education given income level in 1990		0.0039 (3.15)***	0.0037 (2.95)***	. ,
Institutions		、 ,		
Institutional quality index	0.0172 (4.12)***			0.0202 (3.80)***
Excess institutional quality given income level in 1990		0.0172 (4.12)***	0.0190 (4.61)***	
Other control variables		()		
Exports over GDP, 1990				0.0031 (0.26)
Average inflation rate (1990-99)				0.0009 (0.92)
Investment rate (1990-98 average)				-0.0008
Constant	0.0902	-0.0310 (-2 33)***	-0.0075	0.1023
D2	0.30	0.30	0.37	0.48
No. of observations	85	85	85	64

Notes: t-statistics in parentheses.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

Appendix 1.2. Growth Competitiveness Index¹

For Technological Core Economies (most developed countries, plus Israel and Taiwan)

Core GCI = 1/2 Technology Index + 1/4 Public Institutions Index + 1/4 Macroeconomic Environment Index

For Technological Non-Core Economies (most developing countries, plus Greece and Spain)

Non-Core GCI = 1/3 Technology Index + 1/3 Public Institutions Index + 1/3 Macroeconomic Environment Index

For Technological Transition Economies (Hong Kong, Singapore, Ireland)

A. Macroeconomic Environment Index

Macroeconomic Environment Index =

1/2 Macroeconomic Conditions Sub-Index

- + 1/4 Country Credit Ranking Index
- + 1/4 General Government Expenditure Index in 2000

Macroeconomic Conditions Sub-Index = 3/4 Macroeconomic Hard Data + 1/4 Macroeconomic Survey Data

Hard Data (all converted to 1 to 7 scale)

• Inflation in 2000

- Lending borrowing interest rate spread in 2000
- Real exchange rate in 2000 (1990-1995 average = 100)
- General government surplus in 2000
- National savings rate in 2000

Transition GCI = 1/2 Core GCI + 1/2 Non-Core GCI

¹ Taken from World Economic Forum (2001).

Country Credit Risk Rating (from Institutional Investor) in March 2001.

Survey Data (1 to 7 scale)

Is your economy likely to be in a recession next year?
Has obtaining credit become easier or more difficult in the past year?

B. Public Institutions Index

Public Institutions Index = 1/2 Property and Law + 1/2 Corruption

1. Property and Law Sub-index (1 to 7 scale)

• Is your government neutral among bidders when deciding upon public contracts?

• Is the judiciary independent from the government and/ or parties to dispute?

Does organized crime impose costs on business?

• Are financial assets and wealth clearly delineated and well protected by law?

2. Corruption Sub-index (1 to 7 scale)

• How common are bribes associated with import and export permits?

• How common are bribes associated with connections to public utilities?

• How common are bribes associated with annual tax payments?

C. Technology Index

For Technological Core Economies

Core Technology Index = 1/2 Innovation Index + 1/2 ICT Index

For Technological Non-Core Economies

Non-Core Technology Index = 1/8 Innovation Index + 3/8 Technology Transfer Index + 1/2 ICT Index

1. Innovation Index = 1/4 Survey Data + 3/4 Hard Data

Innovation Survey Index (1 to 7 scale)

- What is your country's position in technology relative to world leaders?
- Does continuous innovation play a major role in generating revenue for your business?
- Do companies in your country spend heavily on R&D relative to international peers?

• What is the intensity of business collaboration in R&D with local universities?

Innovation Hard Data Index (1 to 7 scale)

• Gross tertiary enrollment rate in 1997.

• United States utility patents granted per million population in 2000.

2. Technology Transfer Index (1 to 7 scale)

• Is foreign direct investment in your country an important source of new technology?

Technology-in-trade residual in 1999²

3. Information and Communication Technology Index

ICT Index = 1/3 ICT Survey Sub-index +2/3 ICT Hard Data Sub-index

ICT Hard Data Sub-index (Hard data converted to 1 to 7 scale)

- Number of telephone mainlines per capita
- Number of personal computers per capita
- Number of Internet service providers (ISP) per capita
- Number of Internet users per capita
- Number of mobile telephone users per capita

ICT Survey Sub-index (1 to 7 scale)

- Is ICT an overall priority for the government?
- Are government programs successful in promoting the use of ICT?

• Are laws relating to ICT (electronic commerce, digital signatures, consumer protection) well developed and enforced?

- Is competition among ISPs sufficient to ensure high quality, infrequent interruptions and low prices?
- How extensive is Internet access in schools?

 $^{^2}$ Or latest available year. Residual is from the regression of the log of non-primary product exports, as a percentage of GDP, with the logarithm of population as the explanatory variable.

	Gro compe	wth titive-	Macroe	conomi	ic enviro	onment																		
	ness	index		in	dex			Publ	ic institu	utions ir	ndex						Te	chnolog	ly index					
					Macroed	conomic			Propert	v and			·	1	Innova	tion	Techno	loav 6	Info. a	und cation	ICT hard	data		
					stab	ility			lai	N	Corrup	tion			inde	t t	ransfer	index	techno	logy	SCOL	ė	ICT soft	data
	xəpuI	gnixing	xəbnl	ธิกา่มกรม	xəpuI-du2	Ranking	xəpuI	gniking	xəpuI-qnS	gniynsA	xəpuI-qnS	gnixinsA	xəpuI	Bniking	xəpuI	gnixneA	xəpuI	Bniing	xəpul	อุทเ่งทธง	xəpuI-du2	gnixing	xəpuI-du2	Bnixing
Argentina	4.11	49	3.99	40	3.88	51	4.01	55	3.75	50	4.28	55	4.33	48	3.61	9	3.88	34	4.84	39	5.31	38	3.92	47
Bolivia	3.42	67	3.08	70	2.84	73	3.67	62	3.08	62	4.26	56	3.52	67	2.50	30	3.86	35	3.52	65	3.87	64	2.80	74
Brazil	4.26	44	4.24	33	4.50	31	4.21	47	3.97	45	4.45	49	4.33	49	2.66	25	4.17	30	4.86	38	5.04	45	4.49	32
Chile	4.90	27	4.56	21	4.20	40	5.69	21	5.03	26	6.35	13	4.45	42	3.41	10	3.80	38	5.20	32	5.51	34	4.57	29
Colombia	3.68	65	3.29	66	2.94	70	3.85	57	2.96	67	4.73	40	3.92	56	2.39	33	3.78	39	4.40	51	4.62	53	3.95	44
Costa Rica	4.49	35	3.94	42	3.49	58	4.56	37	4.52	35	4.60	43	4.97	32	3.51	œ	5.84	ъ	4.69	42	5.15	41	3.78	52
Dominican Republic	4.11	50	3.87	46	3.21	99	4.02	54	3.59	54	4.46	47	4.42	44	2.78	22	5.50	11	4.02	57	4.10	58	3.86	49
Ecuador	3.36	68	3.45	62	3.75	52	3.30	68	2.70	73	3.91	63	3.33	69	2.25	35	3.31	48	3.62	63	3.88	63	3.11	67
El Salvador	3.84	58	3.87	47	3.30	64	3.79	60	3.11	61	4.47	46	3.86	58	2.08	38	4.37	27	3.93	60	3.92	61	3.93	46
Guatemala	3.44	66	3.73	52	2.84	72	3.22	70	2.31	75	4.12	60	3.38	68	2.00	41	3.66	43	3.50	66	3.77	65	2.97	69
Honduras	3.11	70	3.02	72	3.22	65	3.01	72	2.37	74	3.64	67	3.29	70	1.96	42	3.84	37	3.22	70	3.36	69	2.92	72
Jamaica	3.93	52	3.05	71	3.20	67	4.30	43	3.89	47	4.70	41	4.43	43	2.29	34	4.96	19	4.57	47	4.81	50	4.11	40
Mexico	4.29	42	4.18	36	3.55	57	3.99	56	3.58	55	4.40	52	4.70	36	2.61	28	5.53	6	4.60	46	4.99	46	3.82	51
Nicaragua	3.01	73	2.48	74	2.72	74	3.33	67	2.91	68	3.76	65	3.21	71	1.83	4	3.69	41	3.21	71	3.29	22	3.05	89
Panama	3.88	23	3.92	44	3.95	49	3.83	59	3.41	57	4.26	57	3.89	57	3.24	13	3.32	47	4.48	49	4.79	51	3.86	48
Paraguay	3.01	72	3.31	65	3.18	68	2.75	74	2.72	72	2.77	73	2.98	73	1.74	48	2.62	51	3.56	64	3.90	62	2.89	73
Peru	3.85	22	3.62	58	3.37	62	4.24	45	3.16	60	5.31		3.71	62	2.62	27	3.67	42	4.01	28	4.23	55	3.57	59
ernigag & Tobago	4.40	38	4.48	25	4.66	20	4.63	36	4.15	41	5.10	35	4.10	52	1.94	43	4.09	33	4.64	44	5.11	42	3.71	57
Uruguay	4.22	46	3.38	63	3.02	69	4.89	31	5.01	27	4.78	38	4.40	45	3.03	17	3.85	36	5.15	34	5.62	33	4.21	39
Venezuela	3.70	62	3.73	53	3.32	63	3.40	65	2.76	71	4.05	61	3.98	55	3.01	18	3.60	46	4.51	48	4.85	48	3.84	50

¹ These rankings include non-core and transition economies only. Source: World Economic Forum (2001).

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Appendix 1.3 | Per Capita GDP Growth and Competitiveness: Cross-Section Regression Results

	Annual per	Dependent variable capita GDP growth in	the 1990s
Independent variables	Reg 1	Reg 2	Reg 3
1990 per capita GDP (log)	-0.035 (-7.70)***		
Competitiveness			
Competitiveness index	0.043 (8.50)***		
Excess competitiveness given income level in 1990		0.043 (8.50)***	0.032 (2.60)***
Constant	0.141 (5.55)***	0.016 (7.38)***	0.016 (6.82)***
R ²	0.51	0.50	0.45
No. of observations	72	72	66
Methodology	OLS 1	OLS	IV 2

Notes: t-statistics in parentheses.

¹ OLS = Ordinary Least Squares.

² IV = Instrumental variables. The instrumental variables in this case are dummies of the legal code origin and percent of tropical area of the country.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

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2

Obstacles to Business Development

For businesses in Latin America and the Caribbean, credit is scarce and expensive, taxes and regulations can be excessive, and policies are often unstable. Despite noteworthy progress toward macroeconomic stabilization in the region, inflation also continues to have a negative impact on business. Compounding all of that in some countries are problems of crime and corruption, severe deficiencies in infrastructure, and other problems that hinder the development of businesses and limit productivity.

This chapter examines the results of world business environment surveys that point to a series of problems that can affect the operation and growth of companies. These surveys cover 73 countries from all the major regions of the world, including 20 Latin American and Caribbean countries surveyed in 1999 and 2000 by the World Bank in association with the Inter-American Development Bank. While the surveys make it possible to identify the concerns of existing companies, they naturally cannot tell us much about businesses that do not exist but that might emerge if conditions were different. Part of this bias can be corrected by taking into account differences in the composition of firms in each country. Another option is to seek evidence that the environment in which firms operate determines their characteristics and is likely to be reflected, for example, in the size of the largest companies, which presumably are located at the outer limit of possibilities offered by each country (see Chapter 3).

The central aim of the business environment surveys is to learn what business communities think about the quality of the macroeconomic and institutional environment in which their firms operate. The surveys cover a rather broad range of issues, including the main areas of government services that affect businesses (security, justice, roads, customs, mail), public or private infra-

structure (electric power, telecommunications), financial services, and the legal and regulatory framework (operating licenses, tax rules, labor legislation, regulation of competition, and business freedom).

This chapter focuses on two overall questions that make it possible to compare the seriousness of obstacles that can affect business: "Which of the following factors is the greatest obstacle to the growth and operation of your business?" and "On a scale of 1 to 4, how problematic are the following factors for the operation and growth of your company?" The first question will be used to detect the greatest obstacles to business development, and the second to analyze the severity of those obstacles for the average company in each country.

The surveys were applied to samples of at least 100 companies in most of the 73 countries.¹ Given the small size of the samples, the surveys are not representative of sectors, types of companies, or cities or regions within the countries. Rather, they reflect essentially the typical point of view of business people nationwide,² leaving aside the fact that the proportions of companies by size and sector vary between countries.³

¹ Only in smaller countries such as Belize are smaller samples of 50 companies used.

² Nevertheless, in order to compare results between countries, 15 percent of the samples were from small companies (between 5 and 50 workers), 60 percent from service sector companies, 15 percent from companies located outside the main cities, and a smaller number from companies with some state or foreign ownership. The results were adjusted to correct for possible biases resulting from these manipulations in constructing the samples. For that purpose, the ordered logit model was used. Details are found in Lora, Cortés and Herrera (2001).

³ Another option would have been to weight the opinions by the composition of companies by size and sector in each country, but doing so would require knowing what this composition was in reality (not in the sample).



Source: World Business Environment Survey (WBES) and IDB calculations.



Source: WBES and IDB calculations.

As the region's business communities see it, the greatest obstacles to the operation and expansion of business in Latin America have to do with the financial and regulatory environments. One of three business people considers the most serious problem to be the lack of financing (Figure 2.1); next comes excessive taxes and regulations, mentioned by one of six business people. With slightly less frequency, business people point to policy instability, and, less frequently, to inflation and the exchange rate. There is also an awareness of problems of a social and institutional nature, such as crime, corruption and the ineffectiveness of the justice system. While these problems are rarely considered as prin-



cipal obstacles to business development, they have an indirect influence through other constraints mentioned more often by business people. It must be noticed that the survey did not inquire about problems related to the availability or quality of the labor force.

Figures 2.2 to 2.8 show the *severity* of these problems in the major world regions and in individual Latin American countries. The results were likely influenced by the macroeconomic problems affecting many countries in Latin America when the surveys were taken in 1999. The region grew by 0.3 percent that year, and seven of 20 countries surveyed showed negative growth rates.

Lack of Financing

According to the business communities of Latin America, the biggest obstacle to business development is lack of financing. Over half of those surveyed in Haiti, Ecuador and Mexico consider this to be a serious obstacle for their companies, and only in Panama, Belize and Chile is it regarded as a serious problem by less than 25 percent of business people (Figure 2.2). For the average of all Latin America, the problem seriously affects 38 percent of business people, a rate only surpassed by Eastern European countries as a group (42 percent) (Figure 2.3). As business communities see it, the severity of
	Financing	Taxes and regulations	Unstable policies	Inflation	Exchange rate
Sector (with respect to service sector)					
Manufacturing	-	-			
Size (with respect to large firms)					
Small	+			+	+
Medium	+				
Location (with respect to main city)					
Medium-size city		+	+	+	ļ
Small city or rural					
Legal organization					
Single proprietorship	-			+	+
Partnership		[[[
Cooperative	+				
Corporation, privately held	-	-	- 1		1
Corporation, listed on a stock exchange				4	
Control of the firm					
Individual owner(s)			Į		
Family	+				
Company groups (conglomerate)				l.	
Bank		1		+	-
Board of directors or supervisory board			-		
Managers				+	+
Workers					
Government	+	-	-		-
How was the firm established?					
Private from the time of start-up					
Privatization of a state-owned firm			-		1
Private subsidiary of a formerly state-owned firm			-		
Joint venture, domestic and foreign private owners		-	-		
Age					
Start-up year of the firm	+	-	-	-	-
Other characteristics		l			
Foreign company with a financial stake in ownership of the firm	-	-			
Export firm		-		- 1	
Shareholders					1

Table 2.1 | Latin American Business Characteristics Associated with the Severity of Obstacles to Development

Note: Plus (minus) signs show whether each feature of the firm is directly (inversely) related in a statistically significant way to the severity of the obstacle. Source: IDB calculations.

the financing problem is related to the more direct indicator of the availability of financing—that is, the ratio between the supply of credit available to the private sector through the entire financial system, and GDP. (The correlation between the two variables is 0.52.)⁴

Not surprisingly, in Latin America as in other regions, financing problems more severely affect smaller companies. Nevertheless, not even the largest companies can escape constraints to financing. Indeed, what is surprising is that the differences in the seriousness of the problem between countries and even between regions of the world are much larger than differences between companies according to size within each country. Figure 2.3 shows that the average difference between Latin America and the developed countries in the proportion of business people who regard this problem as serious is 20 percentage points. By contrast,

⁴ Except otherwise indicated, the correlations between survey results and objective data presented in this chapter refer to the Latin American countries only.



Source: WBES and IDB calculations.



Source: WBES and IDB calculations.

Figure 2.4 shows that the difference between small and large companies in Latin America is only 6 percentage points. This suggests that especially in less financially developed countries, the policy emphasis should be placed on the macro and institutional factors that affect the financial sector as a whole, rather than on those variables that affect differential access to credit by companies depending on their size.

Of course, size is not the only characteristic of a company related to its difficulty in accessing credit. In

Latin America, companies in the manufacturing sector have better access to credit than companies in service sectors. Also having better access to credit are sole proprietorships or privately held companies not listed on the stock exchange, and those companies that have foreign investment. By contrast, companies organized as cooperatives face significantly greater problems, as do family firms, companies controlled by the government, and newer companies (Table 2.1).⁵ These characteristics suggest the influence of legal factors that may impact the feasibility of providing easily recoverable guarantees to back up the loans, and possibly even of factors that affect costs of information and loan monitoring by creditors.

Taxes and Regulations

The second greatest obstacle to the development of companies in Latin America is excessive taxes and regulations. Two of three Brazilian business people, and approximately half of those in Argentina and Peru, believe that excessive taxes and regulations hinder their companies' development. The countries least affected by this problem are Chile, Panama and Belize, where it is mentioned as serious by fewer than 20 percent of business people (Figure 2.5). The seriousness with which Latin American business communities regard the problem of taxes and regulations is relatively independent of other relevant indicators. The most adequate indicator for contrasting these opinions is the index of the quality of the regulatory framework prepared by Kaufmann, Kraay and Zoido-Lobatón (1999a and b), which considers the legal environment in which markets operate and the degree of government interference in economic decisions, calculated on the basis of various sources.⁶ The correlation between this index and the average opinion of Latin American business people regarding taxes and regulations is only 0.07. Nor is there

⁵ The characteristics of companies that are significant for at least 10 percent in regressions for Latin American countries as a whole are mentioned. For a more detailed explanation, see Lora, Cortés and Herrera (2001).

⁶ The index uses an econometric method with non-observed components, making it possible to combine information from the different sources in order to obtain estimates of maximum consistency for a broad range of countries.



Source: WBES and IDB calculations.

a significant correlation with a country's tax burden or with the highest tax brackets of companies (-0.096).

Only business communities in Eastern European countries single out tax and regulations problems more frequently than do those of Latin America. However, the problem is also very significant in developed countries, where 27 percent of business people regard it as serious. By contrast, there is less concern in Africa or Asia, where it is considered to be serious by fewer than 15 percent of business people. This pattern might lead one to expect that the more formal and larger the company, the more affected it would be by this problem, since regulations and oversight tend to impact larger firms. However, the companies most affected are generally those of medium size. The reason may be that large companies rely on scale to more easily absorb the fixed costs entailed in regulation, and use their channels of influence to tilt the rules and their application in their own favor.

Taxes and regulations also affect companies differently according to other characteristics. In Latin America, those suffering most from this problem are companies located in medium-sized cities, presumably because these firms have less access to decision-making centers. Taxes and regulations pose less of a problem for privately held companies (those not listed on the stock exchange), companies controlled by the government, those established as a result of mergers between private and foreign companies, those with foreign ownership or export companies, and those recently created (Table 2.1).

Policy Instability

Venezuela, Ecuador, Brazil, Colombia and Mexico are most affected by policy uncertainty and instability. At least half of the business people in these countries believe that instability is a major problem. The countries where business communities enjoy a more stable and predictable policy environment are Trinidad and Tobago, Belize, Honduras, Chile, Uruguay, and Costa Rica. In these countries, fewer than 25 percent of the business people regard instability as a serious problem (Figure 2.6).

There is no objective measurement of policy stability that could be compared with the subjective opinions of business communities. However, there is an indicator of political instability, which is presumably correlated to *policy* instability (and is perhaps one of its main causes). This is the index that combines various sources of objective and expert information on the stability of the political environment.⁷ This index exhibits a 0.48 correlation with the averages by country of the opinions of business people. By contrast, correlations are much lower between these opinions and a number of macroeconomic instability variables.⁸ Hence, the opinions may reflect more conditions of instability of the policy environment than other factors of instability.

According to the survey results, Latin America is the region most affected by an unstable and unpredictable policy environment, surpassing even the countries in transition in Eastern Europe. Whereas in Latin America policy instability is regarded as a major problem by 38 percent of business people, in Africa that proportion is 25 percent, in Asia 20 percent, and in the developed countries only 14 percent (Figure 2.3).

Policy instability is a problem that can affect companies anywhere in the world with equal severity, regardless of size. In Latin America, the problem is less severe for privately held companies (not listed on the stock exchange), those managed by boards of directors or by the government, companies with prior ties to government ownership, and newer companies. The problem is more serious for companies located in medium-sized

⁷ See Kaufmann, Kraay and Zoido-Lobatón (1999a and b).

⁸ For example, the correlation with the volatility of growth in the last 10 years is small and negative (-0.12). With the volatility of inflation it is 0.26, and with the volatility of the exchange rate it is 0.24.





Source: WBES and IDB calculations.

cities. All these factors suggest that companies that have better sources of information and are closer to the sources of government decision making are better able to deal with policy changes.

Inflation

Despite great advances by Latin America in controlling inflation, it remains a major problem for business development. Its importance is perceived as quite similar (and much connected) to the problem of the exchange rate. In Ecuador, inflation is mentioned as a serious problem by 8 of 10 business people, and in Mexico, Nicaragua, Guatemala, Honduras and Venezuela by more than half. Business communities regard themselves as less affected by inflation in Argentina, Panama, Belize, Uruguay and Chile. In these countries, fewer than 15 percent of business people regard inflation as a major problem (Figure 2.7). The general view of a country's business community very closely reflects the inflation situation of its economy (the correlation between these two variables is 0.81).⁹

Only in Eastern European countries in transition is the problem of inflation more severe than in Latin America. Despite recent advances, the region still has a long way to go to reduce inflation to levels of other regions, particularly the developed countries (Figure 2.3). Inflation is a more serious problem for small and medium-size companies than for large ones in all regions Source: WBES and IDB calculations.

of the world, possibly because large companies have better information mechanisms and financial management, and can take advantage of economies of scale in managing their cash balances.¹⁰ Nevertheless, as is the case with other macro problems, this does not mean that large companies escape the effects of inflation, and indeed it is surprising how little difference there is between opinions from different-sized companies.

Inflation is more severe not only for smaller firms, but also for those located outside a country's main city, for individually owned companies, and for those controlled by their own administration or by a bank. On the other hand, inflation is less severe for younger companies, those that export, and those that have stockholders. These factors may be associated with the possibilities that companies have to minimize unremunerated liquid balances and diversify their financial assets.

Exchange Rate

The exchange rate is cited as a serious obstacle to business development about as frequently as is inflation. But there are large differences between the countries of

 $^{^9}$ Strictly speaking, this correlation comes from calculating the loss in purchasing power of money as 1-[1/(1+p)], where p is the variation in the price index.

¹⁰ For similar reasons, poorer people are more affected by inflation, which therefore operates as a regressive tax.

Latin America. At one extreme is Ecuador, where over 80 percent of the business community regards the exchange rate as a serious problem. At the other is Panama, where only 3 percent considers it serious (Figure 2.8). Although the average opinions of the business community by country show relatively high correlations with the behavior of the nominal exchange rate,¹¹ their opinions primarily reflect the contemporary *inflation* rate of their economies: the correlation with this variable is very high (0.77).¹² Surprisingly, there does not seem to be any relationship with changes in the *real* exchange rate.¹³

In all regions of the world, large companies are those least affected by the exchange rate, regardless of the sector in which they operate.¹⁴ Larger companies seem to have greater defense mechanisms, but again it is striking that the differences between large and small companies in the same region (or the same countries) are much less pronounced than the differences between regions of the world, and particularly than the differences between countries. In Latin America, exchange rate problems are greater for individually owned companies and for companies controlled by their own administration, and are significantly less for companies controlled by a bank or by the government, and for more recently created companies. Once more, this list of factors suggests the importance of access to information.¹⁵

Other Obstacles

Other problems cited as obstacles to business development in Latin America include street crime (cited by 41 percent), corruption (36 percent), and organized crime (33 percent). These percentages are higher than they are in any other region in the world. Other problems such as unfair competitive practices, lack of infrastructure, or the ineffectiveness of the justice system are mentioned as serious by lower percentages of respondents. However, it is important to keep in mind that these problems are not frequently mentioned in any region. In any case, most of these problems are considered more serious in Latin America than in other regions.

Although the reason may be that Latin American business people are more predisposed to express their problems, it is important to point out that their opinions are related to other indicators of these phenomena. For example, between the average opinion on organized crime and the rule-of-law indicator calculated by Kaufmann, Kraay and Zoido-Lobatón the correlation is 0.45; between opinions on corruption and their corruption control indicator, it is 0.64; and between the problem of lack of infrastructure and the infrastructure quality indicator from the 2000 edition of *The Global Competitiveness Report*, the correlation is 0.83. And although these factors may not be mentioned very frequently by the business community, they may have harmful indirect effects on the operation of businesses. For example, difficulties in accessing credit, which are mentioned as a main problem, may be due to the fact that the financial system perceives excessive risks due to the weakness of the law.¹⁶

In short, the opinions of Latin America's business communities reveal great dissatisfaction with the economic and institutional environment in which their companies operate. The seriousness of these problems varies strongly between countries of the region, usually reflecting the diverse national situations as measured by objective indicators. Hence, although these opinions are subjective, they are not merely the expression of moods or cultural tendencies toward dissatisfaction. In comparison with other regions of the world, Latin America stands out as the region most affected by many of the problems analyzed, thereby suggesting that the possibilities there for successful business development are more limited than elsewhere in the world. Is there any evidence that this is the case? Is there any trait of Latin American companies that shows that they do in fact suffer from serious constraints? While answering these guestions is difficult due to limited information to compare the business sectors of different countries, information available on larger companies does indeed reveal one distinctive trait: Latin American companies are very small in the amount of assets that they handle and in the employment they generate, which suggests the presence of severe difficulties for business development.

 $^{^{11}}$ For example, the correlation with devaluation rates in the past year is 0.57 and with their standard deviation 0.36.

 $^{^{12}\ {\}rm Also}\ {\rm calculated}\ {\rm on}\ {\rm the}\ {\rm basis}\ {\rm of}\ {\rm the}\ {\rm loss}\ {\rm of}\ {\rm the}\ {\rm purchasing}\ {\rm power}\ {\rm of}\ {\rm money}.$

¹³ The correlations with changes in the real exchange rates in the last year and last five years for which information is available are 0.04 and 0.12, respectively.

¹⁴ These comparisons control for the difference between tradable (industry) and nontradable (services) sectors.

¹⁵ Surprisingly, export sectors seem to be just as affected by the exchange rate as non-export sectors, when the other characteristics of companies are controlled.

¹⁶ See Part II of this Report.

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3

The Size of "Large" Firms

The largest firms in Latin America are small by world standards, even among the developing countries. This chapter will explore what this can tell us about the obstacles to business development in the region.

Why are we interested in the size of large firms? It would be preferable to make an international comparison of all businesses in the various countries, not merely the largest. There is no information that would make such comparisons possible, but if it did exist, the analytical and statistical difficulties would make it necessary to limit the analysis to some subgroup of companies. Limiting the analysis to the largest firms in each country is illustrative because presumably these companies are at the outer edge of the possibilities of development offered them by the milieu in which they operate. Their size may be limited by factors that also affect companies of other sizes. This does not mean that large companies are preferable, or that they are necessarily more efficient or productive. Nor does it entail ignoring that some countries can be competitive with companies that are smaller than those in other countries.¹ It simply means that the analysis assumes that for some sectors or activities, size is beneficial in terms of economies of scale or diversification, access to markets, inputs, information, power, or for any number of other reasons.

The objective of the analysis is to identify which factors limit the growth possibilities of large firms, which may also affect firms of other sizes. It should be noted that the severity of the problems affecting companies varies much more from one country to another than within the same country, as discussed in the previous chapter. Hence, although comparative indicators can be obtained only for the largest companies in each country, analyzing them is relevant for understanding the factors that affect companies of other sizes.

To determine the size of large companies in Latin America in comparison with those elsewhere in the world, information was used from 52 countries, 33 of them in the developing world.² The largest firms in Latin America are very small in comparison with other regions in the world. Among seven regions, Latin America comes in last in average size in terms of total assets of the countries' 25 largest companies. The sample includes 13 countries in Latin America with rather heterogeneous conditions, ranging from Brazil to Mexico, Honduras and Guatemala (see Figure 3.1). Countries from other regions included in the sample were those with greater business development, and not necessarily those most representative of the regions.³ Still, large companies in Latin America are significantly smaller than those in the developed countries and in developing countries as a whole (see Table 3.1).

The small size of Latin American companies is evident in both the nonfinancial and financial sectors. The distinction is important not only because of the different nature of the two types of firms, but because a high

 $^{^1}$ For example, Taiwan has been very dynamic on the basis of companies that are small by the standards of other successful Asian countries. Nevertheless, Amsden (2000, p. 201) reports that Taiwan also ranked high in its share of big businesses, with many more entries on the list of the world's largest firms than Argentina, Mexico or Brazil, which have larger populations.

² The information comes primarily from WorldScope, which includes financial data on over 22,000 open companies from all regions of the world. It is complemented with data on the largest companies in Central America, published by *América Economía* (not all companies in Central America are traded on the exchange). The measurement unit is the company, and hence conglomerates are not included. For more detail, see Lora, Cortés and Herrera (2001).

³ This is especially important in the case of Africa, where the countries considered (Morocco and South Africa) have substantially higher income levels than the regional average.

percentage of the largest firms included in the sample are financial entities (44 percent), most in the developed world (82 percent). However, Latin America is in last place among all regions of the world in terms of the size of both its financial and nonfinancial entities, with significant size differences in comparison with both developed and developing countries. Because the development of the financial sectors depends largely on conditions specific to this sector (see Part II of this Report), the rest of this chapter focuses on nonfinancial companies.

The small size of Latin American companies is not simply a reflection of the size of the economies (see Table 3.1). As a proportion of the size of the economies, the largest companies in Latin America are still among the smallest in the world with statistically significant differences in relation to the developed countries and to developing countries as a whole. Similar conclusions are reached if the comparisons are based on the employment generated as a proportion of the working age population. The low employment generation of large Latin American countries can also be seen in ratios between employment and assets. Given the relative abundance of the labor factor, one would expect greater ratios between employment and assets than in the developed countries. What is round, however, is ratios that are slightly smaller than in those countries



Source: IDB calculations based on WorldScope and América Economía. Note: In some countries, the database includes less than 25 firms.

and substantially lower than in the average of the developing countries (although the differences are not statistically significant).

By contrast, large companies in Latin America are not small in the amounts of capital and reserves for the size of the economies. The implication is that large Latin American companies are very little leveraged, inasmuch as they mobilize few total assets for the capital they Copyright © by the Inter-American Development Bank. All rights reserved

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ble 3.1	Size of Businesses in Latin Am	erica			
			Are Latin Americ	an firms smaller than	:
Under t	he following criteria:	In the develo	oped countries? In what %?	In the other dev Yes/No	eloping countries? In what %?
Real and	d financial firms				
Total	assets	Yes ***	98.4	Yes **	82.4
Financia	al firms				
Total	assets	Yes ***	95.6	Yes *	69.3
Real fir	ms				
Total	assets	Yes ***	96.1	Yes **	70.8
Assets	s/GDP	Yes **	57.8	Yes *	55.4
Emplo	yees/Working age population	Yes ***	91.9	No	-
Emplo	oyees/Assets	No	-	Yes **	56.9
Capita	al/GDP	No	-	No	-
Assets	5/Capital	Yes	37.2	No	-
Capita	al	Yes	69.3	No	-
Emplo	yees	Yes ***	81.9	No	-

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

possess. Thus, in effect, Latin America is the region with the lowest level of leveraging, with differences that are significant with respect to the developed countries (although not with respect to the other developing countries as a whole).

In short, with respect to other regions in the world, the large Latin American companies in the non-financial sectors mobilize few assets and generate little employment, even though their levels of capital are normal. It may thus be asked what determines the size of companies?

Factors that Affect the Size of Companies

What factors may limit the size of companies? Although this has been a central issue in economic theory since the time of Adam Smith, very few studies have taken up this question empirically on an international level, and those that have done so have focused on comparisons between the developed countries (Kumar, Rajan and Zingales, 1999). This section provides a brief theoretical review of the main variables that will be used in the empirical analysis in the subsequent section. The analysis is limited to macro determinants of firm size, largely leaving aside micro or sector determinants that may differentially affect companies in different sectors (such as specific technological or organizational characteristics).

Demand Factors

The macro determinants that limit the size of companies may be conveniently classified into demand, supply and institutional environment factors. In *The Wealth of Nations*, Adam Smith argued that the division of labor depends on the size of the market. Because specialization incurs fixed costs such as physical investment and learning, it is to be expected that the size of the market will be reflected in the size of companies. However, the fact that there are fixed specialization costs does not mean that unit costs will drop indefinitely. The size of the company can be limited at some point by limitations in the supply of some factor or by growing coordination or supervision costs within the company (Becker and Murphy, 1992; Rosen, 1982). Hence whether or not company size increases in proportion to the size of the market is an empirical question.

What constitutes the size of the market is also an empirical question. Because the income elasticity of demand is typically low for mass consumption goods and high for luxury goods, two economies of equal size but different per capita income levels represent markets of very different sizes for companies offering one type of good or another. To this should be added that mass consumption is concentrated on a few goods, whereas luxury consumption tends to be spread over a broad range of goods and services. Hence, the size of companies must depend not only on the size of the economy, but also on the per capita income level (presumably inversely).⁴ Nevertheless, per capita income is also an indicator of the quality of productive resources, whose relationship to the size of companies should be positive.

Moreover, depending on communication and transportation possibilities and on the existence of trade barriers, companies can have a local, national or global market for their goods. Especially in the case of larger companies, it could be expected that their possibilities for expansion would depend on the country's access to world markets (measured, for example, as the coefficient of the country's trade penetration—i.e., exports and imports as a percentage of GDP—or the size of the economies with which the country has free trade agreements).

Supply Factors

Inasmuch as at least some sectors enjoy economies of scale up to very high production levels,⁵ and given the decline in international transportation costs and other barriers to trade throughout the world,⁶ differences in the size of companies cannot be explained only by demand factors. Limitations in the supply of productive

⁴ Patterns of luxury consumption also lead to differential quality by product. Nevertheless, this type of differentiation does not necessarily affect firm size, because although it can reduce the scale of production of each differentiated product it can create economies of scope by jointly producing a number of related goods.

⁵ This is especially true for mining and basic raw material processing industries, which are relevant for developing countries, as well as for sophisticated industries, such as autos, where profitable scales tend to be above the markets of developing countries.

⁶ See Chapter 11.

resources such as financing, infrastructure and human capital, to mention the more important ones, may also be decisive.

As expressed by business communities in the region, the supply of credit is one of the factors that most constrain the development of Latin American businesses. Although differences are much greater between countries than by firm size within each country, access to financial markets is differentiated for firms of different sizes and according to their ownership and control structure. Given the globalization of financial markets, larger firms might have advantages over smaller-sized competitors when facing national financial restrictions. Therefore it is open to empirical debate whether low development of financing is a constraint to the development of larger companies, and to what degree.

Latin American business communities do not perceive deficiencies in infrastructure to be a major constraint to business development. This is a surprising finding that does not seem consistent with the results of various empirical studies that have found infrastructure to have a significant impact on aggregate productivity and growth (Easterly-Rebelo, 1993; Canning, Fay and Perotti, 1994; Canning and Pedroni, 1999; and Sánchez-Robles, 1998). The explanation of this apparent inconsistency may simply be an observation bias: the only opinions that can be known are those of companies that exist, not those of companies that were unable to survive or that never existed, perhaps because of deficiencies in infrastructure. The empirical results that we will present fully bear out this interpretation.

The availability and quality of human resources may have a great influence on the size of firms, but on the basis of theory it cannot be easily predicted whether greater levels of human capital lead to larger or smaller companies. According to Lucas (1978), shortage of management talent (or of any other critical human resource) may bring about the organization of larger productive units to better utilize this scarce resource. If capital and labor are imperfect substitutes, the average wages of workers will tend to be greater when capital increases. If management ability is distributed in the usual manner, this will tend to heighten the relative shortage of managers, because those who have less pronounced management abilities will prefer to be employees. If management talent is not reproducible, firms will be larger in size to the extent that their countries have

more capital. Therefore, the relative shortage of a critical human resource leads to companies that are larger insofar as the wealth of the economy increases.

Nevertheless, it can also be argued theoretically that companies are larger when gualified human resources are more abundant. Greater qualification makes it possible to successfully perform more complex tasks, and therefore allows companies to use technologies that demand larger and more complicated processes. According to Kremer (1993), there is a positive correlation between the number of tasks and the number of workers by firm, which must mean that countries with more human capital will specialize in more complex goods and have larger companies. However, workers with more education can use more flexible technologies that make production on smaller scales possible. These workers may be better able to take responsibility for more creative activities that require greater motivation and are attained better in smaller units (Brynjolfsson, 1994).

Institutional Factors

The environment in which a firm operates can have a great influence on its size. The ways through which the supply and demand factors considered above influence size are basically technological, since they primarily involve characteristics of production functions. But these production scale factors are not sufficient to explain firm size. In principle, every firm has the option to produce internally or to buy from a provider any of its inputs or stages in its production process. Firm size accordingly must be affected not only by the production process, but also by the factors that may influence the decision to buy or produce. Different theories suggest the importance of institutional factors in this decision.⁷ An uncertain legal environment should lead to larger firms: the firm replaces the market, because contracts outside the firm become riskier. On the other hand, the legal environment can offer different protection to different types of assets or rights over the firm. From a legal standpoint, physical assets are easier to protect than intangible assets, such as trademarks or knowledge. The rights of the owners of a limited company can be better protected legally than the rights of shareholders, and depending on legislation, the rights of bank

⁷ See Kumar, Rajan and Zingales (1999).

creditors may or may not be protected vis-à-vis conflicts with shareholders, workers or the government. Hence, the institutions that protect contracts and property rights may have an influence on the size of firms and on the kinds of firms best able to develop.

Other aspects of the institutional environment may also affect firm size. Tax and regulatory loads tend to favor small firms, which can evade monitoring. But they also grant relative advantages to larger firms, because their size enables them to more easily absorb the fixed costs represented by regulation and opens them up to the possibility of influencing government decisions and application of the rules.

Finally, the informal rules of interpersonal cooperation may also influence firm size. Fukuyama (1996) has argued that societies with greater social capital, where trust and the spirit of cooperation between individuals is greater, favor the development of larger companies, because the cost of coordinating and supervising employees within firms tends to be less. Although some analysts have found evidence to support this hypothesis,⁸ another argument is that social capital facilitates relationships outside the firm, and therefore fosters purchasing instead of producing.

Empirical Results

An econometric analysis corroborates the importance of several of these factors to the size of companies. The analysis is based on the size (in total assets) of the 25 largest companies of 52 countries at different levels of development.⁹ The main conclusions are summarized below.¹⁰

Market Size

The size of the economy where companies operate has a great influence on firm size. Nevertheless, the relationship is not exactly proportional: if one economy is double the size of another it will tend to have companies 80 percent larger, thereby indicating increased organization and coordination costs for large companies, and more generally diseconomies of scale.

As has been mentioned, per capita income could be interpreted as an indicator either of diversification of demand or a measure of the abundance, quality and variety of factors of production. In the first case, one would expect a negative relationship with company size, and in the second a positive relation. Econometric results tend to support this latter interpretation. (This is also consistent with the fact that the significance of this variable disappears when alternative measurements of the availability of factors of production, such as infrastructure guality, are included.)

For large companies, development possibilities may go beyond national borders. Therefore, countries with greater trade penetration (i.e., the ratio between exports and GDP or between exports and imports and GDP) should be expected to have larger companies. No statistically solid effect is found, however. The same is true of other alternative measurements of access to world markets, such as the size of the combined market to which each country can have access without tariff restrictions by virtue of free trade treaties, or geographic variables of access to markets, such as the distance to the great world economic centers, the percentage of the population in each country located less than 100 kilometers from the coast, and access to the sea. None of these variables seems to influence the size of large firms.

In short, from the standpoint of demand limitations, the size of the domestic market seems to be the fundamental variable. Although this finding is intuitively obvious, it is still surprising because the analysis is limited to the 25 largest companies in each country, which would have a better chance to be integrated into global markets. These findings do not change when the regressions are limited to the developed countries or to large companies in industrial sectors, which tend to be regarded internationally as tradables.

It is important to point out that the variables of market size do not thoroughly explain why Latin American companies are so small. By these findings, the size of the large companies in the region is at least one-third smaller than might be expected from world patterns.

Access to Factors of Production

The explanation for the small size of Latin American companies is to be found in the availability of and access to

⁸ See La Porta et al. (1997).

⁹ The size of the sample is smaller in some of the regressions due to gaps in information on explanatory variables. See Appendix Table 3.1.

¹⁰ The regression results are presented in Appendix Table 3.1. A broader set of regressions is found in Lora, Cortés and Herrera (2001).

factors of production, particularly credit and infrastructure. The financial depth (measured as the ratio between total credit to the private sector and the GDP) is a very robust determinant of the size of large companies. Given the estimated coefficients, an increase of the standard deviation in the financial depth of a country (which equals 46 percent of GDP) is associated with an increase of between 26 percent and 44 percent in the size of its large companies.¹¹ The magnitude of this effect is surprising because presumably large companies would have better possibilities of having access not only to domestic but also to international financial markets.¹² Consequently, it is to be expected that the effects will be even more pronounced for medium-sized and small companies.

The quality of infrastructure is another domestic factor that has an enormous influence on the development possibilities of companies. To measure infrastructure quality, a subjective index provided by *The Global Competitiveness Report* for 2000 was used.¹³ The index is a combined measurement that correlates very well with the various objective indicators of different kinds of infrastructure.¹⁴ The estimated coefficient is quite stable and indicates a very important effect of infrastructure: an improvement of the index in a standard deviation (1.4) is associated with an increase of approximately 50 to 75 percent in the size of large companies.

Consequently, the supply of financial resources and the availability of infrastructure are decisive factors for the size of large companies around the world, and they presumably also affect the development possibilities of other companies. Together with the size of the economy, these variables explain 85 percent of differences in the average size of large companies. Once these variables are considered, the small size of Latin American companies ceases to be a mystery. In fact, the econometric results show that given the precariousness of the financing and infrastructure development of the region, the size of large companies is somewhat greater than might be expected.

The influence of the availability of human capital is not so easy to discern. In the estimations, the average education of the labor force is found to have a positive effect on the size of companies, a finding that would support the hypothesis of Kremer, according to which greater levels of education go hand in hand with more complex processes and larger firms. Nevertheless, the coefficient is not significant and is not robust to alternative specifications. The results are weaker with

other measurements of human capital, such as proportions of the population by education levels. Nor was the ease with which companies access the labor market (which can be measured by The Global Competitiveness *Report* index) found to have an influence on company size. As has been pointed out, the influence of regulation on the size of companies is ambiguous. Labor regulation tends to have a greater effect on larger companies, which tend to be more monitored. On the other hand, more rigid labor legislation can offer large companies a competitive advantage over medium-size ones, since some rules are less restrictive for them than for medium-size companies. For example, the imposition of minimum wages has less of an impact on large companies, which tend to operate with more highly gualified staff and pay higher salaries for reasons of efficiency. Larger companies may use more capital-intensive technologies, so a relative tightening of labor favors them over medium-size companies.¹⁵ Finally, larger companies may have more possibilities than other firms to influence legislation and how it is applied. Our findings suggest that these factors may be important, since labor laws that constrain the hiring and firing of workers are statistically associated with larger companies. Nevertheless, this relationship is not significant. Nor did we find significant results with alternative indicators of the quality of labor legislation.¹⁶

Institutional Variables

The institutional environment in which companies operate is determined by political stability, efficacy, com-

¹¹ Because this elasticity comes from cross-sectional regressions for countries with very different conditions, it should be interpreted as the long-term equilibrium effect.

¹² Access of countries to international financing does not seem to have an additional influence on the size of companies.

 $^{^{13}}$ The index ranges between one and seven, where the largest values represent the highest ranking.

 $^{^{14}}$ The simple correlations calculated are 0.83 with phone lines per 1,000 inhabitants, 0.80 with personal computers per 1,000 inhabitants, -0.59 with losses in transmission and distribution of electric power (as a percent of electricity production), and 0.54 with the percentage of roads that are paved.

¹⁵ Milgron and Roberts (1992) review the literature on the influence of these variables on company performance.

¹⁶ We are using the labor security index (Heckman and Pagés-Serra, 2000) and information from the World Bank's World Business Environment Survey about the level of state intervention in wage and hiring decisions and on labor regulation as an obstacle to firm growth.

pliance with the law, effectiveness of governance, control over corruption, and the quality of the regulatory framework. All these dimensions of institutional quality have been measured in the studies by Kaufmann, Kraay and Zoido-Lobatón already cited (1999a and b). None of these variables appears to have *direct* influence on the size of companies,¹⁷ but there are very powerful channels of indirect influence through the variables of financial depth and infrastructure quality. The rule of law, which measures respect for rules and consequently the ability of economic agents to operate in an atmosphere of known, stable and accepted rules, is particularly influential on these two variables.¹⁸ Finally, contrary to the evidence of studies already cited, our economic findings do not support the hypothesis that social capital is decisive for the size of large companies. As additional measurements of the environment in which firms operate, different variables of a macroeconomic nature, such as control over inflation, stability of growth, interest rates, or exchange rates, could be taken into account. However, there is no evidence that these variables directly influence firm size (although they may do so indirectly).

In short, the size of the domestic market, financial depth, and the quality of infrastructure are the most important variables that statistically explain the differences in the size of large companies, and that help to understand why Latin American companies are so small.

It is important to point out that these results are not influenced by the number and type of companies surveyed in each country. The results are based on the 25 largest companies in each country simply because this number allows for better utilization of information available for the developing countries. The findings are very similar (although less statistically reliable) when the same procedure is applied to larger or smaller numbers of firms for which information is available. The findings described are based on average sizes of nonfinancial companies, without controlling for possible differences between one sector and another.¹⁹ We have also proven that the results are not affected by this fact. Finally, inasmuch as our size averages come from a mix of manufacturing and service companies that produce goods of a different nature, we limit the exercise to manufacturing companies. The findings show that the significance and approximate magnitude of the coefficients of the relevant variables is maintained. In conclusion, various robust runs show that the variables identified as explanatory maintain their influence.

Fina	If gap were closed, firm size would increase by: Infrastructure Financial development 0.0 29.1 5.8 22.2 0.0 0.0 55.6 17.7 48.4 31.3 39.6 0.0 18.9 31.8 52.9 21.1 0.0 30.3 74.3 15.0 19.4 0.0 24.4 28.9 6.6 35.5					
(In	percent)					
	If gap were closed, firm size would increase by:					
Country	Infrastructure	Financial development				
Argentina	0.0	29.1				
Brazil	5.8	22.2				
Chile	0.0	0.0				
Colombia	55.6	17.7				
Costa Rica	48.4	31.3				
El Salvador	39.6	0.0				
Guatemala	18.9	31.8				
Honduras	52.9	21.1				
Mexico	0.0	30.3				
Nicaragua	74.3	15.0				
Panama	19.4	0.0				
Peru	24.4	28.9				
Venezuela	6.6	35.5				

Table 3.2 | Effects of Gaps in Infrastructure and

Notes: Infrastructure gaps are calculated with respect to Chile, Argentina and Mexico. Financial depth gaps are calculated with respect to Chile, Panama and El Salvador. Simulations are based on regression 4 of Appendix Table 3.1.

The econometric results described in this chapter can be used to analyze the potential impact of better access to financial resources and improved infrastructure on business development. The size of large companies in the Latin American countries in terms of their assets is only 8 percent of that of companies in the developed countries (see Figure 3.1). Some 58 percent of the difference in size is due to the fact that the economies of the developed countries are larger; 31 percent to deficiencies in infrastructure quality; and 11 percent to the lack of financial depth of Latin American economies. Naturally, these comparisons may not be rel-

¹⁷ Appendix Table 3.1 presents only one regression, which uses as an explanatory variable the *average* of those indicators. The complete regressions are found in Lora, Cortés and Herrera (2001).

¹⁸ The simple correlations between the rule of law and financial depth and infrastructure quality are 0.68 and 0.82, respectively, thereby suggesting the importance of this indirect influence.

¹⁹ Whether there should be prior control by sector to compare the average size of firms between countries is open to question. The argument is that there are technological, scale and organizational differences specific to each sector that influence the size of firms. However, the counter-argument is that when the objective is to compare the average size of all large firms between countries, and not those of each sector in particular, such a control would undermine the result, because the fact that the firms develop in certain sectors and not in others may be precisely the result of macro factors.

evant, given the great differences in development between the two groups of countries. Hence, it may be illustrative to consider the effects of gaps in infrastructure and financial depth between different countries in the region. Table 3.2 presents the effects on the size of large companies caused by gaps in infrastructure quality of the various countries in comparison to the average of the three best countries in the region (Argentina, Chile and Mexico). In countries most affected by infrastructure deficiencies, such as Nicaragua, Colombia and Honduras, the size of the large companies could increase by 50 percent or more if those gaps were closed. The table also presents the effect of gaps in financial depth (in this instance the best cases are Chile, El Salvador and Panama). The effects are less pronounced, but they would still represent 30 percent of the current size of large companies in several countries. Although these calculations should not be interpreted as exact simulations, they do suggest the major importance that greater development of financing and infrastructure might have on business development in some countries in the region. The analysis in this chapter has also shown that the access of companies to certain key factors of production determines their development possibilities much more than external factors such as access to international markets or foreign financing. Despite globalization, business development continues to be essentially determined by factors proper to the countries, and that is where governments ought to continue to place emphasis.

pendix Table 3.1 Determin	nants of Rea	al Sector F	irm Size					
(Estimate	s based on	averages of	the 25 lai	gest firms	by country,	according	to assets)	
Independent variables ¹	Dependent variable: total assets (log)							
	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6	Reg. 7	Reg. 8
Market size								
GDP (log)	0.835	0.967	0.883	0.840	0.828	0.787	0.831	0.905
standard deviation	(9.92)***	(9.30)***	(8.32)***	(11.67)***	(11.42)***	(10.15)***	(11.93)***	(9.26)**
(sd) = 1.489			. ,					
Per capita GDP (log)	0.630	0.441	0.427		4			
sd = 0.738	(3.67)***	(2.32)***	(2.34)***					
Trade ratio				}				1
(Exports plus imports/GDP)		0.146	0.077					
sd = 0.468		(2.04)***	(1.03)					
Access to productive resources								
Financial depth					4		í I	
(credit to the private sector/GDP)			0.696	0.620	0.693	0.760	0.634	0.519
sd = 0.461			(2.29)***	(2.15)***	(2.54)***	(2.60)***	(2.29)***	(1.32)
Infrastructure quality index (0 - 7)				0.360	0.274	0.369	0.229	0.301
sd = 1.43				(3.54)***	(2.35)***	(3.61)***	(1.63)**	(2.06)**
Labor force education (Years) sd = 2.092		1			0.095 (1.53)*			
Labor restriction index (1 - 7) ²				ļ		-0.163	(
sd = 1.002						(-1.49)*		
Institutional framework								
Institutional quality index				1				
(-2.5 - +2.5)				J			0.329	
sd = 0.753				1]		(1.40)*	
Trust index (0 - 1)				i				0.310
sd = 0.165								(0.24)
Dummy for Latin America	-0.515	-0.330	-0.194	0.046	0.227	0.350	0.045	0.068
	(-1.75)**	(-1.10)	(-0.66)	(0.15)	(0.76)	(1.03)	(0.15)	(0.16)
R ²	0.85	0.86	0.88	0.88	0.90	0.86	0.89	0.88
No. of observations	52	52 İ	52	52	49	46	52	40

Notes: In some countries, the database includes less than 25 firms; t-statistics in parentheses.

¹ All regressions include a constant not reported in the table.

² Higher index means less restrictions.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

sd= standard deviation.

4

Exports and Competitiveness

Export performance and competitiveness are often regarded as synonymous. Just as a firm's competitiveness can be measured by its participation in the market or by growth of its sales, the competitiveness of a country is often identified with the performance of its exports. Yet, identifying a nation's competitiveness in this way is unsatisfactory because it is not countries but firms that compete. Having said that, it remains true that the dynamism and composition of exports may help explain the conditions under which firms operate and the difficulties that they confront. Export performance is thus a manifestation more than a measure of competitiveness, as are economic growth or company size, issues that have been considered in previous chapters.

The export performance of Latin America and the Caribbean during the 1990s was quite remarkable in com-



parison with the poor performance of the previous decade.¹ While in the 1980s exports were stagnant and trailed all other regions except for Africa and the Middle East, in the 1990s Latin America had the most dynamic exports in the world except for the category of Asian countries that excludes East Asia and the Middle East. The rapid growth rate—12.5 percent annually—was sufficient to multiply exports by 2.5 over the course of the decade. A good portion of this dynamism was due to Mexico, whose sales grew 20 percent a year, facilitated by access to markets in the United States and Canada. For the typical country, the growth rate was a more moderate 7 percent, which is not far from the 6.8 percent increase in world trade (Figure 4.1).² The Dominican Republic, Costa Rica and El Salvador, which grew at rates of over 15 percent, were among the 15 most dynamic export countries in the world in the 1990s. (No Latin American country achieved this distinction in the 1980s.) Only in Colombia, Paraguay and Haiti was export performance in the 1990s lower than it was in the previous decade (Figure 4.2).

A good number of countries in the region achieved increases much more substantial than they would have had they simply maintained their share in world markets for their export baskets, and indeed if they had concentrated their efforts on those goods that seemed dynamic in the 1980s. In the 1990s, Latin America benefited from the new dynamism of many medium and

Source: IDB calculations based on COMTRADE.

¹ The main source of information for this chapter is the international trade database of the United Nations, known as COMTRADE. It covers every country in the world, and presents the three-digit trade values of the Standard International Trade Classification, Revision 2.

 $^{^2}$ The annual average growth rate for each country is defined as the average rate of growth of exports, using a linear tendency.





Source: IDB calculations based on COMTRADE.

Source: IDB calculations based on COMTRADE.

high technology content goods that were virtually unknown in the 1980s. Nevertheless, Chile and some other countries with abundant natural resources were successful exporting low technology content goods. The routes to export success were varied, proving that there is no single prescription for innovation or competitiveness.

Is One Basket Better than Another?

At the outset of the 1990s it would have been difficult to anticipate export success or failure: indeed there was practically no correlation between the export performance of countries in the 1980s and the 1990s, not only in Latin America but throughout the world.³ In a way, this is not surprising because new goods in world trade emerged during this period, and the dynamism of goods varied widely from one decade to another. Approximately half of the goods grew on the world market at around 10 percent a year, but a quarter of the goods with dynamic demand grew by 11.9 percent or more, while goods with less demand grew below 7.4 percent. (See Table 4.1 for an explanation of the cutoff points.)⁴ A country completely specialized in exporting computers, semiconductors and other goods with dynamic demand, and which maintained its share in world markets of these goods, would have seen the value of its exports multiply by 1.8 and its share in total world trade multiply by 1.6. In contrast, another country concentrated in basic goods and manufactures with declining demand would have achieved a much lower 41 percent increase during the entire period, and would have seen its share in total world trade drop.

Latin America's basket of exports is very concentrated in goods with low dynamism. In the 1980s, over half of the region's exports were in this category, and less than 15 percent belonged to the dynamic demand group (see Figure 4.3). By contrast, only 17 percent of the exports of the developed countries were in the low dynamism category, and almost 40 percent were dynamic goods. Should it therefore be concluded that exports from the developed countries should have grown more rapidly than those of Latin America? As we have seen, that was not what happened. Should it be concluded that Latin America's performance would have been even better had it chosen the right goods in the 1980s? That might be suggested by the fact that some of the countries in Latin America that were more successful exporters, like the Dominican Republic and Mexico, succeeded in the 1990s in developing a basket of exports that was highly concentrated on goods with dynamic demand, whereas countries with poor export performance, such as Colombia, Venezuela or Paraguay, exported few of those goods. The problem is that there are too many excep-

 $^{^3}$ The correlation of export growth of both decades for Latin American countries was only 0.087, and for the world it was 0.018.

⁴ The classification of different industries according to the dynamism of demand occupies a prominent place in the ECLAC analysis of the competitiveness of industrial sectors in different countries. See Bonifaz, Duarte de Oliveira and Mortimore (1997).

Table 4.1	Growth of I	Exports by Dynamism of Dem	land		
		Number of tariff items	Average growth (%)	Maximum (%)	Minimum (%)
Dynamic	demand	б4	13.8	19.9	11.9
Average	demand	118	10.0	11.8	7.5
Declining	g demand	57	4.4	7.4	-30.6

Note: Growth trends were estimated econometrically by tariff items. Those items with growth of up to 0.5 standard deviations above and below average growth of all tariff items were classified as average demand. Items with growth above and below these cutoff points were classified as dynamic and declining demand. Source: IDB calculations based on COMTRADE.

tions to leap to such a conclusion: the export performances of Argentina and Chile were respectable, even though they were concentrated in low dynamism goods, whereas Barbados and Haiti had the worst export performance in the region despite an export basket with a solid number of dynamic goods (Figure 4.4).

Figure 4.5 shows the differences between export growth of the Latin American countries in the 1990s and what each country would have exported had it maintained its share in world trade in each product. The regional champions in the area of export performance, such as Mexico, the Dominican Republic, El Salvador and Costa Rica, owe little of their success to having had the right basket of exports, but rather to having taken advantage of favorable conditions to access certain markets (the United States, in particular) and to having forged an identity in the world economy. Indeed, the region's export performance would have been quite homogeneous if it had simply been determined by growth in world demand for each good. Venezuela and Ecuador



Source: IDB calculations based on COMTRADE.

would have had the lowest growth (between 3 and 4 percent, very much influenced by unfavorable trends in the oil market during most of the 1990s), and the Dominican Republic and the Caribbean and Central American countries the highest, although none would have reached 10 percent. For the size of most Latin American countries, it seems unlikely that the growth rate of world demand is an unbreakable barrier.

The scant relationship between export performance and the demand trends of export baskets is not limited to Latin America. Strange as it may seem, the correlation between the two variables for all countries in the world is only 1 percent. Consequently, most of the differences in performance between countries are not due to trends of world demand for their goods. But even if this relationship were closer, it would not be very helpful for designing export strategies because it would be difficult to foresee the dynamism of demand for particular goods. In fact, the correlation between the growth that the various goods had in the 1980s and in the 1990s was low (the correlation for the 239 SITC tariff items is actually negative, albeit not significant).⁵ In view of these findings, "choosing winners" would not have been a good export strategy and in fact that was not what was done. Any effort to support specific sectors was abandoned in the 1990s, and in the export area, efforts were instead aimed at offering financial services, compensating for tax costs, and facilitating access to trade information (see Chapter 17).

⁵ The results are not very different if only manufactured goods are considered. When some tariff items with extreme variations that can strongly influence correlations are excluded, the correlations become positive and significant, although they remain very low (maximum 0.27).



Source: IDB calculations based on COMTRADE. See Appendix 4.1.



Source: IDB calculations based on COMTRADE.

Technology Content of Exports

At the outset of the 1980s, primary goods and manufactures based on natural resources (such as processed foods, lumber, minerals, cement, and petroleum products) represented 44 percent of world trade. This share has since declined to 26 percent, and in its place have emerged other more processed goods. High technology goods such as computers, telecommunications equipment, aircraft, and optical or measuring instruments have been the most dynamic. This group represents almost a guarter of current world trade, considerably higher than the 10 percent of two decades ago. The gain has been less dramatic in other product groups. Medium-level technology goods, which had represented the trade revolution in earlier decades (vehicles, motors, machinery, synthetic fibers, plastics and chemical products) rose in world trade from 31 percent in 1980 to 34 percent by the end of the 1990s. Low technology goods, which for the most part are basic consumption items other than foods, also experienced a modest gain (from 14 percent to under 17 percent).⁶

Although this description shows a clear association between technology content and commercial dynamism, the relationship is not necessarily sustained at a more detailed level of classification, such as at the level of tariff items. As is to be expected, a good proportion of high technology goods had buoyant demand over the last two decades (see Table 4.2). Nevertheless, seven of the 18 items were not dynamic. Only a third of the items in the medium and low technology groups of manufactures were dynamic, even though these groups' shares of world trade continued to increase. Perhaps even more surprising, almost a fourth of goods based on natural resources were dynamic, even though this kind of manufacture lost ground in trade. Consequently, although world trade is clearly shifting gradually from more basic goods toward new high technology goods, this trend is not a sufficient basis for "picking winners," especially in small countries forced to focus on a few product lines in order to penetrate world markets.

During the "lost decade," Latin America was the only region in the world where high technology content exports did not increase. This situation changed in the 1990s: export growth of 35 percent annually of electronic goods and other high technology manufactures was almost as dynamic as in East Asia, and more than in the rest of Asia or any other region in the world. A good portion of the growth was due to Mexico, while many small countries did not participate in this boom. Nevertheless, the rate of increase in the typical country in the region was a respectable 15 percent a year (Figure 4.6).

Thanks to efforts during the 1990s, high or medium

⁶ We use the classification developed by Lall (2000), which is based on previous work by Pavitt (1988) and OECD (1994). ECLAC has used this kind of classification in various studies. See Bonifaz, Duarte de Oliveira and Mortimore (1997).





technology exports today constitute around 40 percent of all Latin American exports. Of the developing regions, only in East Asia is the share larger (see Figure 4.7). This comparison must be qualified, however, for three reasons. First, a much higher percentage of East Asia's exports are high technology exports in the strict sense. Paradoxically, Latin America's mix of exports by the degree of technology content resembles that of the developed countries as a whole more than that of East Asia. Secondly, Latin America has much less commercial depth than East Asia, which means that Latin America's exports with a technology content are a substantially lower proportion of total output and income. Third, although East Asia itself is by no means a homogenous region, in Latin America there are truly huge differences in the degree of technological development between countries. Mexico dominates the aggregate results, since 60 percent of its total exports of close to \$123 billion, which represent 43 percent of the Latin American total for 1998, are of high or medium technology content. Brazil is also a heavyweight: a third of its \$58 billion in exports are computers, vehicles, and high and medium technology equipment and machinery. Costa Rica, Barbados and Argentina—countries whose development is relatively high for the region-are next on the list. At the other extreme, 90 percent or more of the exports of 12 of the 26 countries in the region are basic goods or manufactures with little technology content (Figure 4.8).

What explains these differences? The two most im-

portant factors are the degree of economic development and the size of the economies (see Appendix Tables 4.1 and 4.2). Small economies are at a disadvantage for the fixed investments in research, development and technological adaptation needed to produce highly elaborated manufactures. Also conspiring against small countries are the variety of abilities and knowledge required by more complex production processes and the economies of scale involved in marketing and international transportation. Abundant natural resources may also be an impediment to developing an export sector intensive in high technology goods. This is undoubtedly the most important factor for explaining the composition of exports of countries like Venezuela or Chile, which, despite their greater economic development and the size of their economies, export proportionally fewer goods with technology content than El Salvador or Costa Rica. Nevertheless, the relative success of these latter two countries could not be understood without considering the institutional factors that had a favorable influence on the environment in which firms operate, and which help them to compensate for the disadvantages of size and low income levels. As was argued in Chapter 1, possibilities for economic growth depend not so much on the absolute conditions of competitiveness as on the environment in which firms operate relative to the country's income level. This observation is again valid for the development of exports with high and medium technology content. An institutional environment fa-

Category	Examples	Percent of world trade 1980	Percent of world trade 1998	Percent of tariff items classified as dynamic demand
High technology	Computers, TVs, telecommunications equipment, pharmaceuticals, aerospace	10.6	22.3	61.1
Medium technology	Cars, trucks, synthetic fibers, chemicals and paints, motors, industrial machinery	31.0	34.3	33.3
Low technology	Textile goods, leather, footwear, dishware, furniture, metal parts	14.2	16.8	31.1
Based on natural resources	Prepared fruits and meats, beverages, cement, rubber, petroleum products	18.7	11.6	23.8
Primary goods	Fresh fruit, meat, rice, coffee	25.6	15.1	4.2

Table 4.2 Classification of Goods by Technology Content

Source: Lall (2000) and IDB calculations based on COMTRADE.

vorable to these sectors demands that property rights and the rule of law be well established, that corruption and state interference be controlled, and that it be easy to start new businesses. In Part V of this Report we will discuss in greater detail the conditions for technological development, with special reference to the sectors of the new economy.

High Technology Exports and Economic Growth

What is the reason for being concerned about the development of high technology content exports? Do such exports generate any benefit that is not found in other types of exports?

The relationship between exports and economic growth has been one of the topics most debated among economists over the past two decades. The influential World Bank study *The East Asian Miracle* (1993) argued that export success had been the centerpiece of those countries' economic success not only because exports generated income and savings and were a source of foreign exchange, but because they contributed to the technological development of many sectors and to higher productivity. These arguments have long dominated economic thought (see Box 4.1), yet this study triggered debates in several areas that are ongoing. One issue has been the importance that technological development and the increase of productivity might have had in practice in the growth of East Asia.⁷ Another matter of debate has been whether exports were the cause or simply the result of a process of development of new sectors that may have been led rather by investment.⁸ The relevance of the East Asian experience for other regions has also been discussed, and will be taken up again in the last part of this Report.

These questions remain open, not only in relation to the East Asian experience but worldwide. Whatever the answers may be, economists agree that the production of some goods may generate benefits to other sectors through various "externalities." The process may happen, for example, as the result of learning that is generated in the production of new goods that require the use of new technologies and the development of new capabilities. The knowledge and experience may then contribute to the improvement of other goods or sectors. The externalities may also occur because of the demands of inputs from new sectors. For example, better transportation infrastructure needed to produce or sell a new product may then benefit other sectors, and the same can be said about financial services or other inputs. Similarly, there can be institutional externalities: the development of one sector can lead to the adoption of better labor relations practices in other sectors, or can help eliminate state interference, thereby benefiting other activities.

As these examples suggest, the origin of the exter-

⁷ See Young (1998) and Hsieh (1999).

⁸ See Rodrik (1999).

Box 4.1 Exports are Good for Growth: Theoretical Arguments

Since the time of Adam Smith, one of the most important principles of economic theory has been that international trade is a necessary (albeit not sufficient) condition for countries to attain high productivity and income levels. Trade enables a country to specialize in the production and export of those goods in which it has comparative advantages, thereby allowing it to import at lower cost those goods that others can produce better. World markets also provide the possibility of fully exploiting economies of scale, which may not be possible if goods are produced only for domestic markets.

These classic arguments on the effects of trade are static in nature: once the country has specialized in comparative advantage goods, international trade would not help it to grow more rapidly. However, international trade can be a permanent source of growth if it functions as a channel for assimilating new bodies of knowledge and technologies and as a stimulus for continually improving productivity, a point emphasized by modern theories of economic growth.¹ Trade can technologically benefit firms that use imported capital goods, or firms that produce export goods according to international standards of technology, quality or price. Because these standards tend to be ever more demanding due to the competition, communications and sophistication of international markets, there is a continual stimulus reflected in ongoing growth. These effects can even benefit firms that are not directly tied to international trade, since learning processes may make their way into other firms related in some way as customers, suppliers, local competitors, or as employers of workers who move from some companies to others, bringing new knowledge with them.

¹ See Arrow (1962), Rivera-Batiz and Romer (1991), Romer (1986 and 1990) and Young (1991).

nalities may be quite diverse, and whether exports in general or a certain type of exports are a major source of externalities is an empirical question. The empirical evidence about exports in general is inconclusive, and few studies have analyzed the effect of specific types of exports.⁹ Our own analyses, although tentative, indicate that while exports in general do not have a significant effect on growth, exports with a medium and high technology content do help speed it up (see Appendix Tables 4.1 and 4.2). A country where medium and high technology content exports represent 10 percent of GDP tends to grow between 0.1 and 0.2 percentage points more than another where, other factors being equal, there are no exports of this nature. Hence, exports with a technology content-which, as we have seen, depend on the country's conditions of competitiveness—may be a primary channel through which an improvement in those conditions (relative to income level) translates into greater economic growth.

Conclusions

In the 1990s, Latin American and Caribbean exports regained some of the ground lost during the previous decade. The region not only achieved a remarkable growth in exports—far above what would be expected

on the basis of world demand for its basket of goods but also substantially modified that basket. By the end of the 1990s, around 40 percent of the region's exports were goods of medium or high technology content. Nevertheless, these results were very much influenced by the achievements of some countries, particularly Mexico, that were able to take advantage of access to North American markets.

The Latin American export pattern in the 1990s would have been hard to predict a decade ago. Although many of the more dynamic goods were new articles associated with new technologies in electronics, computerized information, and telecommunications, not all high technology goods were so successful, and a number of basic goods also performed well. Any government policy of "choosing winners" would have run a great risk of failure, especially in small countries that would have had to focus on a few areas. The advance of technology exports is due more to the improved general conditions of competitiveness of the different countries. Such exports may be one of the channels through which an environment more favorable to business development is reflected in greater economic growth.

⁹ See Giles and Williams (2000, Part I). They study the methodological limits of empirical studies for specific countries or group of countries, concluding that there is not a solid base to prove (or reject) the effect of exports on economic growth.

Appendix Table 4.1 Determinants of the Technological Composition of Exports: Cross-Section Regression Results

	(% of total exports)					
Independent variables	Reg. 1	Reg. 2	Reg. 3	Reg. 4		
1990 per capita GDP (log)	0.0971 (4.40)***	0.1072 (3.93)***	0.1144 (3.25)***	0.0812 (2.61)***		
1990 GDP (log)	0.0492 (4.64)***	0.0559 (4.41)***	0.0550 (3.50)***	0.0613 (4.54)***		
Per capita natural resources (log)		-0.0745 (-3.49)***	-0.0884 (-3.34)***	-0.0738 (-3.40)***		
Excess competitiveness given income level		÷	0.2430 (2.91)***			
Excess institutional quality given income level				0.0841 (1.80)**		
Constant	-1.8161 (-7.82)***	-1.4291 (-5.62)***	-1.3422 (-3.68)***	-1.3511 (-5.03)***		
R ²	0.54	0.65	0.61	0.64		
No. of observations	76	62	44	59		

Dependent variable Exports with high nd nodium tachnological nt in the 1000c

Notes: t-statistics in parentheses.

* Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Appendix Table 4.2 Exports and Growth: Panel Regression Results

		Dependent variable Per capita GDP growth					
Independent variables	Reg. 1	Reg. 2	Reg. 3	Reg. 4			
Initial per capita GDP (log)	-0.004 (-0.74)	-0.010 (-1.78)**	-0.011 (-2.18)***	-0.008 (-1.60)			
Education (log)	0.001 (0.15)	0.000 (0.02)	0.002 (0.39)	-0.001 (-0.27)			
Inflation rate (log)	-0.008 (-1.88)**	-0.010 (-2.27)***	-0.013 (-1.82)**	-0.010 (-2.84)***			
Terms of trade variation (log)	0.101 (2.77)***	0.104 (2.55)***	0.176 (1.91)**	0.098 (2.56)***			
Total exports (% of GDP)	-0.006 (-0.27)						
High technology exports (% of GDP)		0.003 (1.70)*					
High and medium technology exports (% of GDP)			0.015 (2.11)***				
Manufacture exports (% of GDP)				0.014 (1.83)**			
Public expenditures (% of GDP)	-0.002 (-0.16)	0.008 (0.66)	-0.011 (-0.71)	0.002 (0.22)			
Black market premium	-0.011 (2.41)***	-0.010 (2.29)***	-0.001 (-0.09))	-0.011 (2.32)***			
Constant	0.044 (0.69)	0.132 (2.16)***	0.106 (-1.76)*	0.108 (1.97)**			
No. of observations	297	297	297	297			
Sargan Test	72.5	68.8	53.8	71.2			
P-Value	0.194	0.286	0.263	0.224			

Notes: t-statistics in parentheses. The period of estimation is 1976–1998, using quinquenal averages for a total of five observations by country. The source is COMTRADE for export data, Barro and Lee (2000) for education data, and the World Bank (1999) for other variables. The methodology used is dynamic panel econometrics as developed and discussed in Arellano and Bond (1991), Arellano and Bover (1995), Blundell and Bond (1998) and Blundell, Bond and Windmeijer (2000). This methodology estimates by generalized method of momentum (GMM), a system of simultaneous equations for the variables in levels and in differences, using as instruments the differences of lagged variables for the former, and the levels for the latter. It also takes care of the possible endogeneity for all the variables, except the initial stocks of physical and human capital, which are exogenous by definition.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

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Summary

The major problem faced by businesses in Latin America and the Caribbean is accessing financial markets. In 18 of the 20 Latin American countries covered by the World Business Environment Survey, access to credit was reported by entrepreneurs as their most serious concern. Figure 1 shows that financial markets in Latin America are in fact very small, so the concerns of business communities would seem understandable. On average, the ratio of credit to the private sector to GDP in the 1990s was close to 33 percent, roughly a third of the size of the average credit markets in East Asia and the developed countries. In countries where credit constraints are tighter, firms are unable to grow. Estimates suggest that, on average, a large firm can increase its assets by nearly 5 to 8 percent for every 10 percent increase in the financial depth of its host country. Therefore, companies in countries with tight credit constraints face severe impediments to expansion.

The importance of well-functioning financial systems for economic growth has been amply explored in the literature.¹ The size and stability of a country's financial system play a key role in ensuring high and sustained levels of economic growth. Entrepreneurs take the initiative on potentially profitable investments only if they are able to obtain the funding required. The ability to mobilize financing and allocate it productively depends on the efficiency of the domestic financial system. Investment intentions of entrepreneurs generate demand for funds in financial markets, and the response of both domestic and foreign financial intermediaries to those demands is what determines the pattern of domestic investment, competitiveness and economic growth.

Beyond financial depth, however, financial *stability* is crucial for competitiveness. Systemic crises in the

financial sector invariably disrupt the real economy (through their effects on the supply of credit and the payments mechanism), increasing the risk associated with real investment. Moreover, generalized insolvency in the financial sector is likely to interact with other risk elements in the macroeconomic environment, increasing the severity of other risk factors. For example, financial sector weakness may increase the probability of a currency crisis when the currency is overvalued. It may be associated with potential fiscal insolvency as well, if the government backs the liabilities of the financial system.

There are many facets as to why financial constraints are more pronounced and financial crises more frequent in some countries than in others. Macroeconomic issues such as international, monetary or productivity shocks are particularly relevant.² A stable environment can facilitate international capital inflows, expand the coverage of financial services, ease the information gathering and processing functions of the financial sector, and allow scope for the emergence of a wider range of financial instruments. In short, it can promote an efficient allocation of financial resources, and reduce borrowing costs for domestic firms, therefore promoting economic growth.

Most Latin American countries have had to address the aftermath of severe macroeconomic problems in the 1980s and early 1990s. Inflation in the region has been reduced dramatically to a nearly one-digit figure aver-

 $^{^1}$ See King and Levine (1993), Levine and Zervos (1998), and Levine, Loayza and Beck (2000).

² See Bernanke and Blinder (1988) and Frexias and Rochet (1997) regarding monetary shocks, and Kiyotaki and Moore (1997) regarding productivity shocks.



Source: World Bank (2000).

age, and countries have engaged in profound reforms to stabilize public finances. There are, however, several institutional and regulatory issues that still constrain development of the financial sector.

In general, Latin American countries have relied much more than other regions of the world on banking finance rather than equity-based finance. On average, stock market capitalization in the region during the 1990s was nearly 3 percent of GDP. Recent studies have analyzed the impact of the legal environment, the regulatory framework, the presence of tax distortions against dividends, and several macroeconomic events on the development of stock markets.³ This section explores several institutional issues that have constrained development of the major source of funding, namely, banking credit.

Institutions that support financial contracts provide an operational framework for financial intermediaries, and therefore are crucial to explaining the size of the financial sector and the way that each country accommodates macroeconomic shocks. Inadequate supervisory and regulatory regimes can increase the vulnerability of the financial system and magnify the impact of shocks on credit markets, causing severe volatility and damaging a country's competitiveness.

The appropriate functioning of the financial sector requires an adequate institutional environment and regulatory and supervisory capacity in order to restrict the scope of information asymmetries, adverse selection, moral hazard, contract enforceability and time inconsistency common to financial contracts.

Regulations that govern credit markets must ensure that financial intermediaries can respond to incentives to direct financial resources toward the most profitable sectors of the economy within a reasonable context of risk management. Policies that force lenders to direct credit towards particular sectors, that impose caps on interest rates, or that excessively tax financial activity inhibit proper risk management and effective risk-taking decisions and misallocate credit. Properly conducted financial liberalization encourages the growth of the financial sector and promotes the development of entrepreneurial activity.

Properly established prudential regulations are intended to address moral hazard considerations associated with lending activity. Restricting lending to related parties, excessive portfolio concentration, and requiring appropriate loan evaluation procedures are examples of regulations aimed at restraining banks from engaging in excessive risks that can be translated into costly crises. When regulation and supervision are weak, the financial sector's ability to allocate investment resources efficiently and broadly is seriously impaired.

Regulations that shape the incentives of the different actors in credit contracts in order to encourage them to abide by the rules are also extremely important to the healthy development of credit markets. In particular, rules that protect creditors and provide a proper legal and judicial apparatus to enforce that protection reduce moral hazard on behalf of borrowers who pledge collateral, and also contribute to financial depth by using the benefits of collateral to reduce informational asymmetries that can constrain credit expansion.

Chapter 5 analyzes the status of prudential regulations, financial liberalization, lender protection, and other regulations that explain the lackluster development of credit markets in Latin American countries. Insufficient regulation to protect creditors and excessive regulation of financial contracts are shown to have negative impacts on the size and stability of credit markets.

Excessive government involvement in banking has a negative impact on credit markets. Public banking induces inefficiencies that can spread throughout the financial system and undermine the financial sector's role in facilitating economic prosperity.

³ See Demirguc-Kunt and Levine (1999).

Chapter 6 looks at this issue, as well as the effects of limiting the scope of action of banks, or what has been called universal banking, as well as at the role of the interrationalization of the banking industry. Latin America's longstanding tradition of publicly owned banks, and the large number of restrictions that banks face in terms of expanding their scope of action, are part of the reason why the region's credit markets are smaller than those of other parts of the world.

Chapter 7 examines the microeconomic issues related to information asymmetries and the degree of development of information-sharing institutions like credit bureaus, credit registries and credit-rating agencies.⁴ Properly established institutions to promote information-sharing help to reduce adverse selection and expand the scope of financial services. These institutions play an important role in counteracting several regulatory deficiencies that explain the limited financial depth of some Latin American countries.

In countries where there are financial constraints, the smallest firms are usually those that suffer most, particularly in terms of credit.⁵ Latin America is no exception. Chapter 8 shows that when the institutional setup is adverse enough to restrict financial intermediation, economies tend to develop mechanisms to expand financial services to the smallest entrepreneurs. The chapter thus discusses the evolution of microlending in Latin America and suggests several regulatory and supervisory considerations to help ensure a stable and deep microcredit market.

⁴ See Pagano and Japelli (1993 and 1999).

⁵ See Laeven (2000), Love (2000) and Winker (1999).

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5

Financial Regulation and Supervision

Financial markets in Latin America and the Caribbean have changed rapidly and dramatically in recent years. Most interest rates have been liberalized, restrictions to capital mobility reduced, and prudential and regulatory practices adopted. Many countries have privatized at least some aspects of public banking, strengthened their supervisory agencies, and adopted capital adequacy standards in line with the Basel Accords (see Table 5.1).¹

Such developments have the potential to improve the performance of economies, since regulations that distort financial market prices can reduce the relative size of the financial sector and curtail economic growth and stability.² There are several ways that the regulatory framework can alter the functioning of financial sectors. Interest rate controls, for example, can reduce the flow of savings to the financial sector and hence reduce the amount of funds available for lending and investment. Restrictions on competition can induce efficiency losses in the intermediation process and reduce overall welfare.³ Credit targeting practices can have adverse effects on the efficiency of resource allocation by ignoring the risks associated with the targeted sectors and the economies of scale that can result from efficient evaluation, ordering and monitoring of projects. Inadequate protection of creditors can reduce the advantages of using collateral in financial contracts, shut down credit markets, and impose restrictions on investment. Finally, prudential regulation is important to ensure a stable financial system where there is a steady flow of resources towards efficient and promising economic sectors.

This chapter discusses major features of regulation of financial markets in Latin America, presents empirical evidence on regulations in countries in the region, and examines possible alternatives to enhance financial sector performance. Despite the evolution of financial market regulation in the 1990s, there are still several areas where intervention constrains efficient risk management and pushes credit out of potentially attractive investment opportunities. This chapter shows that the lack of creditor protection in Latin America poses significant challenges to the development of financial markets.

Recent Trends in Latin America

Figure 5.1 plots an average reform index that incorporates advances in interest rate deregulation, the evolution of reserve requirements, and the adoption of capital adequacy ratios. The index shows just how rapidly financial reforms were implemented in Latin America in the 1990s. Liberalization has been associated with a substantial expansion of the region's financial sector: private credit as a proportion of GDP went from nearly 30 percent of GDP at the start of the decade to 40 percent in 1998. The reforms can be expected to contribute to financial sector development for several reasons. Eliminating caps on deposit interest rates can raise deposits. Eliminating or reducing credit targeting policies, caps on loan interest rates, reserve requirements, and other impositions on financial sector activities may improve credit allocation by financial intermediaries by allowing them to properly price and administer their risks. Caps on lending interest rates as well as credit targeting policies can push lending away from profitable opportuni-

¹ However, loan ranking and provisioning criteria remain nonstandardized, and forward-looking ratings are still not common.

² See MacKinnon (1973).

³ See Caprio, Atiyas and Hanson (1994).

	Major interest	Maior	Adoption of capital	Reserve requirements ³ (%)		
	rate liberalization ¹	privatization ²	adequacy ratios ²	1990	2000	
Argentina	1989	1995	1991	24	4	
Belize	1995	na	1996	13	13	
Bolivia	1990	na	1995	25	9	
Brazil	1989	1997	1995	15	12	
Chile	1985	1987	1989	6	5	
Colombia	1992	1993	1992	38	8	
Costa Rica	1995	na	1995	43	18	
Dominican Republic	1999	na	1998	37	30	
Ecuador	1994	na	1995	20	7	
El Salvador	1990	1991	1993	33	33	
Guatemala	1995	na	1995	27	18	
Haiti	Before 1985	na	1998	46	27	
Honduras	1990	na	1998	9	22	
Jamaica	1998	na	1997	38	25	
Mexico	1988	1992	1994	5	7	
Nicaragua	1990	1999	1999	57	17	
Panama	Before 1985	na	1998	0	0	
Paraguay	1990	na	1991	33	26	
Peru	1991	1993	1993	31	26	
Trinidad & Tobago	Before 1985	na	1994	14	15	
Uruguay	1985	na	1992	45	22	
Venezuela	1989	1996	1993	18	29	

Table 5.1 | Financial Liberalization in Latin America

Sources: ³ EIU, various issues, and IDB; ² EIU, various issues; ³ IFS-IMF. Reserves/Deposits.

ties in economically viable sectors and toward politically attractive ones.

It has long been recognized that highly intervened financial systems can distort the allocation of credit and lead to underinvestment.⁴ More recent empirical evidence supports these findings. Financial liberalization reduces credit constraints at the firm level⁵ and increases the efficiency of investment.⁶ In short, empirical evidence suggests that financial liberalization generates the necessary incentives for credit expansion and can have an impact on economic performance by improving the allocation of credit.

Econometric results presented in Appendix Table 5.1 confirm the positive influence of financial reform on credit expansion for 18 Latin American countries over 1985-99. The size of the financial sector as measured by the ratio of private credit to GDP is significantly related to the financial liberalization index constructed after controlling for other relevant factors.

While these findings suggest that financial reform has in fact had a significant impact on the development of Latin American financial sectors, there still are several issues that need to be addressed. Financial lib-



Source: World Bank (2000) for Credit/GDP and Table 5.1 for financial liberalization index.

⁴ See McKinnon (1973) and Shaw (1973).

⁵ See Laeven (2000).

⁶ See Wurgler (2000) and Galindo, Schiantarelli and Weiss (2001).

	Currency denomination of loans	Loan terms	Capital amortization schemes	Interest payment schemes	Maximum level of interest rates on loans	Maximum level of overdue interest rates	Mandatory investments different from reserve requirements	Minimum ratios of targeted credit
Argentina								
Belize	~							
Bolivia				~			}	
Brazil	~	~			~	v		 ✓
Chile				~	~)	
Colombia		~	 ✓ 	· ·	~	 ✓ 	~	~
Costa Rica		~				v		
Dominican Republic		1		(1	1	1	
Ecuador		~	· ·	~	~	v	~	
El Salvador		~		~	1	~	~	
Guatemala	~	~	· ·				V	
Honduras		~	1	 ✓ 		~		
Jamaica								
Mexico		 ✓ 	 ✓ 	~			~	
Nicaragua				 ✓ 	(~	1
Panama				 ✓ 	~			
Paraguay			1		~	1		
Peru				~	~	 ✓ 		1
Trinidad & Tobago						1		~
Uruguay			 ✓ 	· ·				
Venezuela	ļ	~	1	~	· ·		V	1

Table 5.2Government Interference in Financial Contracts

Source: Felaban/IDB survey.

eralization has not always promoted financial stability. Several countries—including Argentina, Brazil, Colombia, Ecuador, Mexico, Paraguay and Venezuela—went through costly financial crises during the 1990s that cost between 2 and 20 percent of GDP.⁷

The section that follows describes additional reforms and specific areas that deserve particular attention in order to increase financial development and stability throughout the region.

Government Intervention in Financial Contracts

Latin American governments traditionally have used bank ownership as a principal means of intervention in the banking sector. This has been deleterious to financial development, as have other forms of government intervention. However, government intervention need not be detrimental. For example, prudential regulation and supervision—which have been strengthened in most countries of the region in the last decade—can support financial development.

Governments throughout Latin America have a tendency to intervene in the relationship between banks and their customers. This is surprising, since the wave of financial reforms of the last decade was oriented towards allowing more freedom to financial markets in order to improve the allocation of financial services and stimulate financial development. A survey conducted recently by the Inter-American Development Bank and the Latin American Federation of Banks (Felaban) reports many

⁷ See Caprio and Klingebiel (1999).

instances of intervention in clauses of financial contracts over the past five years. The survey also documents the existence of mandatory investments in particular areas and credit targeting policies (see Table 5.2).

In Colombia and Ecuador, the government has intervened in all of the clauses of financial contracts in one way or another. And in Brazil, Colombia, Mexico, Trinidad and Tobago and Venezuela, there are still some credit targeting policies, particularly for the agricultural sectors and for lower income housing. Mandatory investments, on the other hand, tend to be directed toward the purchase of specific types of government bonds. The extent to which government intervention affects financial development is difficult to assess from an empirical standpoint given the scarcity of cross-country data and data over time. However, it is worthwhile noting that the groups of countries that have more than two restrictions (as reported in Table 5.2) on average have ratios of private credit to GDP (32 percent) much lower than those with fewer restrictions (45 percent). Clearly, allowing banks to choose where to allocate funds and to design optimal contracts from a financial point of view increases funding opportunities and reduces underinvestment.

The Role of Creditor Rights in Financial Markets

The rights of creditors regarding assets pledged as collateral have a major role in explaining the breadth of financial markets and the variety of responses of credit markets to shocks.⁸ The protection of creditor rights stimulates both lenders and borrowers to subscribe to financial contracts and to abide by their clauses, an essential ingredient of financial development.

A credit contract involves three players: the creditor, the debtor, and the institutions that guarantee that each of the parties will live up to its responsibilities. If institutions are inadequate, it is likely that the benefits from reneging on the debt contract will be so pronounced that the contract will not be honored. Hence, the ability of these institutions to ensure that the best interests of the players coincide with the clauses of the debt contract can promote financial security. The nature of the rules and regulations that govern financial markets can influence the degree to which credit is available and can also explain why credit markets in different countries respond in such varied ways to similar types of shocks.

Advocates of regulations that support the rights of creditors claim that if the right to repossess collateral in case of debtor default is not strictly protected, the use of collateral will lose its important role in solving the information asymmetries that can lead to credit rationing and underinvestment.⁹

Theoretical findings regarding the role of collateral in mitigating asymmetric information problems are based on the presumption that collateral can be repossessed by the creditor in case of default. That is, it is presumed that a third party stands ready to protect and enforce the creditor's rights over the collateral stipulated in the debt contract. The right to repossess collateral and the feasibility of doing so act as a threat to ensure compliance by borrowers. This threat can be sufficient to reconcile the borrower's incentives with the clauses of the contract. If lenders feel that regulations do not protect them, and that they run the risk of not being able to take control of assets pledged as collateral, they are likely to prefer not to extend credit. The implicit bankruptcy risk will severely reduce their expected earnings, and the credit-rationing outcome will resurface. Therefore, countries with more creditor protection can be expected to enjoy deeper debt markets, since they can take advantage of additional noninterest clauses such as collateral to mitigate problems from information asymmetries.

Testing the validity of this view of collateral requires establishing just how difficult it can be for a creditor to repossess that collateral. By providing valu-

⁸ See La Porta et al. (1997, 1998), Padilla and Requejo (2000), and Galindo and Micco (2001). The latter develop a model in which the asymmetry of responses of credit markets to shocks is linked to the institutional setup. The estimates use a panel of over 50 countries with information from 1990 to 1999.

⁹ Coco (2000) explains that collateral can solve problems derived from asymmetries in the valuation of projects, uncertainty about the quality of projects and the riskiness of borrowers, and problems related to the cost of monitoring or supervising the borrower's behavior. If not addressed, these problems can lead to partial or complete credit rationing. Collateral requirements can solve or at least mitigate the impact of these issues on the expansion of credit. Collateral helps reduce asymmetric valuation problems (that is, the conflict that arises when borrowers and lenders disagree about the true value of the project); reduces credit rationing, since pledging collateral can convey information about borrowers and about the projects to be financed; and alleviates moral hazard problems by adding a potential cost to borrowers if they do not make their best effort to succeed.
stay on assets	creditors paid first	going into reorganization	Management does not stay during reorganization
	~		
v		~	
		v	~
✓			
		v	
¥			
v			
		v	
V		v	v
V		 ✓ 	
V		v	
		v	
		v	~
		v	~
V		v	 Image: A start of the start of
 ✓ 	~	v	
V			
	assets	assets paid first	assets paid first reorganization V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V

Notes: 🗸 means creditors are protected by law.

Source: Galindo and Micco (2001).

able data on the state of creditor rights regulations around the world, recent studies by La Porta et al. (1997 and 1998) have given new impetus to the empirical discussion of the importance of regulations regarding the rights of creditors to the assets of borrowers. The studies construct an index that summarizes regulations on creditor rights to control collateral in case firms file for reorganization or bankruptcy. The studies examine if (i) regulations do not impose an automatic stay on assets in case of reorganization; (ii) secured creditors have the right to be paid first in case of bankruptcy; (iii) firms must consult with creditors before filing for reorganization; and (iv) creditors can force removal of the firm's management during reorganization. A positive response to each of the four elements of the index is interpreted as a country providing sufficient protection of creditors' rights. The studies go beyond collateral repossession, since they focus also on total asset liquidation in case of bankruptcy. Galindo and Micco (2001) extend the coverage of the La Porta et al. studies by including most of the Latin American and Caribbean countries (see Table 5.3).¹⁰

Based on this methodology, it is only fair to say that creditor protection in Latin America is extremely weak. Moreover, if one takes into account that law enforcement in general is also weak in the region, and therefore creditors may not be protected independent of what is written in bankruptcy law procedures, *effective* creditor rights protection is even lower. Figure 5.2 plots the values of this index for the Latin American countries. Higher values imply higher effective protection.

 $^{^{10}}$ La Porta et al. (1997 and 1998) originally covered only eight Latin American countries.



Sources: Galindo and Micco (2001) and La Porta et al. (1997, 1998).



Notes: Figures adjusted by GDP growth, government deficit, inflation and income per capita (log).

Sources: La Porta et al. (1997, 1998) and Galindo and Micco (2001).

The measure of creditor rights developed by La Porta et al. has been used in several studies to examine the impact of regulations on the size of credit markets and to explore the determinants of creditor rights. (The conclusion regarding the latter point is that legal systems based on French traditions—as are the Latin American countries—tend to grant less protection to creditors and more to debtors than do systems based on the Anglo-Saxon legal tradition.) Empirical evidence suggests that creditor protection can have a significant impact on the development of financial markets.¹¹ Figure 5.3 shows that after controlling for inflation, past economic growth, the size of the economy, and fiscal imbalances, there is a strong correlation between creditor protection measures and financial sector development. Appendix Table 5.2 reports econometric findings.

Countries with more creditor protection and with better law enforcement tend to have deeper credit markets than those with less credit protection. Using the findings of Galindo and Micco (2001), it can be inferred that if Latin American countries were to increase their average effective protection to the level of developed countries, the size of their financial markets could increase on average by nearly 15 percentage points. In other words, if creditor protection were enhanced, the average size of credit markets would increase by nearly a half, from 35 percent of GDP to nearly 50 percent. In countries with limited law enforcement, such as Colombia, Guatemala, Haiti, Mexico, Paraguay and Venezuela, increasing effective creditor rights could triple the size of their credit markets.

Credit protection can also reduce the impact of adverse shocks on the credit cycle. The extent to which credit contracts during these episodes will depend on regulations regarding the repossession of collateral. If creditors cannot recover pledged assets when borrowers default, the increased credit risk in a recession will be exacerbated. In such cases, the credit market overreacts to the exogenous shock and credit is strongly contracted. Galindo and Micco (2001) find a strong correlation between the volatility of credit and the effective protection of creditor rights (see Figure 5.4).

The main intuition driving these results is that weak creditor protection can exacerbate the increase in credit risk that comes naturally in recessions. When economies are hit by adverse shocks and creditors are not protected, lenders will disproportionately reduce their lending, since their chances of recovering their loans or the collateral that guarantees them is slim in the face of such shocks as a recession, a decline in the terms of trade, or a reversal of international capital flows.

To test the validity of this proposition, a panel of information was estimated for 55 countries over 1990-99. The results reported in Appendix Table 5.3 suggest that better creditor protection reduces the impact of aggregate shocks on credit markets.

 $^{^{11}}$ La Porta et al. (1997 and 1998), Padilla and Requejo (2000), and Galindo and Micco (2001) show that creditor protection can impact the size of financial markets, the level of interest rates, and the level of non-performing loans.





The discussion above refers to creditor rights-that is, to the ability of banks to take over the assets of debtors if they default. This, however, is not the only channel through which regulation, or the lack of it, affects how collateral can reduce problems associated with information asymmetries. Regulation also addresses limits on assets that may be used as collateral, or the mechanisms to register collateral or monitor an asset pledged as collateral. To ensure deeper financial markets, regulation should be directed toward expanding the family of assets that can be pledged as a credit guarantee.¹² In many Latin American countries, there are limits on the types of assets that can be pledged.¹³ In Argentina, Brazil, Ecuador, El Salvador, Mexico, Nicaragua, Peru and Venezuela, family-owned properties cannot be pledged as collateral. There are also difficulties in pledging moving assets. In Uruguay, for example, if a bank lends against a number of heads of cattle, it must identify each animal by specific brand, making monitoring expensive. In contrast, in the United States and Canada, loans can be based on a floating security interest in terms of the collateralized asset. Finally, many countries do not allow for a "continuing security interest," meaning that if the asset pledged as collateral is sold, the creditors cannot attach the proceeds.

Registries that keep track of assets pledged as collateral are also underdeveloped in the region. Ensuring that there are no superior claims on an asset pledged as collateral requires access to some type of legal registry. Yet, in some Latin American countries the process of registering collateral is extremely difficult. In Uruguay, for example, assets are classified by date of pledge, hence in order to know if an asset was previously used as collateral it is necessary to know when it was used, which clearly undermines the use of the registry. Similarly, in Bolivia, where assets are classified chronologically, the whole file has to be searched in order to determine if a particular asset has ever been pledged. Finally, permission is often required to search the registries, which makes the process more complex and prone to corrupt practices. Fortunately, most countries have developed instruments that substitute the use of tangible assets as collateral and that ease these procedures.¹⁴

In addition to rules and regulations regarding assets pledged as collateral, there are other rules that constrain the expansion of credit. Restrictions on registering businesses have a particularly negative effect on small and medium-size enterprises. Banking institutions typically lend only to officially registered firms, so constraints to formalizing businesses can reduce the volume of credit granted. And the cost of credit for businesses outside that formal structure is much more expensive.¹⁵

Prudential Regulations

Prudential regulations and the supervision of banks are important tools to alleviate adverse selection and moral hazard in the banking business. The increased integration of financial markets requires standardized methods to promote international financial stability.

Capital adequacy requirements have been among the most debated regulations. Regardless of the theoretical debate, most countries around the world, and certainly the Latin American countries, have adopted Basel Accord types of regulation. It is widely accepted that capital serves as a buffer against losses and fail-

¹² Regulations governing collateral use can also have an impact on poverty reduction. De Soto (2000) argues that current regulations impede the poorest from pledging their assets as guarantees for financing productive activities, severely restricting the productivity of their capital.

¹³ According to the IDB/Felaban survey, as reported in Galindo (2001).

¹⁴ Except for El Salvador, Mexico, Nicaragua, Dominican Republic and Uruguay, all countries rely on repo operations, securitizations, warrants, and the like for credit contracts.

¹⁵ In his classic work on informality in Peru, De Soto (1989) found that the nominal rate of interest of loans to informal firms was nearly five times that of loans to formally registered enterprises.

	The minimum capital-asset ratio requirement is in line with the Basel guidelines	The minimum ratio varies as a function of the market risk	The market value of loan losses not realized in accounting books is deducted	Unrealized losses in securi- ties portfolios are deducted	Unrealized foreign exchange losses are deducted	Capital stringency index = sum of all columns
Argentina	V	~	~	~	~	5
Mexico	 ✓ 	~	~	~	~	5
Bolivia	 ✓ 		~	~	~	4
Colombia	 ✓ 		~	~	~	4
Jamaica	 ✓ 		~	~	 ✓ 	4
Peru	 ✓ 		~	~	 ✓ 	4
Chile	 ✓ 			~	~	3
Trinidad & Tobago	~		~		~	3
Brazil	v .	~				2
Guatemala	v				~	2
Panama	V				~	2
Honduras	· ·)	1
El Salvador	~					1
Venezuela	 ✓ 				1	1
Latin American average					l	2.9
Developed country average	ļ				l	4.3

Sources: Barth, Caprio and Levine (2001b) and Banco de la República de Colombia.

ure. Even more, in the presence of a deposit insurance scheme that can lead to moral hazard behavior, the fact that the capital of bank owners is at risk reduces their incentive to shift towards excessive risk taking. The main drawback of compulsory capital requirements, however, is that they do not necessarily mimic the risk implied in the bank's asset structure, and hence are not a real buffer, given a bank's particular exposure to risk. The question is whether compulsory capital requirements reduce risktaking incentives. Some argue that they can increase credit rationing,¹⁶ increase the cost of capital,¹⁷ and reduce economic growth. Others argue that capital adequacy ratios can promote stability by controlling the risk of the bank's portfolio,¹⁸ and encourage a flow of financial resources from savers to investors.

The stringency of capital requirements varies widely across Latin America. Table 5.4 shows that even while many countries have adopted capital adequacy ratios in the Basel spirit, many of the other prudential regulations that ensure effective capital adequacy ratios are still not in place. While Argentina, Mexico and Peru require banks to adjust the minimum capital adequacy ratio according to risk and limit the type of funds that can be used to initially capitalize a bank, others (Honduras and El Salvador) are less rigorous. For example, they do not require banks to deduct market value losses from capital before calculating the minimum capital adequacy ratio. However, all of the countries do require their banks to have the minimum capital-asset ratio requirement risk weighted in line with the Basel quidelines.

The last column of Table 5.4 reports a capital stringency index as constructed by Barth, Caprio and Levine (2001b), which adds the elements of each of the other columns. The index allows for comparison between Latin American countries and the rest of the world and measures the quality of capital adequacy regulations. The

¹⁶ See Thakor (1996).

¹⁷ See Gorton and Winton (1999).

¹⁸ See Gjerde and Semmen (1995).

average capital adequacy index for Latin America is lower than that of the developed countries; the latter are in general more rigorous with capital standards than the former. However, there is a wide variance within Latin America. Guatemala, Venezuela, Panama, Honduras and El Salvador, in particular, have extremely relaxed capital adequacy regulations, while Argentina, Mexico, Jamaica and Bolivia are nearly as or even more stringent than the average of the developed countries.

A very relevant feature of prudential regulation is the quality of the capital itself in terms of serving as a buffer against shocks and avoiding insolvency problems. Unfortunately, cross-country information regarding the quality of capital is scarce. Also important in prudential regulation is the strategy followed by each country to classify non-performing loans and to provision them. The degree of stringency in these areas varies across countries. While Brazil, Chile, Mexico and El Salvador classify loans as doubtful earlier than others do, Argentina, Bolivia and Trinidad and Tobago provision higher percentages of loans at an earlier stage. What is important to note is that no matter what policy is followed, what really matters is the quality of loan classification. Very few countries, for example, use forward-looking methods to classify their loans and restrict loan classification to arrears.¹⁹

Unfortunately, information on the role of external agents or on the accountability of auditors in classifying loans is unavailable.

Regulations that Facilitate Private Monitoring

Although private monitoring can be costly, it can be an important complement to public monitoring. Certain regulations that stimulate private sector monitoring are crucial for the health of the financial system (see Barth, Caprio and Levine, 2001a). These primarily include rules and regulations regarding transparency of bank activities, disclosure of information, and accountability of banking managers. In addition, external-rating agencies can play a key role in stimulating private monitoring by supplying information to depositors on the quality of financial institutions.

There are wide disparities in Latin American countries regarding rules and regulations that support pri-



Sources: Barth, Caprio and Levine (2001a) and Banco de la República de Colombia.

vate monitoring. The 13 Latin American economies surveyed by Barth, Caprio and Levine (2001a) require their banks to have an external audit by a licensed auditor. However, while in eight countries banks must disclose off-balance sheet items to the public (Bolivia, Brazil, Chile, El Salvador, Honduras, Jamaica, Panama and Peru), only two of them (Argentina and Bolivia) require disclosure of risk management procedures. The 10 biggest banks are rated by international credit rating agencies only in Argentina, Brazil and El Salvador.

A synthetic way to measure the level of public disclosure of information by country is to use a private monitoring index similar to that constructed by Barth, Caprio and Levine (2001a). It is plotted for the Latin American countries in Figure 5.5.²⁰ The figure shows that Argentina and Brazil have high levels of private monitoring. On the other extreme is Guatemala (among others), where none of the top 10 banks are rated by international agencies, and where banks are not obliged to report consolidated balances. The average level of private supervision in the region is lower than that of the developed countries. Empirical evidence suggests

¹⁹ The only countries that use forward-looking methods to classify loans are Argentina, Chile, Nicaragua, Uruguay and Venezuela.

²⁰ The index is constructed by adding 1 if external audits by certified auditors are a compulsory obligation for banks, if the top 10 banks are rated by international credit rating agencies, if financial institutions are required to produce consolidated accounts covering all bank and any non-bank financial subsidiaries, if directors are legally liable if information disclosed is erroneous or misleading, if off-balance sheets are disclosed to the public, and if banks must disclose their risk management procedures to the public. Higher values indicate that private monitoring is easier.

that private sector monitoring is important to financial sector development and stability. Improvement in this area could foster financial development in Guatemala, Chile, Honduras, Mexico, Trinidad and Tobago and Venezuela.

Conclusions

Regulations governing financial systems in Latin America and the Caribbean advanced significantly in the 1990s. Many countries liberalized interest rates and adopted policies to promote healthy competition in the financial system. As a result, financial sectors expanded rapidly during these years. However, there remain several legal issues that constrain financial development. Governments continue to regulate many elements of financial contracts in several countries, impeding the proper use of financial technological advances that would otherwise facilitate management and expansion of possible investments. In many countries, there are institutional restrictions that impede the use of collateral. Creditors are left unprotected, virtually neutralizing the positive consequences of pledging collateral even if regulations to facilitate its use were in place.

Most countries have adopted or are in the process of adopting prudential regulations that can increase the stability of financial systems. However, further effort is needed to reduce moral hazard practices and to identify and provision for risks. In the same spirit, many countries have adopted international auditing and disclosure standards that enhance private monitoring and increase the efficiency of prudential regulations and supervision. Yet, some countries lag behind in implementing important disclosure measures and should be encouraged to promote a transparent and more efficient financial system.

Appendix Table 5.1	Financia Reform:	inancial Development and Reform: Regression Results		
		Depende private o	ent variable: credit/GDP	
		OLS	Fixed effects	
Constant		22.290 (7.28)***	27.830 (12.35)***	
Financial liberalizati index (0-1)	on	10.930 (2.83)***	6.00 (2.05)***	
Inflation		-0.015 (-1.86)*	-0.001 (-2.24)***	
GDP growth ¹		0.670 (1.94)**	-0.050 (-0.18)***	
R ²		0.06	0.62	
No. of observations		250	250	
No. of countries		26	26	

¹ Refers to the moving average of the past five years.

Notes: OLS = Ordinary least squares. t-statistics in parentheses.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

ppendix Table 5.2	Credit Do Protectio	epth and Cre on: Regressio	ditor on Results
		Depender private c	it variable: redit/GDP
Explanatory variable		Reg. 1	Reg. 2
GDP growth		-0.029 (-1.381)	-0.028 (-1.217)
Per capita GDP (log)		0.076 (3.45)***	0.111 (5.55)***
Inflation		0.000 (-0.208)	0.000 (-0.759)
Government surplus/0	GDP	0.013 (1.75)*	0.012 (1.50)
Effective creditor rig		0.479 (2.90)***	
Rule of law index		0.694 (4.39)***	
Creditor rights index		0.184 (1.75)*	
Constant		-0.766 (-3.51)***	-0.803 (-3.72)***
R ²		0.55	0.46
F test (whole regressi	ion)	12.06	10.03
Prob > F		0.00	0.00
F test (creditor rights + rule of law)	5	10.84	
Prob > F		0	ļ
No. of observation s		55	55

Appendix Table 5.3 Credit Growth, External Shocks and Creditor Protection: **Regression Results**

Dependent variable: real private credit (change, logs)

Explanatory variables	Reg. 1	Reg. 2
Foreign shock	6.440 (3.30)***	6.840 (3.15)***
Foreign shock times credit index	-6.160 (-2.92)***	-7.370 (-3.20)***
Inflation (change logs)		-0.100 (-2.00)***
Government surplus/GDP		0.006 (3.68)***
Constant	0.030 (3.00)***	0.050 (5.00)***
R ²	0.02	0.09
F test (whole regression)	7.07	9.06
Prob > F	0.00	0.00
No. of observations	568	421

Notes: t-statistics in parentheses.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

Notes: t-statistics in parentheses.

* Significant at the 10% level. ** Significant at the 5% level.

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CHAPTER

6

Ownership and Structure of the Financial Sector

Increasing the efficiency of the financial sector is key to improving the flow of financial resources toward profitable firms. Without an orderly and effective financial sector, economies cannot be competitive and profitable firms cannot grow. Three of the most common and important issues concerning the structure and governance of financial sectors in Latin America and the Caribbean in recent years have been the role of public institutions in banking, the internationalization of the banking sector, and whether to allow universal banking or focus on specialized financial institutions.

From a theoretical perspective, there have been a considerable number of arguments on both sides of each of these issues. But until recent years, empirical evidence was far from conclusive. Several authors have since joined efforts and collected valuable cross-country information from around the world concerning public banking and regulations and restrictions on foreign and universal banking.¹ These data have led to more exhaustive empirical analysis of the benefits and drawbacks of the various positions on these issues. The consensus has supported private, internationally open and universal banking as a means of achieving more developed and stable financial systems.

This chapter presents the discussion from a theoretical perspective, describes some recent trends in Latin America in each of these areas, and provides relevant and up-to-date empirical evidence. The findings sug-

⁴ See Lewis (1950) and Myrdal (1968).

gest the need for important transformations in these areas in Latin America in order to achieve more competitive financial sectors, and hence better financial services for growing businesses.

Public Banking

Throughout the world, government-owned financial institutions have been developed to reduce the cost of credit, increase access to it, allocate resources toward strategically chosen projects, design new financial services, and control excessive risk-taking by the financial sector.² In short, in order to promote financial and economic development, governments have taken up the task of intermediating the public's savings.

Despite the recent era of worldwide privatization, public banking has remained in place. While in the 1970s governments owned on average 59 percent of the assets of the 10 largest banks, in 1995 this proportion had only fallen to 42 percent.³

To what extent is it desirable to have the government owning banks? Economists offer conflicting views regarding the impact of public ownership of banks on financial development. Supporters of public banking suggest that government ownership is desirable because it directs savings toward strategic sectors that can have a positive long-term impact on the economy,⁴ provides greater financial services at lower costs, and increases access to credit. This "optimal" allocation of resources is possible in principle because public banks have better information, and have the proper incentives to allocate capital toward socially desirable objectives. In that way, public banking can overcome capital market failures and promote economic development.

 $^{^1}$ See Barth, Caprio and Levine $\$ (2000 and 2001b) and La Porta et al. (2000).

² See Fry (1995).

 $^{^{3}}$ Based on data provided by La Porta et al. (2000) and Barth, Caprio and Levine (2001b).

According to this view, public banks also consider other types of social returns beyond financial profits, such as more equitable income distribution and the provision of credit to marginalized social and economic groups. Such socially profitable decisions are less likely to be a concern of the private sector. If the social benefit of intervention in these areas is greater than the social cost induced by the distortions it generates, expanding the scope of public banks is clearly worthwhile.

The contrary view is that government ownership of banks is undesirable because it politicizes lending decisions, softens budget constraints, and diverts funds towards politically attractive projects instead of economically viable ones.⁵ From this perspective, stateowned banks, far from looking out for social welfare, respond more to political incentives. Private banks tend to be better managed than public banks, in many cases can hire and retain better staff than government ones due to salary considerations, and have incentives to allocate resources as efficiently as possible in order to attain higher profits. In the process, the argument goes, they promote economic growth.

Even if there are market distortions in an economy, government intervention through public banking is not necessarily the best way to deal with them. Public spending aimed at correcting the fundamentals of the market distortions can be more profitable and less costly than directing credit towards sectors that for whatever reason have been rationed out. In many cases, the distortions are induced by government rather than by market failures, so the social benefits of solving the problems directly are greater than any benefit from intervening in the credit market. Restrictions on the use of collateral, intervention in financial contracts, or the imposition of limits on information sharing are problems that commonly translate into financial constraints on specific sectors.

The privatization trend in the early 1990s that decreased public sector involvement in banking by nearly half slowed considerably towards the end of the decade. Data on government ownership of banks for over 120 countries recently collected by Barth, Caprio and Levine (2001b) show relatively widespread government involvement in Latin America's banking sector. As shown in Figure 6.1, Latin America's banking sector. As shown in Figure 6.1, Latin America governments on average own nearly 20 percent of total assets of the banking systems and nearly 15 percent of deposits. In contrast, government ownership of banking assets in developed



Sources: Deposits: IDB Survey of Banking Superintendencies, Ministries of Finance and Central Banks (2000). Assets: Bath, Caprio and Levine (2001a).



Notes: Figures adjusted by average GDP growth, inflation, income per capita (log) and rule of law.

Sources: Bank ownership from La Porta et al. (2000); private credit/GDP and other controls (inflation, log [GDP], average GDP growth rates of previous years) from World Bank (2000); rule of law from Kaufmann, Kraay and Zoido-Lobatón (1999).

countries is about 8 percent. However, while in Jamaica and Brazil the government holds more than 50 percent of banking assets, the figure for El Salvador, Guatemala, Peru and Honduras is less than 10 percent.

Recent empirical evidence supports the hypothesis that public banking has a negative impact on the banking industry and economic performance by impeding

⁵ See Shleifer and Vishny (1994).

Select only profitable projects with positive development impact

Multisectoral: problem-oriented, not sector-specific

Table 6.1 Minimum Conditions for Successful Public Banking

Economic Environment

- Macroeconomic stability
- Open economy
- Industry competitiveness
- Repayment culture
- Adequate legal and regulatory framework
- Functioning judicial system Appropriate supervisory oversight Functioning private markets
- Professional management Political independence

Project design

Policy consistency

Temporary nature and limited size

Market-like source of funds

Small, targeted to imperfections

Source: Vives and Staking (1997).

the efficient allocation of financial resources. Studies show that countries with (initially) higher levels of government ownership of banks have slower rates of (subsequent) financial development and economic growth,⁶ and that greater government ownership is associated with less efficient, underdeveloped and more fragile financial systems.⁷ Instead of reducing banking and macroeconomic risks, public banking increases them. As a result, interest spreads become wider and financial instability in the form of systemic or nearly systemic banking crises more common. The importance of public banking is greater in countries where governments are less efficient and more corrupt, and where property rights are not protected. Yet, the presence of public banks in these countries exacerbates rather than reduces these problems. The ultimate effect is an overall reduction in productivity, and hence constraints to long-term economic performance.

Figure 6.2 shows the relationship between the current ratio of private credit to GDP and the share of assets of the top 10 banks owned by the government in 1995, once controlled for inflation, the size of the economy, past economic growth, and law enforcementall factors that also influence financial development.⁸ A strong significant negative relationship between the development of the financial system and public participation in banking is evident.⁹

These findings suggest that the Latin American countries have much to gain from privatizing public banks. Reducing government involvement can lead to efficiency gains at the financial system level, improve the allocation of credit, remove distortions in interest rates associated with implicit bailout premiums, and reduce the fiscal strain on governments that results from owning institutions that are usually inefficient and un-

profitable. The empirical estimations above suggest that reducing government ownership of banking from current levels to developed country levels-which would imply reducing it by more than half--could increase the size of Latin America's financial sector (as a share of GDP) by nearly 10 percentage points. This of course is just a direct effect-additional positive economic impacts would be expected once governments were free of the fiscal burden of public banks, and citizens free from the obligation of financing, via tax collection, the costs of these inefficient institutions.

However, despite the problems commonly associated with public banking, there are particular cases in Latin America and elsewhere where it has been successful. Table 6.1 divides the conditions needed for successful public banking into environment-specific and project-specific conditions.¹⁰

Public banking is justified only when there are true market distortions as opposed to government-created or macroeconomic distortions. That is, specific sectors are being rationed out of credit not because governments have failed to establish the proper institutional framework, but because of a market distortion. If there are macroeconomic distortions, or the regulatory framework is weak, public lending will likely lead to misallocation of resources at a high social cost.

Even if the environment calls for public lending due to true market distortions, government intervention can

⁶ See La Porta et al. (2000).

⁷ See Barth, Caprio and Levine (2001a).

⁸ As constructed by La Porta et al. (2000).

⁹ Regression results are presented in Appendix Table 6.1.

¹⁰ See Vives and Staking (1997).

be unsuccessful if the lending program has a faulty design, since there is always the potential for abuse and distortions. The right column of Table 6.1 provides a list of conditions vital to achieving a successful lending program. Project design issues focus on dealing with particular distortions in a transparent way, both from a political and fiscal perspective. However, a lending program must be accompanied by initiatives that target the source of the distortions, so that while the groups affected by the distortion receive temporary relief, action is also under way to correct the distortion itself.

Clearly it is not easy to combine these varying conditions, a difficulty that in fact is what drives the empirical evidence documented above. Given the current stance of Latin American financial markets, governments should direct their efforts towards ensuring the proper functioning of these markets. Governments can have a greater impact by concentrating on macroeconomic stability, keeping their economies open, maintaining a competitive structure for industries, and developing a proper legal and judicial system where property and individual rights are protected, and which allows for the safe and sound functioning of private financial markets. Once these conditions are met, public lending programs that attack the problems and not the symptoms can be designed.

Internationalization of the Banking System

During the second half of the 1990s, the share of foreign ownership of commercial banks in Latin America increased significantly. Restrictions on entry of foreign banks were removed as part of the liberalization process; formerly public banks were privatized, with foreign investors participating in that process; and the banking sector used international funds to recapitalize after the external shocks that hit the region. Figure 6.3 shows the share of assets in foreign-owned (or partially foreign-owned) banking institutions with respect to total banking assets in 1995 and 2000. In all countries except Chile, the share of assets in foreign-owned institutions at least doubled. In Argentina, Chile, Mexico, Peru and Venezuela, the share of assets in such banks was approximately 50 percent of total banking system assets.



Notes: These figures do not include the acquisition of Banamex by Citibank in Mexico. Sources: Crystal, Dages and Goldberg (2001).

Several authors have discussed the potential benefits of more foreign ownership in the banking sector. Levine (1996) argues that it can promote competition and import modern banking skills and technologies, thus improving the quality and availability of financial services. Foreign ownership in the banking sector can also stimulate the development of the underlying bank supervisory and legal framework and increase a country's access to international capital. Recent studies have shown that it can also reduce the vulnerability of the banking sector to domestic shocks.

Recent empirical findings provide evidence on the effects of the internationalization of the banking sector for emerging economies, particularly the Latin American countries. Differences between the way that foreign banks operate as opposed to domestic ones suggest that they can increase overall efficiency and stability. Claessens, Demirguc-Kunt and Huizinga (1998) find that countries that allow foreign participation in banking experience lower average gross interest margins and operating costs¹¹ and have a more competitive banking sector. Martínez Peria and Schmukler (1999) also find that more foreign participation in banking reduces profit margins for domestic banks and increases efficiency. This

¹¹ The authors base their estimates on a bank-level panel for 80 countries over 1988-95. They measure foreign ownership as the share of foreignowned assets in the banking sector, and as the number of banks that have foreign ownership as a portion of the total.

benefits consumers, who have more access to financial services at lower costs and can take advantage of new financial products offered by the foreign institutions.

Lending by foreign banks is also more stable than that of domestic institutions and depends less on domestic financial cycles.¹² Using information on lending decisions of U.S. banks in the rest of the world, Goldberg (2001) finds that the credit supply from these institutions is linked to U.S. cycles and not correlated with country-specific fluctuations. This finding shows that countries with foreign participation in the banking sector are less vulnerable to idiosyncratic shocks. The potential drawback, however, is that this further opens up channels for international transmission of shocks. However, even though this is a potential source of vulnerability, the overall effect of foreign banking on credit volatility can be expected to be favorable (reduce volatility), given that developed economies are usual more stable than developing ones. In any case, further research has shown that foreign banks have not fled from Latin American countries during financial crises.¹³

Foreign banks have had other positive effects on the health of Latin American financial systems. Crystal, Dages and Goldberg (2001) find that institutions acquired by foreign entities behave more prudently than their domestically owned counterparts. They provision more for loan losses, which reflects a more aggressive approach to loan loss recognition and a greater capacity to absorb losses. This is probably driven by the fact that foreign banks have greater access to capital than local banks, for whom raising additional equity can be much more costly. However, higher provisioning can also reflect a more deficient loan portfolio. In part, this finding is influenced by the fact that in many cases banks acquired by foreign entities were in trouble to begin with. Foreign banks have lower leverage ratios and higher capital ratios than domestic banks.

Under the new Basel Accord, foreign banks will surely play an important role in the transfer of credit risk evaluation methodologies into emerging markets. Foreign banks have greater experience than local ones in risk management, and hence will be able to provide international risk management standards that will increase the effectiveness of prudential regulation in Latin America.

The major claim against foreign entry of banks is that they frequently follow "cherry picking" practices that is, they select the lowest risk clients for themselves and concentrate the worst risks in the domestic financial institutions. Evidence regarding this finding is inconclusive. Crystal, Dages and Goldberg (2001) argue that higher provisioning by these banks can be interpreted as evidence against this critique. More provisioning can also reflect relative deterioration of the loan portfolio, which would imply that their loans are no more creditworthy than those of the rest of the system.

Empirical evidence on the impact of foreign banks in Latin America is scarce or preliminary. However, the fragmented evidence available suggests positive effects from internationalizing the banking system. The banking system becomes more efficient and credit volatility is reduced. Other measures that ensure future stability—such as more aggressive provisioning standards and higher capital ratios—are also apparently fostered by foreign entry.

Specialized or Universal Banking?

Should commercial banks be allowed to participate in activities different from those strictly related to banking? Should banking activities be restricted? Viewpoints in the theoretical literature vary regarding whether to allow banks to engage in multiple tasks. On the one hand, supporters maintain that allowing banks to engage in several activities takes advantage of economies of scale and scope (gathering and processing information about clients, risk management, advertisement, etc.), encourages prudent behavior that can increase a bank's franchise value, and increases banking stability by promoting diversification of income streams. In addition, some believe that allowing mergers between the commercial banking and securities industries increases competition and generates multiple benefits by reducing the price paid for the security by the general public. If competition in the securities industry is allowed, there will be more bidders to underwrite the issue of new securities, reducing the spread between the price guaranteed to the issuer of the security and the price to the public, benefiting both issuers (borrowers) and purchasers (lenders).¹⁴

 $^{^{12}}$ Dages, Goldberg and Kinney (2000) analyze foreign banking in Argentina and Mexico. Crystal, Dages and Goldberg (2001) also analyze Colombia and Chile.

¹³ See Crystal, Dages and Goldberg (2001).

¹⁴ See Mishkin (1997).



Sources: Barth, Caprio and Levine (2001a) and Superintendencia Bancana de Colombia.

Others claim, however, that banking activities must be restricted because banks may attempt to shift security related risks to uninformed investors, and conflicts of interests may ensue. They also maintain that deposit insurance and limited liability, without restrictions on banking activities, create perverse effects that can lead commercial banks to undertake riskier transactions (moral hazard). If banks are allowed to engage in the securities industry, instability in the banking sector could increase, since the securities business is usually more risky than traditional banking. The problem could be magnified if there is deposit insurance, since this would promote moral hazard behavior on behalf of banks given that they would be tempted to take high risks in the securities market at the expense of government protected deposits. Banks could also purchase securities either directly or through a trust fund that they themselves underwrote if they were unable to sell them in the market. (However, the argument that this can deteriorate the quality of a bank's assets and contribute to a possible failure can easily be countered by imposing and enforcing proper regulations that avoid this type of pervasive behavior.) The mix of banking and commerce may also lead to the formation of huge entities that can be extremely difficult to monitor or discipline. And these big entities could drive smaller ones out of business, reducing competition and the overall efficiency of the market. This could also lead to unfair competition, since commercial banks can absorb deposits at lower costs, given that they are usually protected by some sort of deposit insurance. Others argue that specialization can speed the pace of securities market development. Fry (1995) cites countries with universal banking, such as Germany and France, that tend to have weaker equity markets because bank services crowd out other alternative financing sources.

In many countries, the banking and securities industries are forced to remain separate.¹⁵ Banks are allowed to sell new offerings of government securities, but cannot underwrite corporate securities or engage in brokerage activities. Not all countries, however, have followed such a scheme. For example, Japan has adopted a similar structure in the sense that banking and insurance industries are separated, but it allows banks to own equity in commercial firms. In Germany, the Netherlands, Switzerland and, more recently, the United States, there is no separation between commercial banking, securities and insurance industries. One single legal entity is allowed to operate any of these activities, and banks usually hold commercial firms' equity. The United Kingdom, Canada and Australia abide by universal banking principles as well, but in a slightly different style. The combination of banking and insurance is less common in these countries, and different operations are usually carried out through separate legal subsidiaries of the bank. The Japanese banking industry is evolving, and appears to be leaning toward the British style of organization.¹⁶

In many Latin American countries, there are major restrictions on the types of business opportunities in which commercial banks are allowed to engage (see Figure 6.4). Following the activity index as constructed by Barth, Caprio and Levine (2001b),¹⁷ the size of the bars in Figure 6.4 denotes the degree to which each activity is restricted. Larger bars imply higher restrictions. In countries such as Mexico, Guatemala, El Salvador and Jamaica, banks cannot freely undertake in securities underwriting, insurance or real estate activities. In Brazil, Bolivia, Chile, Peru and Venezuela, only bank sub-

¹⁵ As in the United States from the time of the passage of the Glass-Steagall Act in 1933 until it was repealed in 1999.

¹⁶ See Mishkin (1997).

 $^{^{17}}$ On a scale of 1 to 4, the index measures the extent to which securities, insurance and real estate activities are restricted. Four means the highest restrictions. Figure 6.4 presents the three individual indexes in one unique measure.



Notes: Figures adjusted by average GDP growth, inflation, income per capita (log) and rule of law.

sidiaries can engage in such activities. To some extent, the least restricted are the banks in Argentina, Panama and Honduras. Comparing the index for the 13 Latin American countries surveyed to that of developed countries, it is clear that the former group tends to have more restrictive banking systems than the latter.

As with most of these regulatory issues, the impact of these restrictions on financial sector development and stability boils down to an empirical matter. There is no unique theoretical case in favor of or against universal banking, and empirical analyses are scant due to lack of comparative information across counties. Barth, Caprio and Levine (2000 and 2001a) construct an extended database for over 100 countries and use their data to show that restrictions on banking activities are associated with less financial development and less stable banking systems. Figure 6.5 shows the relationship between the overall activity index and the ratio of credit to GDP, after controlling for various factors such as the size of the economy, previous GDP growth, inflation and overall law enforcement. The figure and the regression results underlying it (as reported in Appendix Table 6.1), suggest that there is an important negative relationship between the degree of restrictiveness and the size of the financial sector.

Latin American countries have various opportunities to promote financial sector development on this front. The empirical estimates suggest that reducing restrictions to developed country levels would imply on average an enlargement of the financial sector of nearly 15 percentage points of GDP. Allowing banks to assume more risks—provided that proper regulations are in place to support responsible risk taking—can widen financial services and promote business development.

Conclusions

The Latin American and Caribbean countries have comparatively large government-owned banking sectors and impose more restrictions on banking activities than elsewhere in the world. Research shows that public banking worldwide generates distortions in the financial sector and leads to inefficient allocation of capital. It also generates pressure on government finances that discourages inflows of international capital and deteriorates the competitiveness of local firms. Latin American businesses could increase their access to credit markets substantially if state banking were reduced. Because the overall efficiency of financial services would then improve, there would be less dependence on external finance and improved financial stability. Because fiscal pressure would be alleviated, investment and overall efficiency would increase.

Traditionally, public banking has been directed towards providing financial services to economic sectors that have been rationed out of credit. However, governments can contribute to credit expansion and better access to credit through other mechanisms, such as the design and enforcement of an arrangement compatible with incentives.

The share of foreign banking in Latin American countries has increased dramatically in the past years. In many countries foreign banks own nearly half or more of the financial system. Although much of the impact of this recent trend has not been studied, preliminary evidence suggests it will lead to greater efficiency and more stability in domestic financial sectors.

Regarding universal banking, evidence suggests that increasing the scope of financial activity can also promote financial sector depth and stability. Increasing the scope of action of banks stabilizes income flows. However, this is valid only up to a point, and must be interpreted with caution. In order to achieve such diversification, it is necessary to have some development

Sources: Bank restrictions from Barth, Caprio and Levine (2001a) and Banco de la República de Colombia; private credit/GDP and other controls (inflation, log [GDP], average GDP growth rates of previous years) from World Bank (2000); rule of law from Kaufmann, Kraay and Zoido-Lobatón (1999).

of securities markets. Many Latin American countries lag behind in this respect, which would imply that even if universal banking were more widespread, the gains from diversification, if any, would not be immediate. Expanding the scope of action of banks also requires a prudent institutional arrangement that allows for the monitoring and control of larger financial entities. This in turn points to the importance of dealing with regulatory deficiencies such as those described in the previous chapter before turning to universal banking as a means of promoting wider access to credit.

Appendix Table 6.1	Financial Development and
	Government Ownership of
	Banks and Restrictions on
	Commercial Bank Activities:
	Regression Results

	Dependent private cre	variable: edit/GDP
	Reg. 1	Reg. 2
Constant	-42.560 (-0.82)	8.010 (0.16)
Income per capita (log)	3.938 (3.88)***	2.730 (1.48)
Average economic growth ¹	7.072 (4.59)***	7.410 (4.01)***
Inflation	0.006 (0.210)	-0 <i>.</i> 102 (-0.570)
Rule of law	16.207 (3.88)***	16.190 (3.34)***
Government ownership of assets of 10 largest banks	-0.631 (-5.44)***	
Restriction index		-5.820 (-2.75)***
R²	0.61	0.51
No. of observations	75	74

¹Average growth of per capita GDP from 1980-97.

Note: t-statistics in parentheses.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

7

Information in Financial Markets: The Role of Credit Registries

The role of asymmetric information in credit markets has received considerable attention in economic theory. The forward-looking nature of credit contracts, which involve a promise to pay over time, makes the identity and intentions of the buyer critical to the likelihood of repayment and, thus, the profitability of the loan. Information on potential borrowers and their investment projects is typically disclosed only partially to lenders, which can introduce adverse selection into the credit market. Once a loan is made, lenders face moral hazard-the possibility that borrowers may try to avoid repaying the loan or take actions that increase the risk of the investment project. Asymmetric information between borrowers and lenders regarding project (borrower) quality and the risk of repayment may keep interest rates from clearing the credit market. As a result, credit will be rationed and the market equilibrium results in higher prices and less availability of credit than would be the case if information sharing were optimal.

While there is extensive theoretical literature on the role of information in credit markets, much less attention has been given to the institutional responses that actual lenders have developed to minimize the impact of asymmetric information. One such institutional response is credit registries, also commonly known as credit bureaus, which collect, distribute and often analyze information on borrower behavior from a variety of sources, including numerous lenders.

Credit registries date back to at least the 19th century. In Latin America, some of the oldest credit registries were formed by Chambers of Commerce to record information on customers who did not pay accounts held with merchants. More recently, banks have organized in many Latin American countries to share information on delinguent customers. In addition, most Latin American central banks or bank superintendencies now require supervised financial institutions to provide information on borrowers to a public credit registry, which then makes the information available to the financial system.

Credit registries have gained in importance over the past 20 years in both developed and developing countries due to changes in banking systems and advances in technology. In many countries, the financial system has recently gone through a period of consolidation. Community-based institutions with a limited geographic focus have been acquired or closed in favor of large national and even international financial conglomerates. There is evidence that such a process of mergers and acquisitions results in a loss of institution-specific knowledge on borrowers. In addition, larger institutions often want to centralize the credit decision process. These factors may increase reliance on the standardized and easily transmitted information contained in credit registries. Along with the shift toward larger institutions, there has been rapid growth in computing capacity, which enables lenders to quickly and cheaply access and analyze data on massive numbers of borrowers. Credit scoring technologies that provide a numerical ranking of borrower credit quality have become a central part of the credit decision used in a growing number of markets. From their early use in the credit card market, credit-scoring tools have now become a fundamental part of the mortgage and small business loan market.

The small business loan market is perhaps the segment of the credit market where asymmetric information is most pronounced. There is little independent analysis of most small businesses through ratings firms or stock prices, and these firms are often so diverse that it is difficult to identify clear predictors of success. Further complicating matters is the fact that many small business owners mingle their personal finances with those of their company. In Latin America, these problems are even greater due to economic volatility, poor accounting standards and widespread tax evasion.

The traditional response of banks—the main source of *untied* credit for small firms¹—has been to put significant resources into studying business plans and cash flows, and requiring collateral to back loans. This approach is time consuming and results in high fixed costs, making many small business loans too costly to undertake. Credit registries that collect standardized historical data on borrowers can create a new kind of "reputation collateral" that can help both in reducing problems of adverse selection and moral hazard. Credit scoring technologies that make use of such data greatly reduce costs per loan, thereby opening up new lending opportunities. Data on both small businesses and on their owners has proven to be effective in determining the risk and profitability of small business loans.²

What Credit Registries Can Do

Due to asymmetric information between borrowers and lenders, the price of a loan—the interest rate—is insufficient to balance the supply and demand of financial resources. Stiglitz and Weiss (1981) suggest that the structure of the credit market will determine the extent to which either lenders or borrowers benefit from greater transparency of information. While greater access to information should increase the quantity of lending, it may not necessarily reduce the price of loans unless the credit market is competitive and the information can be transferred between institutions.

Pagano and Jappelli (1993) provided the first rigorous treatment of information sharing mechanisms, such as credit registries. They found that the structure of the credit market drives the impact of information sharing on lending; in a competitive market, informational rents fall and lending increases, whereas such benefits do not necessarily accrue when competition is lacking. Padilla and Pagano (1997) show that information sharing can reduce moral hazard by imposing discipline on credit users.

Empirical research on the benefits of information sharing and their impact on credit markets is scarce. At the macro level, this is due to a lack of cross-country



Notes: Figures adjusted by creditors' rights, average GDP growth, inflation, income per capita (log) and rule of law. Sources: Galindo and Miller (2001) and World Bank (2000).

data on the nature of different credit reporting systems. At the micro level, the confidential nature of credit registry information, much of it held by private firms, limits access to the data for research. In the last few years, however, several new studies have used both macro data on credit reporting systems and data from credit registries themselves. Pagano and Jappelli (1999) find that the performance of credit registries, proxied by the number of years they have operated and the type of information that they share (positive, negative or both), has a significant positive impact on the amount of consumer credit (relative to GDP) available through the financial sector and on the total amount of credit as well. And it has a negative impact on nonperforming loans.

The availability of information is crucial to sound lending decisions. More information reduces default rates and increases access to credit.³ Accurate credit information has substantially greater predictive power about

¹ Trade or supplier credit is perhaps the most common for small firms, but it is tied to specific purchases or transactions and usually very short term (30-90 days). The prevalence of trade credit in the small business market is likely due, at least in part, to the information advantages enjoyed by firms that share business relationships.

² The most common credit-scoring product in the United States—SBSS, which is sold by the Fair Isaac Corporation—uses information on small businesses and their owners to create scores for firms. This credit-scoring product is used extensively in the small business market and has reduced loan processing times from hours or days to minutes.

³ Barron and Staten (forthcoming).

the performance of firms than the data contained in financial statements.⁴ Informed lenders provide better financial services to borrowers. And in countries where credit bureaus are more developed, businesses face fewer financial constraints.⁵

However, information sharing can be difficult, especially in medium-sized markets. Banks may be unwilling to disclose information on clients even if this would reduce their risk, preferring to maintain their informational rents.⁶

A simple empirical exercise reveals the importance of credit registries for financial market development. Figure 7.1 reports a strong significant correlation between credit market development (the ratio of private credit to GDP) and the number of years that credit registries have been operating in each country (a variable frequently used as a proxy for the development of credit registries) after controlling for rule of law, creditor rights, inflation, the log of GDP, and previous economic growth rates.⁷ Results are reported in Appendix Table 7.1.

Credit Registries in Latin America⁸

In an international comparison of the development of credit registries, Latin America scores high in each of the measures and in the index that averages them (see Table 7.1). Although there is wide variance within the region, the averages suggest the existence of healthy credit bureaus in the region. This strong performance is due to a combination of factors, including (i) the absence of laws prohibiting or significantly restricting the sharing of credit information within the financial sector; (ii) foreign direct investment in credit regis-



Sources: Galindo and Miller (2001).

tries in the major Latin American markets (Argentina, Brazil, Chile, Mexico) and in many smaller countries; (iii) a history of using credit registries in the retail sector, often organized by Chambers of Commerce; and (iv) changes in banking systems that encourage infor-

⁸ This section is based on a recent credit registry survey conducted by the World Bank. Information regarding the region's public and private credit bureaus is reported in Appendix Table 7.2.

Table /.1 Summ	ary Statistics					
		Loans reported individually	Positive and negative data reported	Type of loan reported	Institutions allowed to access bureau	Quantity of information available
Latin America	Average	0.11	1.00	0.78	0.50	0.63
	Standard deviation	0.32	0.00	0.18	0.23	0.12
	Maximum	1.00	1.00	1.00	0.93	0.80
	Minimum	0.00	1.00	0.40	0.14	0.33
United States	Average	1.00	1.00	1.00	0.57	0.73
Other developed	Average	0.11	0.78	0.65	0.35	0.40

Notes: Based on information presented in Appendix Table 7.2. Positive answers take values of 1 and figures are normalized to the 0-1 interval. Source: Galindo and Miller (2001).

Figure 7.2 Quality of Credit Registries

⁴ Kallberg and Udell (forthcoming).

⁵ Galindo and Miller (2001) focus on a structural empirical question related directly to the microeconomics of credit markets. Using firm-level data for over 20 countries, they find that information-sharing institutions reduce businesses' credit constraints.

⁶ Castelar and Moura (forthcoming) use data from Brazil's largest private credit registry, SERASA, to study how sharing of credit information is different in a highly segmented credit market.

⁷ The results stand even if the United States is excluded.

mation sharing (consolidation of the sector, a return of long-term lending due to macroeconomic stability, and an increased foreign presence requiring modernized lending practices).

In order to allow for international comparisons, the different sets of variables are added up and indexes summarizing the information are computed. Table 7.1 reports some summary statistics for the diverse measures and compares them to international standards. The final column reports an index that combines the complete set of indicators. Although the data do not allow for evaluating the reliability of the information, they do allow for comparison regarding the amount of information available in the registries, the type of information reported, the way it is reported, and who can access it.

The United States has the most complete and accessible credit reporting system (see Figure 7.2). This is in line with general perceptions of the credit reporting industry internationally. In contrast to Europe (most of the nations in "other developed" are European), the United States has a very open system for credit reporting with a relatively light regulatory approach.⁹ The European Union, on the other hand, has placed a significant regulatory burden on the credit reporting industry, and the EU Privacy Directive of 1998 greatly limited sharing of personal information, including credit data in credit registries. Some European nations, such as France, have even more stringent laws than the European Union with regard to credit registries. This accounts for the lower scores of the "other developed" category in Figure 7.2.

The Latin American nations that fare best are Brazil, Costa Rica, Chile, Argentina and Peru. Brazil has a well-established credit registry in which most banks participate. The Brazilian firm SERASA is by far the largest Latin American credit registry, with annual sales of approximately \$150 million. Brazil's extensive Chamber of Commerce system operates a credit registry and bad check list on a state-by-state basis. Finally, the Brazilian Central Bank in 1998 established a public credit registry to collect detailed information on all large loans.

Argentina and Chile have strong private credit registries, both of which are now majority owned by Equifax. In addition, both countries have public credit registries, and much of the data in the Argentine public registry are accessible to the general public via the Internet. In Chile, the Santiago Chamber of Commerce runs one of the region's oldest retail credit databases. The information in this database on consumers is actually superior in some ways (coverage, years of history) to that of the bank-led credit registry.

Peru enjoys an unusually active credit reporting industry, with at least four credit registries operating in that relatively small economy. In Central America, Costa Rica, which has enjoyed years of relative economic stability, has the most developed credit registry.

Of the countries that scored lower, Mexico is worth noting. In the wake of the 1994 "Tequila" crisis, the Mexican government helped to establish credit reporting. The Trans Union Corporation together with a local banking association invested in a registry that now has a virtual monopoly on the industry. While the information it collects and distributes is considered of high quality, distribution of the data is restricted to protecting the banking sector, and competition is virtually nonexistent, which may explain Mexico's relatively low ranking.

Quality of Information

Although information asymmetries can be reduced by developing credit bureaus such as those discussed above, it is also necessary to ensure that the information compiled by those bureaus is reliable. Unfortunately, Latin American countries have proven weak in adopting the international accounting and auditing standards that are essential to assure the reliability of business data.¹⁰ Many countries are behind in adopting global standards such as the recently updated international accounting standards (IAS), and have been unable to enforce auditing standards (IFAC).

Countries have been reluctant to move to international standards in part because it can be costly. Applying more stringent principles to accounting can show the true status of businesses that appear to be solvent.

⁹ The United States has allowed a significant degree of self-regulation by the credit reporting industry. However, the Fair Credit Reporting Act, which protects consumer rights with regard to credit registries, was amended in 1997 to address growing consumer concerns with privacy abuses by the industry.

¹⁰ See Staking and Schulz (1999).

Creditors and clients might lose confidence in firms once their real financial situation is revealed.

From a national perspective, incentives to renew standards are not necessarily in place because capital markets are closed or nearly closed for many countries. However, given the new financing opportunities for Latin American firms provided through the re-emergence of American Depositary Receipts, new incentives for modernizing standards have appeared. A positive effect of intensive ADR trading is that it prompts firms to pressure regulators to update standards to increase transparency and create competitive conditions vis-à-vis the rest of the world.¹¹

The advantages of information sharing grow clearer with time. Firms, individuals and governments are gaining awareness of this issue at a time when the world is moving towards defining and adopting precise standards of disclosure and accounting of information. Together, these two trends will likely increase the access of people and businesses to credit markets, and reduce the information boundaries that, to a certain extent, have reduced capital mobility across borders.

Conclusions

Credit registries are an institutional response to the problem of asymmetric information in credit markets, but they are not the only possible response. Pledges of collateral and, in extreme cases, the threat of bankruptcy are other tools used by lenders to both screen applicants (address adverse selection) and encourage repayment (reduce moral hazard). Perhaps the fact that Latin America has advanced as far as it has in credit registries is related to the difficulties faced in many countries in the region with regard to seizing collateral.¹² Developing a credit registry, either voluntarily in the private sector or under the auspices of a banking superintendency, may be easier and politically more palatable than changing fundamental laws and judicial systems. It is also worth remembering a basic tenet of psychology—that the best predictor of future behavior is past behavior. Information contained in registries has proven to have greater predictive power than collateral pledges in determining who will repay loans, and is therefore more prized by bankers.

Exploiting the benefits of credit registries requires an adequate legal framework that encourages information sharing among lenders. In this regard, bank secrecy laws, which can restrict information flows, have to be reviewed. Nonprecise privacy laws can impose limits on credit reporting and hinder the usefulness of credit reporting agencies. However, there must also be rules that impede the improper use of credit information in order to ensure that information sharing does not compromise the safety and security of the people recorded in the registry.

The regulatory framework that supports credit bureaus must also address unfair competitive practices and ensure that the database is not used for "cherry picking," which occurs when institutions use it to take clients away from one another. Such practices discourage information sharing and could negate the advantages discussed above.

The ownership of credit registries is an important determinant of the quality of the data produced. Ownership by a limited group of lenders or bank associations can discourage a broader database by restricting not only information providers but also access to the system. Registries must not belong to a closed network, since this constricts information sharing. However, the role of the government in the information sharing activity is still being debated. Privately owned registries have the advantage that they gather information from several sources, not just commercial banks. However, public registries can oblige banks to report data to the registry, while private ones cannot. This in any case is not necessarily an argument favoring public property of registries. Once the value of information is acknowledged by the financial system, sharing occurs naturally and can be enforced through such methods as imposing reciprocity conditions for the usage of the data (only those that share can have access to data). The business of providing and analyzing information (through credit scoring models, for example) is profitable and attractive enough so as to have sufficient private agents managing it once the value of information sharing has been socially recognized.

To strengthen the quality of the information in the databases, the legal framework must provide mechanisms that allow consumers to file complaints pertaining to the collected information promptly and, most

¹¹ See Moel (2001).

¹² See Galindo (2001).

importantly, outside the judicial system. Borrowers must be able to access their data, and there must be consumer-friendly procedures available to quickly challenge erroneous information. However, if the consumer has had access to the data, that fact should be noted in the report in order to avoid data manipulation by consumers.

Credit registries can only succeed in reducing information asymmetries if the data shared are reliable. Despite incentives for adopting international accounting and auditing standards, governments have moved slowly in adopting these standards. To increase access to both national and international financing, proper accounting and auditing principles must be adopted and enforced.

Appendix Table 7.1	Financial Age of Cr Regressio	Development and redit Registries: on Results
		Dependent variable: private credit/GDP
		OLS
Constant		-17.64 (-0.220)
Income per capita (l	og)	0.59 (0.170)
Average economic gr	owth	6.18 (1.75)*
Effective creditors' ri	ights	13.45 (4.12)***
Age of credit registry	/	0.41 (2.04)**
R² Number of observation	ons	0.57 28

Notes: t-statistics in parentheses.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

	Argentina	Barbados	Bolivia	Brazil	Chile	Colombia	Costa Rica	Dominican Republic	Ecuador	EIS	alvado
Year bureau was founde	d: 1957 1991	1993	1994 198	9 1968 199	97 1928	1982 1990	1999 1995	1994 1994	1966 19	7 199	7 199
Loans described individually Positive and negative data reported	Pr Pr	P 7	Pr G	Pr 9	Pr G	Pr 6	ی ی	Pr Pr G	Pr G	<u>ل</u>	00
Name	Pr G	Pr	Pr G	Pr.	Pr G	Pr G	9	Pr G	Pr Pr	à	0
Address	Pr G	P	Pr	Pr.	-F	Pr	•	Pr -	Ŀ Ŀ	۲.	
Taxpayer ID	Pr	Pr	Pr G	Pr G	Pr G	Pr G		Pr G	Pr G	Ł	J
Name of reporting institution	Pr G	Pr	Pr G	Pr 6	Pr 6	Pr G	9	Pr G	Pr G	Pr	J
Amount of loan	Pr G	Pr	Pr G	Pr G	Pr G	Pr G	9	Pr G	Pr G	Ł	9
Interest rate	9	Pr	9	9	0	9	9	9			9
Maturity	Pr	Pr	Pr G	Pr		Pr		Pr	Pr	ፈ	G
Type of loan	Pr	Pr	Pr G	Pr G	Pr	Pr		Pr		Ъ	G
Type of collateral	Pr	Pr	Pr 6		9	Pr G	9	9	9		9
Value of collateral	9		9						9		
Status or rating of loan	Pr G	Pr	Pr G	Pr		Pr		Pr	9	ፈ	
Ownership or participation in a business	9		0	Pr	Pr G	9	9	G	9		9
Financial data			Pr	Pr				Pr	Pr	Pr	
Personal information		_	Pr	Pr	Ŀ			Pr	Pr	Å	
Tax information	Pr		9		ት			Pr			
Unsecured line of credit including credit cards	Pr G	Pr	Pr	Pr	Pr	Pr G	Pr	Pr	Pr	4	
U Overdraft lines	Pr G	Pr			Pr G		Pr	٦			
Auto loans	Pr G	Pr	Pr	Pr	Pr	Pr		Pr	Pr	ď.	
Mortgages	Pr G			Pr	Pr	Pr G		Pr		Ъ.	
Secured lines of credit	Pr G	Pr				Pr	Pr	Pr	Pr	à	
Public financial institutions that provide data	ۍ ۲	Pr		Pr G	Pr G	Pr G	0	Pr G	0		0
> Public financial institutions that do not provide data	Pr G		Pr	P	Pr		Pr		9		
Private financial institutions that provide data	Pr G	Pr	9	Pr G	Pr G	Pr G	Pr G	Pr G	Pr G		J
e Private financial institutions that do not provide data	Pr G	Pr	Pr	Pr	Pr		Pr		Pr		
Central Bank	Pr G		Pr G	Pr G	Pr G	9	Pr	9	9		
Public credit registry	9		9	9	Pr 6	Pr	Pr G	9	0		9
6 Government tax collection office	Pr G				Pr	Pr	Pr				
Law enforcement agencies	Pr G		Pr G		Pr	Pr G	Pr G	9			
0 ther federal government offices					Pr	9	Pr	9			
State/provincial/municipal governments or agencies	Pr 6		Pr		Pr	Pr	Pr	9			
Credit bureaus and registries	Lr -		Pr	Pr	Pr -	، ق 	Pr		ہے۔ ا		
Other businesses	ن ق ر	ú	ት		Pr C	Pr G	Pr ,	ţ	b L		
Individuals	الار	۲r	۲۲	ا ۲۲	١٢٢		Lr.	و	۲		

Appen	Idix Table 7.2 Features of Credit Registries	in Latin A	merica (cor	nt.)							
		Guatemala	l Haiti	Mexico	Nicaragua	Panama	Paraguay	Peru	Urugua	/ Venezu	ela
1	Year bureau was founded:	1976 199	1980	1996 1964	Bn	1956	na	1970 19	58 1954 198	82 1	975
)	Loans described individually Positive and negative data reported	Pr 6 Pr	0	Pr Pr	G	Pr Pr	U	Pr G	لم ل	5	
1	Name	Pr	9	Pr G		Pr		B,	Pr Pr	0	
	Address		0	Pr 6	•	Pr.		<u></u>			
	Taxpayer ID	Pr	9	Pr G	J	Pr	9	Pr G	Pr	9	
	Name of reporting institution	9	9	Pr G	9	Pr	9	Pr G	Pr 6		
1	Amount of loan	Pr G	9	Pr G	9	Pr	9	Pr G	Pr G	9	
ete	Interest rate	J	9	0	9		9	J	9	9	
p p	Maturity	Pr G		Pr	9	Pr			Pr		
ətı	Type of loan	Pr	9	Pr	9	Pr		Pr	Pr 6		
oda	Type of collateral	9	9	9	9			9	Pr 6		
эŊ	Value of collateral	Pr G			9			Pr G	9		
	Status or rating of loan	Pr G		Pr	ى	Pr	ں	Pr 6			
	Ownership or participation in a business	9	9	9	9		G	9		G	
	Financial data			Pr		Pr					
	Personal information	Pr				l Pr		Pr	Pr	_	
	Tax information						9	Pr G			
su	Unsecured line of credit including credit cards	Pr		Pr G	9	Pr		Pr G	Pr G	0	
60l Lai	e Overdraft lines				9				Pr G	9	
1 0 11	S Auto loans	Pr		Pr	0	Pr		Pr	Pr	9	
əq	Antgages			Pr	9	Pr		Pr G	9	9	
γT	Secured lines of credit	Pr		Pr G	9	Pr		Pr	Pr G	9	
	Public financial institutions that provide data			Pr G		Pr Pr	9	Pr G	Pr G	0	
λ. (Public financial institutions that do not provide data							Pr			
ot c tzh	Private financial institutions that provide data	Pr		Pr G		Pr	9	Pr G	Pr G	9	
293 Yer	2 Private financial institutions that do not provide data	Pr						Pr			
+!P	Central Bank	Pr		Pr G			9	Pr G	7	ی	
uti dti	Public credit registry	Pr		Pr			9	Pr	9	9	
W:	Government tax collection office	Pr			-11			Pr G	Pr		
5U0	Law enforcement agencies	Pr				Pr		Pr			
ite itu itu	cher federal government officers			9					Pr	9	
tita	State/provincial/municipal governments or agencies					_		Pr	Pr	9	
:nI otn	Credit bureaus and registries	Pr		Pr				0			
ŀ	Other businesses	Pr	_		_			Pr			
	Individuals	Pr		Pr		Pr		Pr	l Pr	_	

CHAPTER

8

Microfinance: From the Village to Wall Street?

It started out small and simple. In villages throughout Latin America and the Caribbean, poor people had to find ways to compensate for the lack of financial services available from commercial banks. Credit constraints in the region traditionally were tighter than elsewhere due to limited creditor protection, stringent restrictions on banking activities, and other regulatory faults. These regulatory problems had a negative impact on microcredit markets, forcing entrepreneurs with small businesses to look for alternative forms of financing. In some cases they created informal groups among friends and neighbors, taking turns as borrowers and lenders. Others relied on the flexible but exorbitant terms offered by local moneylenders. Yet others sought out a local credit union or non-profit organization providing basic financial services.

Given poor people's lack of assets, the organizations providing credit to them had to rely on measures other than collateral to assess creditworthiness and encourage repayment. As a result, loans were typically extended only for entrepreneurial activities, and the lending decision was based on a careful analysis of the person's character and the cash flow of the business. As part of this process, lenders would interview the applicant's family, neighbors and business contacts, and reward good clients with larger loans at lower rates.

Over time, some non-profit institutions became increasingly proficient with this lending methodology and began to grow rapidly. Their growth continued and in many cases accelerated in the 1990s. Today, microfinance institutions providing financial services to lowincome entrepreneurs constitute an established element of Latin American financial markets, serving more than 1.5 million small and mostly poor entrepreneurs throughout the region (see Figure 8.1). If credit unions are added to that total, the number of microenterprises served by these institutions exceeds 3 million.

The success of non-profit grassroots organizations in serving this sector has led to two important developments. First, commercial banks, realizing that there might be a profit to be made in microfinance, are starting to pay serious attention to how they can serve this segment of the market. Second, between grassroots nonprofit organizations and profit-driven commercial banks, there is an emerging breed of professional financial institutions that specializes in microfinance. These are former non-profit organizations that have requested and received a license to operate as regulated and supervised finance companies or banks. These "re-constituted" institutions are in the forefront of showing that doing



Notes: Data for total microenterprises are from 1998 or 1999 (except for Peru, which are for 1997); data for microenterprises with microcredit institutional credit are from 1999. The data do not include credit unions. Source: Westley (forthcoming).

Table 8.1	Types of Micro	ofinance Institutions	·		
		Multipurpose financial institutions	Specialized financial institutions	Specialized nongovernmental organizations	General nongovernmental organizations
Strategy microfin	/Purpose of ance activities	New market, image, philanthropy	Social impact, growth, profitablity	Social impact, sustainability, growth	Social impact, sustainability
Legal fo	rm	Banks, finance companies and cooperatives	Banks and finance companies	Foundations, associa- tions	Foundations, associa- tions
Clients		Various; small and microentreprises are small share of portfolio	Small business and microenterprises	Microenterprises	Microenterprises
Services		Various and targeted to the specific market segment; individual credit; savings	Individual credit, group loans; limited offerings of leasing, factoring, etc.; savings	Individual credit, solidarity loans, village banking	Individual credit, solidarity loans, village banking
Sources	of funding	Savings, shares, bonds, commercial loans	Commercial loans, shares, savings	Commercial and soft loans, guarantees, donations	Donations, soft loans, guarantees
Example	S	Banco Solidario (Ecuador); Financiera Familiar (Paraguay); Coop. Fucac (Uruguay); MultiCredit Bank (Panama)	Financiera Calpia (El Salvador); BancoSol (Bolivia); Caja los Andes (Bolivia); FinSol (Honduras); FinAmerica (Colombia); Edyficar (Peru); Banco Ademi (Dom. Republic)	WWB (Colombia); FED (Ecuador); Acodep (Nicaragua); ADRI (Costa Rica)	Fundasol (Uruguay); Fundación Carvajal (Colombia); Fundación Cesap (Venezuela)

Source: Adapted from Lucano and Taborga (1998).

good and doing well are not necessarily mutually exclusive. There are about 35 such institutions in Latin America today.

Although many Latin American microentrepreneurs are still without access to financial services, the group as a whole is served by an increasing number of different institutions, ranging from very small non-profit organizations to very large and diversified commercial banks. The institutions differ in many ways, including their legal form, strategy, clients, services, and sources of funding, but they all contribute to serving the region's microentrepreneurs with much needed financial services (see Table 8.1).

How Does the Microfinance Industry Measure Up?

From a regional perspective, Latin America is clearly leading the way in transforming microfinance from a subsistence activity to a profitable business. In no other region of the world are there as many financially sustainable microfinance institutions (see Figure 8.2). For a long time, the conventional wisdom held that microfinance could not possibly be a sustainable, much less profitable, business. However, microfinance institutions in Latin America are in the process of proving that notion wrong.¹ In Bolivia, which has the most developed microfinance market in Latin America, the most profitable financial institutions during 1999 and 2000 were not traditional commercial banks, but transformed microfinance institutions. Other countries are following suit, proving that poverty alleviation can be combined with good business practices. Peru, Colombia, El Salva-

¹ See Morduch (2000).



Source: The MicroBanking Bulletin, September 2000. Data are based on a sample of 114 microfinance institutions worldwide.

dor and the Dominican Republic are all examples of countries with very strong and successful microfinance institutions. Some have become licensed and supervised, while others have remained under non-profit status (see Table 8.2).

As the microfinance industry has matured, donors and investors have become more concerned with measuring the financial performance of these institutions. Donors want to make sure their assistance is creating sustainable institutions, while investors want to see if the institutions offer real investment opportunities. As a result of this demand for objective and reliable information, a limited number of firms have sprung up to provide specialized assessment services of microfinance institutions. The most prominent are MicroRate, which focuses on Latin America; PlaNet Finance, which focuses on Africa; and M-CRIL, which focuses on Asia.² These firms also play an important role in gathering and processing information on the industry as a whole.

A review of 22 Latin American microfinance institutions finds a number of trends.³ First, in terms of return on assets, this group of microfinance institutions compares very well to commercial banks. Over the past three years, their collective return on assets was 4 to 6 percent, well above the typical return achieved by commercial banks in Latin America. Even in 1999, a year characterized by economic and financial troubles in the region, the return on assets remained above 4 percent.

	BancoSol, Bolivia	WWB Popayan, Colombia	Financiera Calpia, El Salvador	CMAC Tacna, Peru	
Institutional form	Bank	Nonprofit organization	Finance company	Special financial institution owned by municipalities	
Assets (millions)	\$91.8	\$7.4	\$33.6	\$15.4	
Active clients	60,976	22,663	35,910	12,978 ¹	
Average loan balance	\$1,274	\$281	\$822	\$1,187	
Return on assets (%)	1	21	3	6	
Return on equity (%)	4	28	13	38	
Portfolio yield (%)	28	51	31	43	
Debt/equity	5.3	0.36	3.53	5.6	
Operating expenses/assets (%)	12.5	11.9	13.6	9.3	
Loans over one day past due (%)	12	1	6	6	

Table 8.2 Financial Performance of Selected Microfinance Institutions, December 2000

¹ Number of loans outstanding. Source: MicroRate.

² MicroRate and M-CRIL are private for-profit concerns, while PlaNet Finance is a non-profit organization.

³ The institutions are Caja los Andes, BancoSol, and Fie (Bolivia); Finamerica, WWB Bogota, WWB Bucaramanga, WWB Cali, WWC Medellin, and WWB Popayan (Colombia); Adopem (Dominican Republic); Financiera Calpia (El Salvador); Finde (Nicaragua); Financiera Vision (Paraguay); and CMAC Arequipa, CMAC Ica, CMAC Sullana, CMAC Tacna, CMAC Trujillo, Crear Arequipa, Crear Tacna, and Edyficar Proempresa (Peru). These institutions were selected not because they are considered a representative sample, but rather because information on them was available.



Second, the efficiency of the 22 institutions has steadily improved over 1998-2000, continuing a longstanding trend. However, their operating costs as a percentage of assets was still about 60 percent higher than that of the region's commercial banks, which reflects the high costs of the microfinance credit methodology (small amounts, visits to clients, etc.). Therefore, the high returns on assets achieved by these institutions are primarily a result of relatively high portfolio yields (an average of 41 percent in nominal terms in 2000).

Third, the institutions are growing very rapidly, registering growth rates above 20 percent (unweighted) in all of the three most recent years. After a slowdown in 1999, the growth rate picked up again in 2000, exceeding the rate achieved in 1998. Undoubtedly, this rapid growth is another factor in explaining the high levels of profitability among microfinance institutions.

The sampling of institutions also permits a cursory analysis of some interesting correlations.⁴ To begin with, it appears that larger microfinance institutions are more efficient than smaller ones. Given the well-established presence of economies of scale in financial services, the correlation shown in Figure 8.3 is not surprising. What may be more surprising is that, while less efficient, the smaller institutions are generally more profitable than the larger ones. Figure 8.4 shows that what small institutions lack in efficiency, they make up for in higher interest rates. Smaller institutions also seem to be marginally better at controlling loan delinquency, at least among the 22 institutions in the sample. However, when the at-risk portfolio is directly compared to efficiency, there appears to be no correlation. In other words, microfinance institutions that spend more on operating expenses relative to the size of their loan portfolio are not more successful in controlling loan delinquency.⁵

The rapid growth and financial success of the microfinance industry has in recent years brought another issue to the forefront for many institutions: securing additional funding sources to finance continued expansion of their lending. One major potential source of funding is the savings of their own clients and the public in general. However, as long as microfinance institutions are constituted as non-profit organizations, they are not permitted to capture savings. This has in recent years led to several large non-profit institutions requesting permission to re-constitute themselves as licensed banks or finance companies. This has prompted supervisory authorities in some countries to examine how they can accommodate microfinance within the existing regulatory and supervisory framework.

⁴ Correlations should be interpreted with caution, as they do not demonstrate a causal relationship between variables.

⁵ Operating expenses include personnel expenses, depreciation, board fees and other non-financial expenses.

Category	Conventional credit	Microcredit		
Ownership and governance	Profit maximizing institutional and individual shareholders	Downscaling bank or upgraded NGO; in the latter case, shareholders are mainly non-profit institutional shareholders		
Client characteristics	Diverse formal businesses and salaried individuals Geographically dispersed clients	Low-income entrepreneurs with rudimentary family businesses and limited formal documentation Located in specific geographic area		
Product characteristics	Larger amount Longer term Lower interest rate	Smaller amount Shorter term Higher interest rate		
Lending methodology Collateral and formal documentation Monthly repayment		Debtor and cash flow analysis through on-site inspections Weekly or bi-weekly repayment		

Table 8.3	Distinctive	Features	of	Microfinance

Sources: Adapted from Jansson and Wenner (1998) and Rock and Otero (1996).

Getting the Policy Framework Right

When Bolivian supervisory authorities granted a bank license to a small but dynamic microfinance non-profit organization in 1992, they started a process that would transform the Latin American microfinance industry. The non-profit organization was Prodem, and it reconstituted itself as a commercial bank, taking the name BancoSol. For the next five years, supervisory authorities struggled to adapt the regulatory framework and supervisory practices to effectively monitor and address the particular challenges arising from the unique activities of this new and unusual institution. In 1995, as a result of this experience with BancoSol, the Bolivian authorities took a yet another significant regulatory and supervisory step by creating a new form of financial institution: the Private Financial Fund (PFF). In several important ways, the PFF was designed to accommodate non-profit institutions prepared to offer microfinance services in a regulated and supervised setting.

Meanwhile, in Peru, a new institutional structure for microfinance was created: Entities for the Development of Small Business and Microenterprise (EDPYME).

These developments started an important trend in Latin America: the reform of financial laws, regulations and norms to accommodate microfinance. Since then, other countries have followed suit with modifications of their own, including the Dominican Republic, El Salvador, Brazil and, most recently, Mexico. The reason behind these reforms, quite simply, is the increasing number of sufficiently large non-profit organizations that want to capture deposits from the public to further grow their lending activities.

But does microfinance require special prudential regulations to thrive? Do existing frameworks really need to be modified? If so, what changes are needed? The answers to these questions are found in the distinctive features of microfinance that make it different from conventional banking.

Distinctive Features of Microfinance

As seen in Table 8.3, microfinance requires special attention because its unique characteristics give rise to a particular risk profile:

• First, the ownership structure of specialized microfinance institutions is distinct from that of conventional financial institutions (commercial banks and finance companies). The latter have individual and profitminded institutional shareholders with deep pockets who can offer additional capital in a time of crisis, and who constantly push the institutions to perform optimally. In contrast, a specialized microfinance institution is usually majority-owned by the NGO from which it was formed. Typically, this NGO cannot easily be counted on for significant financial support at a time of crisis, and it might not prioritize efficiently or sustainably, since it is based more on a social purpose than on the profit motive.

• Second, the clients of specialized microfinance

institutions are distinct from those of conventional financial institutions. Typically, they are low-income entrepreneurs with rudimentary family businesses and limited formal documentation. As such, they are usually regarded as high-risk borrowers.

• Third, the credit products of specialized microfinance institutions are distinct from those of conventional financial institutions. Loans are typically smaller, shorter term, and carry a higher interest rate. As a result, the loan portfolio of microfinance institutions has a unique risk profile: it is more atomized, which decreases risk, but has a higher turnover, which increases risk. It also tends to be more geographically concentrated.

• Fourth, the microfinance lending methodology is distinct from that of conventional financial institutions.⁶ Character and cash flow analysis plays a greater role, while the use of collateral and formal documentation play a lesser one. Repayments are in many cases carried out through weekly or biweekly installments rather than monthly. This methodology is appropriate for the clients of microfinance institutions, but it also results in high administrative costs. As was pointed out earlier, operating costs (relative to assets) of specialized microfinance institutions are at least 60 percent higher than for those of commercial banks.

For all the reasons mentioned, microfinance institutions have a unique risk profile, and supervisory authorities may therefore view them with considerable caution. From their point of view, microfinance institutions have high administrative costs covered by high interest rates generated from a portfolio containing a large number of short-term, uncollateralized, and geographically concentrated loans. This is not an encouraging profile from the perspective of a bank supervisor. Not only can loan delinquency rapidly get out of control if management is lax in monitoring the portfolio, but since administrative costs are so high and loans are not backed by collateral, a non-performing portfolio will have an immediate and drastic impact on the institution's bottom line. Given all these considerations, some requlatory and supervisory practices have to be adjusted to effectively control risk and protect depositors in microfinance institutions.

It is important to underscore that the purpose of modifying regulations for microfinance is not simply to exempt this activity from critical review by supervisory authorities. In some cases, standards should be made stricter to counter the particular risk profile of microfinance. In essence, the modifications are intended to eliminate requirements that raise the cost of microfinance without offering better control of risk, and to introduce new measures and standards that will enable better control of risk without raising costs. With its already-high cost to deliver credit, the microfinance industry can ill afford regulation that unjustifiably raises even further the cost of financial services to low-income entrepreneurs.

Establishing a Regulatory Framework

Step 1: Define What Is to Be Regulated

The first step in creating an appropriate regulatory framework for microfinance is to define the objects of new or modified microfinance regulation. In other words, exactly *what* are supervisory authorities supposed to regulate? In essence, there are two possible areas of regulation: the activity and the institution. To adequately address the distinctive risk profile of microfinance, regulation has to cover both.

Regulations relating to documentation guidelines, guarantee requirements and loan loss provisions are all based on the type of activity performed by the institution (for example, consumer, commercial or mortgage lending). Unfortunately, microenterprise loans do not fit neatly into any of these categories, so before any regulations of microcredit can be proposed, the activity needs to be defined.

In many countries the task of adopting a single definition of microcredit is complicated by the fact that the government, through its various agencies and ministries, simultaneously recognizes several different definitions of microcredit and microenterprises. To the extent that supervisory authorities have approached the issue, they have typically taken one of two approaches: either defining the loan (as in Bolivia, where business loans below \$20,000 are considered microcredits for most purposes), or the client (as in Peru, where loans for productive purposes to clients with less than \$20,000 in assets are considered microcredits). The first approach

⁶ Morduch (2000) surveys some of the types of microfinance lending contracts, especially for group lending.

has the advantage of simplicity, clarity and enforceability, but it may inadvertently include some loans that are not really for microenterprises. The second approach has the advantage of clearly defining the target group, but it may be difficult for supervisory authorities to verify that loans classified as microcredits actually went to microentrepreneurs.

But defining the activity of microcredit is not enough. Much of financial regulation is based on the *institution* as such. For example, while commercial banks are allowed to offer a virtually unlimited range of services and products to the public, finance companies are restricted in several important ways (e.g., no checking accounts, and in most Latin American countries, no savings accounts). Also, different institutional forms often have different minimum capital requirements and capital adequacy standards. A comprehensive regulatory framework for microfinance has to provide a way for microfinance services to be offered in a reasonably efficient and sustainable manner.

At present, Latin American NGOs that want to convert into regulated entities often face an unattractive choice: they can seek a license either as a commercial bank—which involves daunting entry standards such as initial capital requirements that have increased about 45 percent in the region since 1997—or as a finance company, which in many countries cannot capture savings from the public.

Step 2: Build Regulations Around the Key Areas

Once a definition of microcredit is adopted, supervisory authorities can make some of the following regulatory modifications to accommodate microfinance responsibly:

• If there are interest rate restrictions in the country, microcredit can be exempted. Given the high cost of the microcredit methodology, microfinance institutions are particularly vulnerable to such restrictions. In addition, interest rate caps will cause commercial banks to restrict lending to low-income clients, since the amounts are small (which makes it costly relative to the amount lent) and the borrowers are typically considered "high risk."

• Loan documentation requirements can be made more flexible for microenterprise loans to account for the semi-formal nature of most clients. Minimum requirements in this area should be limited to information required to establish repayment capacity within the context of the lending methodology.

• Guarantee requirements can be made more flexible for microenterprise loans to account for clients' lack of valuable collateral. Given the small size of the loans, the cost of recovering collateral would often exceed its value.

• Loan loss provision schedules can be simplified and tightened up. Given that microenterprise portfolios typically contain several thousand loans, the process of establishing provision must be simple. At the same time, since microenterprise loans are typically not backed by collateral, the provisioning schedules need to be relatively strict.

Some countries, including Bolivia, Peru and Costa Rica, have indeed implemented special rules for loans below a certain size. In Bolivia, there are special guidelines for evaluating loan applicants who intend to borrow \$20,000 or less. Financial institutions may use the salary of wage earners as the sole indicator to determine repayment capacity. In cases where a fixed salary is not the principal source of income, the financial institution has to consider the assets, debts, and cash flow of the applicant's "socioeconomic unit" (i.e., business and/or household). However, when loan terms do not vary from those of previous loans and the borrower has a good repayment record, the financial institution is permitted to forego a new evaluation of the borrower's payment capacity.

Such modifications allow both microfinance institutions and traditional commercial banks to apply the appropriate credit methodology and lower operational costs while still enabling supervisory authorities to monitor the risk of these institutions' activities.

Moreover, supervisory authorities in Bolivia, Brazil, El Salvador and Peru have addressed the institutional side of microfinance regulation by establishing new types of institutions entirely or partly for the purpose of microfinance (see Table 8.4). This allows microfinance NGOs to re-constitute themselves as licensed financial entities with relative ease. However, such a step does not automatically entail permission to mobilize deposits. Most superintendencies prefer that new institutions take a slow approach to deposit mobilization, since this step implies a need for more sophisticated management of liquidity and other functions. In Peru, for example, it only takes \$245,000 in capital to constitute an EDPYME, but the institution needs \$1 million in capital and a

	Bolivia	Peru	El Salvador	Brazil
Name	Private Financial Fund (PFF)	EDPYME	Savings and Credit Company	Microenterprise Credit Company
Year created	1995	1995	2000	1999
Minimum capital	\$828,000	\$245,000	\$2.86 million	\$60,000
Number of institutions	б	9	0	5 + 3 pending
Capital adequacy (%)	10	9.09	12 (same as banks)	5 x liquid assets
Checking	No	No	No	No
Savings deposits	Yes	Yes, if \$1 million in capital + rating	Yes	No
Maximum loan size (% of capital or US\$)	3% secured (\$30,000) 1% unsecured (\$10,000)	5% (\$12,225)	2.5% indiv. (\$71,500) 10% inst. (\$286,000)	\$6,000
Restricted operations	Trusts, foreign trade, equities, mutual funds underwriting	Depends on capital and maturity	Foreign investments, majority stakes in other companies	Restricted to lending to microenterprises
Supervision	Bank Superintendency	Bank Superintendency	Bank Superintendency	Central Bank
Complementary regulations	Simplified loan analysis and provision reqs.	Simplified loan analysis and provision reqs.	na	Simplified requirements and flexible collateral

Table 8.4	Institutional F	orms of	Microfinance

Source: Interviews with officials from Central Banks and Bank Superintendencies.

favorable risk rating to qualify to receive savings. Even then, the permission to take deposits remains at the discretion of the superintendency, and no EDPYME has so far been cleared for this activity.

In the case of Bolivia, which arguably has the most advanced regulatory framework for microfinance in the region, the government created an institutional form (the PFF) that is broad enough to allow such entities to undertake microfinance as well as operations typically performed by traditional finance companies. PFFs are able to accept savings deposits (subject to a special review and clearance by supervisory authorities), offer a number of other financial services, and use chattel such as jewelry as collateral for loans. The PFF's relatively broad range of permitted operations, coupled with a reasonable minimum capital requirement of \$828,000,⁷ eliminates the need to create a new, separate entity specifically for microfinance. Of the seven PFFs in Bolivia, five specialize in microfinance. This arrangement prevents a proliferation of institutional forms, which has occurred in Peru, and greatly facilitates the work of supervisory authorities.

Step 3: Establish Supervision

Finally, although the regulatory framework is important, it is only half the story. The other half is about supervision. Just because the supervisory authorities may have been able to design an appropriate regulatory framework does not necessarily mean that they have the ca-

 $^{^7}$ The minimum capital requirement is stated as SDR 630,000 (Special Drawing Rights), which currently equals US\$828,000.

pacity to effectively supervise the entities involved in microfinance. The distinctive features of microfinance call for adjustments in supervisory practices. In fact, the issue of microfinance supervision spans a range of challenges, from budgetary considerations to the organizational structure of the superintendency and special training for individual analysts and inspectors.

The Road Ahead

The next challenge for microfinance is to integrate into mainstream financial markets. The Latin American microfinance industry is in the midst of a profound transition. While having started as non-profit organizations to help the poor, these institutions are increasingly incorporating other objectives, such as growth, efficiency and profit. The institutions understand that these latter objectives ultimately allow for a greater outreach to a larger number of clients. Not surprisingly, it has proven a challenge to pursue all these goals simultaneously; yet, a significant number of institutions have been remarkably successful in achieving high levels of efficiency, profit and growth without straying from their original target clientele. But success has also brought a new set of challenges.

By recent estimates, the Latin American microfinance industry has a combined portfolio of approximately \$1.4 billion. It has taken about 20 years to arrive at this stage, starting with a limited number of small and fragile non-profit organizations scattered across the region. If the industry continues its current growth of about 25 percent per year, it will need this same amount—\$1.4 billion—to finance its growth only over the *next three to four years*. While not much in relation to the enormous sums circulating in international and domestic financial markets, this amount nevertheless constitutes an unprecedented flow of funds to the sector, and especially to the microenterprises whose survival and competitiveness may hinge on it.

But who will supply these funds? Basically, microfinance institutions will have four options to attract the funds they need for future growth: donors, public savings, and local and international creditors and investors. Each faces major challenges:

• Donors have historically been very important suppliers of grants and loans to the industry, but their relative importance is declining. While institutions in several microfinance markets still receive considerable loan and grant funding from donors, these resources are not keeping up with the overall growth of the market. In addition, these funds often come with strings attached that can have a significant cost of their own to a microfinance institutions.

• Savings from the public constitute an enormous potential source of funding for microfinance institutions. Savings are not only abundant, but also inexpensive in comparison to what it costs to borrow from local banks. However, in order to take savings, microfinance institutions need to constitute themselves as licensed and regulated banks or finance companies (or other types of institutions, if possible). As mentioned earlier, the problems and challenges associated with this process are more than trivial.

• Local and international creditors (banks) and investors provide most of the new financing for microfinance institutions that are not allowed to take deposits, but the relationship between microfinance institutions and creditors and investors is far from seamless. Even though local creditors and investors operate in the same market as the microfinance institutions, it is often a challenge to convince them to commit resources to the sector. Local creditors and investors do not always understand the business model and often feel there is not sufficient transparency to make informed decisions. In addition, the relatively modest sums requested by microfinance institutions give rise to relatively high transaction costs, which make the deals less attractive. Until recently, international creditors and investors were nowhere to be found as far as microfinance was concerned. During the past five years, however, the situation has changed. While purely commercial investors and creditors are still few and far between, an increasing number of international social investors are appearing on the scene. Still, these investors confront the same problems as do local actors, but even to a greater extent, since they do not have a presence in the local market.

So, while it is clear that the microfinance industry will need a significant amount of financing over the coming years, it is less clear exactly from where these funds will come. Indeed, to enable a greater flow of resources from private creditors and investors, particularly from purely commercial ones, several obstacles that stand between them and microfinance institutions including issues of transparency, transaction costs and liquidity—must be addressed. The gradual integration of microfinance into the formal financial sector promises to expand access to commercial sources of financing and capital. Yet, it also creates a new set of demands on the industry. In order to attract these new sources of capital and financing, microfinance institutions must impress potential creditors and investors with a high level of transparency and an attractive risk/return profile.

Lack of transparency has at least two dimensions: quality and availability. The quality of the information regarding the risk and financial performance of microfinance institutions has so far been impaired by a lack of recognized accounting standards, risk assessments, and commonly accepted minimum disclosure standards. This problem is compounded by a lack of useful, reliable and timely information about the risk and financial performance of most microfinance institutions, many of which issue financial reports only once a year, far too infrequent to allow investors to stay abreast of their investments.

Even with improved transparency, it is not a given that the microfinance industry will receive an increased flow of funds. Current creditors and investors face very significant transaction costs when they provide funds to microfinance institutions. The small amounts transacted (typically \$100,000 to \$1 million) give rise to high costs in relation to the amount provided. And the absolute costs are high as well.

It typically takes two months to a year to fund a microfinance institution, from the initial contact to the final disbursement of the loan or equity. In addition, for a \$250,000 loan, the transaction cost between a financial investor and a microfinance institution generally ranges between \$10,000 and \$20,000 (5 percent and 10 percent) with a great variance from one investor to another. Triodos Bank, a Belgian commercial bank and social investor, estimates that it pays about \$5,000 in legal expenses alone for each debt transaction. For an equity investment, the total transaction cost can easily amount to \$50,000. For both debt and equity,

the transaction costs are mainly concentrated in due diligence, legal expenses, and custodial arrangements.

These costs are very high by investment standards in conventional securities, but close to standard in the private equity and venture capital side. The high transaction costs have the effect of distorting the actual pricing of loans to microfinance institutions. If a spread of 6 percent is charged on a one-year loan, it only leaves a gross of some 3 percent over six-month Libor rates to take care of the management (usually \geq 1.5 percent) and monitoring phase (0.5 percent), with little available to the investor when specific country and currency risks are combined. In short, in today's world, asset managers earn more money lending to microfinance institutions than investors themselves.

Finally, liquidity is a crucial consideration to investors in debt or equities because it allows them to instantly convert their positions into cash. Risk is therefore significantly reduced. At present, investors in microfinance debt or equities are severely limited in their ability to liquidate their positions. There is no secondary market trading of these instruments and every trade has to be individually negotiated between buyers and sellers, which is costly and time consuming.

The challenges of insufficient transparency, high transaction costs and lack of liquidity will have to be overcome before the microfinance industry can count on having access to large and steady flows of resources to finance its rapid growth. This is particularly true for purely commercial funds, where creditors and investors need to see a competitive risk/return profile before committing their money.

Admittedly, it would be an exaggeration to claim that the microfinance industry is knocking on doors on Wall Street at this point. However, the industry is definitely on a path leading in that general direction. It may still take many years before the liability/equity side of microfinance institutions is fully integrated in local and international financial markets. But there should be no doubt that it is just a question of when, not if.

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Summary

Workers bring their talents, skills, motivational levels, perceptions and fears to the workplace. Yet, most of the literature focuses narrowly on labor costs as the only aspect of labor that affects competitiveness. In fact, labor costs alone are not an important factor in determining cost-competitiveness—that is, the ability to produce at a cost below that of competitors. Nor do they contribute to competitiveness when it is used to mean productivity and economic growth. Rather, competitiveness reflects labor productivity, which in turn depends greatly on the range of human factors that affect how people work.

Why, then, is there such an emphasis on competitiveness based on labor costs? This view is based on the notion that Latin America, as a region, has a comparative advantage in producing goods and services with unskilled labor. Thus, to preserve cheap labor as the region's main source of wealth, wages and non-wage labor costs must be kept down.

This view has several conceptual errors. First, Latin America does *not* have a comparative advantage in unskilled labor. Indeed, a worldwide comparison finds that Latin America has an abundance of workers with primary education, and cannot compare with regions filled with truly unskilled labor—workers with no schooling at all. Nor, however, is Latin America at the level of countries that have made significant progress in schooling, such as the East Asian Tigers, where there is an abundance of workers with secondary or higher education. Therefore, the region lies somewhere in between, with a comparative advantage in workers who may be low skilled, but whose skill levels are nevertheless above those of workers in the poorest regions of the world.

The second conceptual mistake is that cost-competitiveness implies sustaining low wages. The ability to sell to other countries in the world depends on productivity-adjusted labor costs, rather than on the labor costs themselves. This implies that as long as labor costs move together with productivity levels, there is not a real trade-off between achieving a high level of costcompetitiveness and increasing workers' welfare.

This does not suggest that productivity-adjusted labor costs are unimportant in determining the price of goods and services produced in the region. Escalations in labor costs above productivity due to statutory changes in minimum wages or the introduction of mandatory benefits, to cite just two examples, will result in higher unemployment rates and lower exports. In this area, there are some reasons for concern. In some Latin American countries, mandatory minimum wages are higher than productivity levels, and mandatory social security and job security benefits are not valued by workers at their cost, and therefore may be a source of unemployment and of low cost-competitiveness.

The real stumbling block in Latin America's quest for competitiveness, however, is the low productivity of its labor force. In a study of 47 countries including most developed countries, six Latin American countries and a sampling of countries in Asia and Africa, Argentina was ranked 29th in productivity per worker, Mexico 34th, Chile 36th, Brazil 38th, Colombia 40th, and Venezuela 42nd.¹ The reasons behind these low productivity levels include slow progress in education, the failure of training systems, poor labor relations, and the absence of compensation mechanisms for workers who stand to lose their jobs or job standing due to innovations.

¹ See International Institute for Management Development (2000).

There are various ways that public policy can foster productivity growth. Foremost is to bring education to the top of the agenda. This can be achieved through a mix of policies that reward poor families that keep their children in school and that improve the quality of education by distributing funds according to school performance. Better education will also foster more on-thejob training, but this will not be enough to raise the standards of a poorly educated workforce. Educating these workers requires making schooling available outside work schedules and giving subsidies to people who complete certain educational levels. The quality of training can also be improved through certification programs for providers and by giving subsidies to firms that train their workers. Finally, public policy can improve labor relations by facilitating dialogue between labor and management, promoting training for managers and employees, and advancing compensation mechanisms for workers who need them.

9

Labor Costs and Competitiveness

International trade theory posits that a country will have a comparative advantage if it produces goods and services that intensively use the factor of which the country has a relative abundance. Possessing more of a given factor implies that its price will be low relative to other more scarce inputs. Goods produced with relatively cheaper inputs command lower prices and therefore are more competitive than these same goods produced somewhere else. This theory has been applied to Latin America to establish that the region has an advantage producing goods that are intensive in the use of labor, since it is assumed this is its most abundant factor. If the region's competitiveness depends on cheap labor, the argument goes, it follows that policies that improve the welfare of workers necessarily imply higher labor costs and lower price competitiveness.

This chapter reviews these claims by assessing, first, whether Latin America has a comparative advantage producing goods with unskilled labor. Secondly, it examines the importance of labor costs to successful exports. Finally, it looks at whether the various policies and mechanisms introduced to improve the welfare of workers in fact diminish the region's ability to be competitive.

The chapter shows that Latin America's comparative advantage does not lie in producing goods using uneducated workers, as is the case of Asia (excluding East Asia). Nor does it lie in producing goods with semiskilled or skilled labor, as in East Asia and the OECD countries. Instead, Latin America lies somewhere in between, with an abundance of workers with primary education, and, therefore, with an advantage in producing goods that require that level of skill.

However, the evidence for developed and developing countries alike suggests that export success depends on productivity-adjusted labor costs rather than on labor costs themselves. This implies that if a country's productivity is low, its cheap labor is irrelevant. As long as labor costs move together with productivity levels, there is no real trade-off between achieving a high level of cost-competitiveness and increasing workers' welfare.

Mandatory provisions such as social insurance benefits funded with labor contributions, job security provisions and minimum wages will decrease cost-competitiveness only if they are de-linked from productivity, or if the benefits afforded by those contributions are not valued by workers at their true costs. The evidence suggests that the quality of these benefits in Latin America is low in relation to their price, and that they therefore reduce competitiveness in the region. The policy implication is not to dismantle those benefits, but to make them cost effective and valuable from the point of view of both employers and employees.

Does Latin America Have a Comparative Advantage in Unskilled Labor?

When the trend toward trade liberalization started in the mid-1980s, Latin America was considered a region abundant in unskilled labor. Standard trade theory predicted that given its comparative advantage, Latin America would experience a surge in demand for unskilled labor, which in turn would boost the wages of workers with lower schooling levels, who are normally the poorest. But this prediction has not materialized to date. Even though most countries in the region resumed positive growth after the "lost decade" of the 1980s,





World average Latin America 🔲 East Asia Rest of Asia Source: Barro and Lee (2000). of workers with primary schooling. The bulk of the working-age population in Latin America actually has achieved only some primary education. This is not the case in Asia, where primary schooling still seems to be a "luxury good" for most. And it is not the case in East Asia, either, where there has been considerable progress in schooling. The share of the population that has either no schooling or only primary education in this region is very low. In Latin America, unlike all other regions, the share of workers with primary education has remained virtually constant over the last two decades.

Latin America falls far behind East Asia, the rest of Asia, and the world average with respect to its endowment of secondary school workers. While in the rest of

5

1975

1985

Secondary education

1995

1975

1985

Higher education

1995

the evidence is that this was achieved in the context of lower than expected poverty reduction.¹ Moreover, the wage gap between skilled and unskilled workers has widened considerably. While the wages of workers with higher education have been rising continuously, the wages of the unskilled have basically stagnated.²

What has gone wrong? What if, for instance, the region is not really that abundant in unskilled labor? The evidence suggests that Latin America in fact has no advantage in producing unskilled labor-intensive goods at low cost. It seems that the region is at a point between two worlds. On the one hand, it is not the region of the world most abundant in unskilled labor. On the other, schooling progress has been so slow in the past few decades that the region has not made the big push seen in other areas (such as East Asia) needed to achieve comparative advantages in middle-skilled labor.³

This interpretation is supported by Figures 9.1 and 9.2, which plot endowments of labor available for production (that is, the population over 25 years of age) by levels of education.⁴ Latin America has a much larger share of the working-age population with no schooling than the East Asian economies or the world average, but has a considerably lower share than the rest of Asia, the most populous region in the world. Furthermore, the share of uneducated workers in the labor force has declined at a faster pace than in any other region.

Where Latin America stands out is in the abundance

¹ See Székely and Hilgert (2000).

² See Behrman, Birdsall and Székely (2000) and IDB (1998-99).

 $^{^{3}}$ Hong Kong, Korea, Singapore and Taiwan are included in the group of East Asian "tigers."

⁴ Figures 9.1 and 9.2 plot the factor endowments of the world and for selected regions, computed through the following methodology. First, the share of adults with no primary, secondary and higher education from the updated Barro-Lee database is used to measure the human capital endowment of each country. Second, to obtain regional or world averages, each country's share in world (or regional) trade is computed, and this share is multiplied by the factor endowment to obtain a trade-weighted average. The weights are used because the factor endowment of a country only competes in the world market if the country actually trades. Therefore, endowments of countries totally closed to international trade have no weight in the average, while those of countries that do trade are weighted by the importance of this country in international markets.

Asia about 33 percent of the working-age population have achieved secondary schooling, only 20 percent have done so in Latin America. The region is evidently not well endowed with workers with higher education, although their share has been rising steadily.

The result of Latin America's labor situation is that it cannot compete with countries where unskilled labor is abundant and cheap. Yet, nor can it compete with countries that have made enough schooling progress so as to have an abundant middle-skilled labor work force. If the comparative advantage of the region is an abundant, primary school-educated labor force, does this still mean that preserving cost-competitiveness requires low wages and few benefits? The answer, fortunately, is no.

Do Low Labor Costs Ensure Export Success?

One of the many ways that competitiveness has been measured has been by assessing a country's success in exporting certain types of goods and services. Two recent studies have measured the sensitivity of countries' export performance to changes in labor costs.⁵ To avoid the problem that higher wages are just a measure of higher labor productivity-and therefore not of higher labor costs-both studies distinguished between the raw cost of labor (that is, wages and other non-wage components of labor costs), and productivity-adjusted wage measures. These measures adjust labor costs for the fact that some workers are more productive than others, either because they have more and better capital to produce with, because they make more of an effort, or because the technology used by some plants is more efficient than others. They also correct for changes in productivity over time. The most widely used productivity-adjusted measure is the unit labor cost. This measure divides nominal wages, measured in dollars, by the average productivity of a worker. It can therefore be interpreted as the dollar cost of producing one unit of a product. Increases in productivity and exchange rate depreciation lower unit costs, while nominal wage increases and exchange rate appreciation increase them.

The studies find that within OECD countries, a 10 percent increase in unit labor costs in one particular country—vis-à-vis the average regional labor cost—leads to a 2.8 percentage point decline in the export

share of that country. Quite surprisingly, these results are very similar to those of a study of five large Latin American countries, where a 10 percent increase in the relative unit labor costs of one country was associated with a 2.5 percent decline in export market share. To assess the magnitude of this effect, however, it is necessary to consider the size of the average market share of the industrial or Latin American countries considered in the studies. On average, the market share of an industrial country (as a percentage of the total exports of 14 industrial countries) is around 7 percent. This implies that a 10 percent decline in unit labor cost would add 0.175 percentage points to an industrial country market share. In Latin America, the average market share is 14.2 percent, and a 10 percent decline in unit labor cost would increase this share to 14.6 percent. Although these are not large effects, they can have a substantial impact in periods of rising productivity-adjusted labor costs. Furthermore, there is evidence that this effect is larger in the industrial subsectors that employ the most workers in Latin America. The Latin American study groups each industrial subsector into different categories according to factor use, technological sophistication and average level of wages in that industry.⁶ Within the factor categories, the measured effects are larger in the sectors that use labor as their main factor of production (labor-intensive sectors). In these, a 10 percent increase in unit labor costs reduces export market shares by about 7 percent, an effect three times larger than the overall effect. In contrast, in the natural resource-intensive sectors, the effect of a 10 percent increase in unit labor costs on export market shares is about zero, implying that for these sectors, other factors such as the price of commodities or transportation costs might be more related to export success than unit labor costs.

There are also striking differences within sectors with regards to technological sophistication or wage levels. The effect of an increase in unit labor cost is much larger in low-technology industries, which presumably depend more on low-skilled labor. Indeed, while in low-tech industries a 10 percent increase in unit la-

⁵ See Carlin, Glyn and Reenen (2001) for the OECD countries and Pagés and Ruíz-Núñez (2001) for Latin America.

 $^{^{6}}$ See Appendix 9.1 for a complete listing of the industrial sectors included in each classification.





Notes: Average for Argentina, Chile, Colombia, Mexico and Peru. Excludes tobacco and oil sectors. Source: Manufacturing surveys, PADI (ECLAC) and IDB calculations.

Source: Manufacturing surveys, PADI (ECLAC) and IDB calculations.

bor costs reduces export market shares by 2.6 percent, the average effect for high-tech industries is zero. In addition, the response of the export market share to labor costs is large and negative in the low-wage sectors and zero in the high wage sectors.

These results are very intuitive. Sectors that rely on labor are more sensitive to swings in labor costs, while sectors that intensively use other factors of production are less sensitive. But which factors do Latin American industries use the most? The average for 1980-96 for five countries for which disaggregated data at the sector level are available is that more than 50 percent of the manufacturing labor force is employed in labor-intensive sectors and 27 percent in natural resources-intensive sectors. 7 By wage level classifications, about 56 percent of the workers are in low-wage sectors, 32 percent medium wage, and 12 percent high wage. The split according to technological sophistication is similar. More than 70 percent of workers are employed in low-tech industries and only about 5 percent in hightech ones. Therefore, most workers are employed in sectors very sensitive to labor costs-a situation that did not change much during the late 1980s and the 1990s. If anything, there was a slight increase in labor-intensive and low-wage activities and a slight decline of highwage sectors.⁸ However, the 15-year average of the distribution of exports by sector for the same group of countries shows a somewhat different picture. Some 26

percent of manufacturing exports originate from sectors that are resource-intensive, and 29 percent from sectors that are labor-intensive, while more than 38 percent of the exports are from sectors classified as low wage and only 21 percent originate from high-wage sectors. The time frame is guite revealing and corresponds to what would be expected given the comparative advantage of the region. Figure 9.3 show that although both the share of resource-intensive and laborintensive exports declined substantially from 1980 to 1999, the share of exports by wage level fluctuated widely during the period. Thus, while the shares of high-, middle- and low-wage exports were similar in 1980 and 1998, there was a marked decline of high-wage exports from 32 percent in 1985 to 17 percent in 1998-and a substantial increase in low-wage ones (from 28 percent to 45 percent).

Figure 9.4 shows that the share of low-wage exports followed a similar pattern in four of the five countries considered, with only Argentina showing a slight decline. This pattern is consistent with the evidence presented in Chapter 10, which shows that Argentina has the highest average years of education and the sec-

⁷ The five countries are Argentina, Chile, Colombia, Mexico and Peru.

⁸ The share of goods originated in high-tech sectors has also increased during this period, although its level remains very low.

ond highest percentage of college-educated people in Latin America.

Thus, trade openness and the reduction or elimination of export subsidies in strategic sectors during the mid and late 1980s implied that sectors for which the region did not have a comparative advantage—such as high-wage industries—declined as a proportion of total exports. Instead, as countries opened to international trade, the patterns of exports came in line with the relative abundance of low-skilled labor, and the sensitivity of export shares to unit labor costs increased.

The lesson that emerges from this evidence is that the particular range of industries and sectors that form the bulk of Latin American exports and production are increasingly sensitive to unit labor costs. However, this cost sensitivity does not imply that in order to sustain export shares, wages have to be kept low. Rather, it suggests that wages have to move in line with changes in productivity in order to keep productivity-adjusted labor costs at competitive levels. This implies that increasing wages can accompany sustained increases in productivity without affecting unit labor costs. Therefore, achieving high and sustained levels of productivity is a competitiveness strategy that does not imply a trade-off between maintaining labor costs and improving the welfare of workers.

Labor Costs in the Region

Economic theory teaches that in labor markets where there is enough competition over workers, wages are likely to closely match workers' productivity levels. If wages are lower than productivity, another employer can recruit a worker for a higher wage and still make a profit. If wages are higher, employers will lose money and sooner or later let workers go. Therefore, the theory says, changes in wages should follow changes in productivity, which in turn implies that, except for swings in exchange rates and inflation, unit labor costs should remain fairly constant over time.

However, not all markets have enough competition over workers to ensure a match between wages and productivity. Wages may grow faster than productivity simply because they were at such a low level to begin with. There are a host of other reasons why movements in wages and productivity may not be equal, even with enough competition. Governments or labor unions may



Source: Manufacturing surveys, PADI (ECLAC) and IDB calculations.

alter labor costs without considering productivity, for example, by setting minimum wages or by mandating taxes or other measures that increase the cost of labor.

As expected, exchange rates and inflation have driven the movement of unit labor costs in the region. Real exchange rates appreciated over 1989-93 and from 1994-98 in all six countries sampled except Mexico (see Figure 9.5).⁹ This implies that in order to keep unit labor costs constant, countries had to maintain productivity growth above wage increases. However, average labor productivity in manufacturing sectors rose very slowly from the end of the 1980s to the beginning of the 1990s, and could not compensate for the real exchange rate appreciation even when wages declined in real terms. In contrast, over 1994-98, despite declines in total factor productivity, average productivity per worker in manufacturing grew at a healthy annual rate of 5 percent.¹⁰ This made possible a small decline in unit labor costs even as wages maintained their real values during the period.¹¹ Unit labor costs declined in Mexico, Argentina and Ven-

⁹ A decline in the real exchange rate implies a real exchange rate appreciation.

¹⁰ The fact that the average productivity per worker increased even when total factor productivity declined suggests a capital deepening, that is, a higher use of capital per person, rather than a more efficient use of labor and capital.

 $^{^{11}}$ Non-wage labor costs such as mandatory contributions are not included because no measure of total non-wage labor costs is available.

ezuela and increased in Chile, Colombia and Peru. In the last two countries, real wages grew above productivity, while in the others, real wages fell behind it.

Factors behind the Cost of Labor

Besides wages, there are a number of factors that, if de-linked from productivity, may alter the costs of labor and reduce cost-competitiveness of the region. Governments legislate on a number of issues that have a bearing on the cost of labor. These interventions are generally motivated by the desire to protect workers against low incomes, income insecurity or poor working conditions. It has been said that these provisions increase the cost of labor, create unemployment and introduce a bias against labor.¹² Is this a reason for concern in Latin America?

Mandatory Benefits and Restrictions on Hiring and Firing

To some degree or another, all governments in the region mandate payroll contributions to such national programs as old age, disability and death pensions, health insurance, maternity benefits, unemployment insurance, workers' compensation and family allowances. Figure 9.6 shows mandatory contributions in and outside the region to social security programs, measured as a percentage of wages. The expected contribution rate in the region is high and only slightly lower than the average rate in OECD countries. Argentina, Uruguay, Colombia, Brazil and Peru all have contribution rates that are higher than the OECD average.

Argentina stands out as having the highest contribution rate in the region and the third highest, only after France and Italy, in the combined Latin American and OECD region. In contrast, some industrialized countries such as Japan or the United States have much lower contribution rates than the average Latin American country. Based on these comparisons, the Latin American countries are classified as having a high, middle or low level of expected contributions. The countries with rates above the OECD average constitute the high contribution group: Argentina, Uruguay, Colombia, Brazil and Peru. Venezuela, Costa Rica and Ecuador form the middle group, with contributions below the OECD average but above the Latin American one. Bolivia, Chile, the Dominican



Source: Social Security Administration (1999).

Republic, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay and El Salvador form the third group, with contributions below the Latin American average.

Governments have also intervened in the labor market by regulating firing and hiring. Termination laws require firms to abide by at least two types of regulations: advance notification and compensation for unjust dismissal. The objective is to increase job stability by taxing dismissals, but these laws may also increase labor costs and ultimately reduce employment opportunities for workers. Some recent studies have quantified the monetary cost of abiding by such laws in the OECD and Latin American countries.¹³ Figure 9.7 plots the expected future costs of dismissing a worker hired under the legislation in force in 1999.¹⁴ The cost is measured in multiples of monthly wages. The comparison reveals that, quite surprisingly, job security regulations are much more stringent in Latin American than in OECD countries. Indeed, the expected cost of job security requlations is higher in all Latin American countries—with the exception of Colombia—than in the average OECD

¹² The Global Competitiveness Report for 2000, for instance, rates countries with higher social security contributions as less competitive.

¹³ See OECD (1999) and Heckman and Pagés (2000).

¹⁴ In several countries, labor reforms have allowed for retaining certain benefits of workers hired prior to the reforms.



Source: Heckman and Pagés (2000) and Ministries of Labor.

country. Classifying again the countries according to high, medium and low job security costs, there is a high group with job security provisions above the Latin American average, including Bolivia, Ecuador, Peru, Costa Rica, Honduras, Chile, Mexico, El Salvador and Argentina. The medium cost group, with job security costs below the Latin American average but above the OECD average includes Venezuela, Dominican Republic, Panama, Nicaragua, Uruguay, Paraguay and Jamaica. Colombia is the only country in the low cost group with costs below the OECD average (although firing costs for workers hired before the 1991 labor reform are quite high).

Knowing the levels of contributions and costs does not tell much about the impact of these programs on competitiveness. Determining whether their cost results in higher labor costs requires assessing the extent to which workers and companies value the programs. It is customary to assume that contributions to these programs are taxes whose cost is borne by employers, but in fact this may not be the case. If workers value the benefits funded by these contributions, they would be willing to trade lower wages for access to valued benefits. In this case, wages adjust downwards and labor costs paid by employers remain constant regardless of the contribution rate. Of course, this argument assumes that workers value benefits at exactly their costs. Oth-





Source: IDB calculations based on World Economic Forum (2000), and labor indicators from Heckman and Pagés (2001).

erwise, part of the contribution is perceived as a wage tax, and part of that tax results in higher labor costs for employers.¹⁵

How much do workers in the region value mandatory social security benefits? Although there is no direct way to know, some indirect evidence can be used, first by examining whether firms complain about the cost of labor regulations. If workers do not value mandated benefits, and wages do not fully adjust, firms in countries with high levels of contributions will face higher labor costs than others. Although one cannot discard the possibility that employers complain regardless of whether they suffer high or low costs, it is nonetheless useful to observe whether employers' complaints increase in purportedly high-cost countries. Figure 9.8 shows the relationship between the total costs of mandatory benefits, computed as the sum of social security and job security benefits, and the degree to which employers in the different Latin American countries find labor regulations to be a major obstacle to operation and growth of their businesses. To control for the possibility that employers in some countries may have a higher propensity to complain than in others, we report the percentage of em-

¹⁵ The one case where labor taxes are entirely paid by workers (and therefore do not increase the cost of labor) is when labor supply is perfectly inelastic. As will be argued later, this scenario is unlikely in Latin America.

ployers who complain about labor regulations relative to the percentage that complain about other regulations such as business licensing, customs or foreign trade, the exchange rate or foreign currency, and environmental, fire and tax regulations. The figure shows that in the countries where abiding by labor regulations requires higher contributions, employers tend to complain more about labor regulations relative to other regulations affecting their businesses. This relationship suggests that at least part of the cost of mandatory benefits is not shifted to workers, and is therefore borne by employers in the form of higher labor costs.

Other types of studies provide further evidence that mandatory benefits may be increasing the cost of labor in the region. One group of studies compares wages of workers who have access to mandatory benefits (covered sectors) with wages of workers who do not have such access to benefits (uncovered sectors). Most but not all studies conclude that part of the cost of labor market regulations is shifted to workers in the form of lower take-home wages. However, a part of the cost is also shifted to employers, increasing the cost of labor. On average, these studies conclude that a 10 percent rise in mandatory contributions increases the cost of labor between 3 and 7.5 percent.¹⁶

Another way to examine whether workers are willing to trade lower take-home wages in exchange for higher benefits is to examine whether such contributions have a negative impact on employment rates. If there is a negative association between higher mandatory benefits and employment rates, then one can conclude that these measures increase the cost of labor. Recent studies comparing Latin America and the OECD countries conclude that firing costs reduce employment rates both in developed and developing countries.¹⁷ The studies also suggest that job security measures have a larger impact on the employment rates of younger workers.

Estimates reported in Appendix 9.2 suggest that both mandatory social security contributions and job security provisions have a negative effect on employment rates. They also suggest that social security contributions have a larger negative effect in Latin America. After enduring sustained deterioration in the quality of health benefits and the real value of pensions, workers in Latin America may value the benefits afforded by social security contributions less than workers in industrial countries. As a consequence, contributions that in principle were aimed at improving the welfare of workers ended up being perceived as a tax on labor income, resulting in lower employment and higher labor costs. The obvious implication of these results is that in those countries where social security contributions or job security provisions have been rated as medium or high, labor policies affect the price competitiveness of the factor that is used the most in the sectors with an export advantage. Thus, these countries may be paying a large cost in terms of foregone exports and income to sustain programs that are not much valued by workers.

A reason why benefits are more valued in OECD than in Latin American countries seems to be the origin of the two regions' respective legal codes. Whether legal systems of a country originated in the French, Common Law (English), German or Scandinavian traditions has been shown to be correlated with structural characteristics of financial markets (see Part II) as well as with the level of mandatory benefits. Regarding social security, for example, countries with an English legal system have significantly lower average benefits than countries in the French, German or Scandinavian systems. Similarly, there are also statistically significant differences between job security measures in countries under French legal systems and the other systems. Since all countries of Latin America are under the French legal system, and all countries of the British Caribbean are under the English legal system, the correlation between legal origin and benefits suggests that the level of benefits responds more to the historical heritage of these countries than to the real needs of their workers.¹⁸

Additional evidence suggests some mismatch between the level of benefits and the purchasing power of workers in the region. While the level of contributions to social security programs is directly, though weakly, related to income—as would be expected if social protection is a normal good—the level of job security measures is negatively correlated with per capita income

¹⁶ See Edwards and Cox-Edwards (1999), MacIsaac and Rama (1997) and Mondino and Montoya (2000). See also Gruber (1997) for a study of the effect of the 1981 Chilean pension reform on wages and employment, which finds evidence that the cost of mandatory benefits is fully shifted to workers.

 $^{^{17}}$ See Saavedra and Torero (2000), Kugler (2000) and Heckman and Pagés (2000).

¹⁸ This would also suggest that historical heritage is by nature permanent, perhaps due to the fact that once the law grants some benefits to workers, covered workers resist changes in the law.



Source: Per capita income data from World Bank (2000) and job security data from Heckman and Pagés (2001).

(see Figure 9.9). In addition, in countries of the region where social security contributions seem to be more binding—Argentina (not shown), Uruguay and Brazil the level of contributions is high relative to their levels of income. All this suggests that the level and perhaps the design of social protection programs may not be appropriate for the countries of the region. Adapting existing programs to the true needs of countries would go a long way towards increasing the cost-competitiveness of labor.

Minimum Wage Laws

As with other labor market policies, minimum wages are set in order to improve the welfare of the poorest workers.¹⁹ However, raising wages far above productivity levels can result in massive losses of employment and a large decline in export market shares, both of which do little to improve the welfare of the workforce. Puerto Rico provides an example. After the island's minimum wage was substantially increased to reach the mainland U.S. level in 1977, there was a massive drop in employment and a loss of price competitiveness. Many studies on the United States itself find no discernible effect of minimum wages on employment.²⁰

Do minimum wages pose a problem for price competitiveness in Latin America? Minimum wages may affect the cost of labor in the region because they tend to be particularly binding for low-skilled workers, that is, the group that represents Latin America's competitive

Figure 9.10 Minimum Wage in OECD and Latin American Countries in the 1990s



Source: Maloney and Núñez (2001) and IDB (1998-99).

advantage. In addition, by fixing a wage floor for workers' take-home income, a minimum wage may prevent wages from adjusting to compensate for increases in mandatory benefits. Whether this is the case depends of course on the level at which minimum wages are fixed.

Determining whether Latin America's minimum wages are high or low requires more than just simply comparing the wage floor across countries. To say that minimum wages are higher in one country than another does not provide much information if productivity levels differ accordingly. A common way to relate the minimum wage level to some productivity measure is to compare it with a country's average wage level. Such comparisons between OECD and Latin American countries reveal a wide range of minimum wage levels in Latin America (see Figure 9.10). Venezuela, El Salvador, Paraguay and Honduras have minimum wages relative to average wage levels that are higher than those prevalent in most OECD countries. Mexico, Chile, Argentina, Brazil, Bolivia and Uruguay have minimum wages relative to average wage lev-

¹⁹ The evidence on whether minimum wages can actually redistribute income in Latin America is ambiguous. Lusting and McLeod (1997) find that increases in minimum wages are associated with poverty reduction. IDB (1998-99), however, finds only a small impact of minimum wages on income inequality.

²⁰ See Card and Kruger (1995, 2000).



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Source: Maloney and Núñez (2001).

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els that are 20 to 35 percent lower than those of most OECD countries. (Minimum and average wages refer to the same year, but the minimum to average figures correspond to various years between 1995 and 1998.)

Even average wage-adjusted measures are insufficient to explain the impact of minimum wages on labor costs if laws are not enforced. To address this possibility, Maloney and Núñez (2001) examine the effect of minimum wages on the actual distribution of wages. The results are summarized in Figure 9.11. If minimum wages are either not binding or not enforced, the distribution of wages, summarized in the density plots, is bell shaped. However, if minimum wages are indeed binding and alter the distribution of wages, then there is a peak around the minimum wage level (vertical line in the figure). In Brazil and especially in Colombia, minimum wages alter the distribution of wages, while in Argentina, Mexico, Uruquay and Bolivia their effects are less pronounced. Of particular note is that minimum wages affect the distribution of wages in both the formal and informal sectors. In Argentina, Colombia and Brazil, the effect on informal sector wages appears more pronounced than the effect on the formal sector. Neri, Gonzaga and Camargo (2000) study this phenomenon for Brazil and label it the "lighthouse effect." They argue that although not necessarily enforced by the law, the minimum wage operates as an important benchmark of what constitutes a "fair" wage. Moreover, Maloney and Núñez (2001) find that minimum wages alter wages at higher levels in the distribution due to a "numeraire" effect. That is, it is quite common to find that wages or other benefits are determined as multiples of the minimum wage level, effectively extending the influence of changes in the minimum throughout the distribution.

One final piece of evidence is still needed to conclude that minimum wages affect a country's comparative advantage in low-skilled labor-intensive products. Do minimum wages reduce employment by increasing labor costs? If so, minimum wages alter productivityadjusted labor costs. While empirical studies for some countries—most noticeably the United States—find substantial effects of minimum wages on the level and the distribution of wages, they do not find significant effects of minimum wages on employment rates. Instead, the evidence for Latin America suggests that minimum wages have larger effects in countries where the minimum wage is fixed at relatively high levels. Bell (1997) finds no evidence of effects of the minimum wage on employment in Mexico, but strong negative effects of the minimum wage on low-skilled workers in Colombia. Maloney and Núñez (2001) confirm the findings for Colombia with more recent data. Moreover, they find that the negative effects of the minimum wage on employment are spread along the distribution of wages through the "numeraire" effect.

To conclude, although at first glance the minimum wage may appear to be a sensible way to increase the welfare of the working poor, if set at levels not supported by productivity, it may do more harm than good to the very workers it is intended to help. The burden of such a policy is reflected not only in higher unemployment levels, but also in costly losses in export market shares.

Trade Unions and Labor Costs

Trade unions have been at the center of the debate on how labor market institutions affect price competitiveness and the welfare of workers. On the one hand, trade unions are seen as essential to defending worker rights and promoting sustained improvements in workers' welfare. On the other, trade unions are seen as a threat to price competitiveness, since they can seek and obtain wage increases above productivity. Is there any evidence to support these claims in Latin America? By negotiating on behalf of a large number of workers, unions can obtain more favorable wage agreements than if every worker were to bargain over his or her own wage. However, union membership has declined steadily both in industrial countries and in Latin America. According to World Bank data, union membership declined from 39.7 percent of the workforce in the 1980s to 31.2 percent in the 1990s in industrial countries and from 24.6 percent to 15.5 percent in the Latin America. This decline has reduced unions' influence in determining wages.

Empirical evidence for the United States and Canada suggests that, historically, union workers earn, on average, 15 percent more than non-union workers. The evidence for Latin America is mixed. In Mexico, for instance, non-union workers on average may earn more than union workers.²¹ But in Venezuela and Brazil, union workers earn wages that are above those earned by non-

²¹ Pagés and Shinkai (2001) use recent household survey data to examine the impact of unionism in Brazil, Mexico and Venezuela.

union workers. However, there are important differences within demographic groups. In all three countries mentioned as well as in the United States, the wages of low-skilled workers tend to be lower in the union than in the non-union sector, while the reverse is true for high-skilled workers. While it is still unclear what type of phenomenon is driving these findings, the results suggest that unions do not increase the cost of labor for low-skilled workers.

Finally, it should be stressed that the effect of unionism on wages is only part of the story regarding unions and price competitiveness. The second important piece is the effect that unions have on productivity. If unions seek and obtain higher wages for their members in exchange for higher productivity levels, then unions may increase workers' living standards without affecting unit labor costs. Unfortunately, little is known about the impact of unionism on productivity in the developing countries.

What Should Be Done?

This chapter has shown that Latin America has become more specialized in producing goods and services highly sensitive to productivity-adjusted labor costs. This implies that open economies should try to maintain these costs at competitive levels. However, this policy does not imply sustaining low levels of wages, but rather wages that are compatible with productivity levels. Achieving this requires that countries:

• Focus on policies that increase labor productivity

Fast and sustained productivity growth allows wages and living standards to increase rapidly without altering competitiveness. Given the importance and complexity of the issue, the next chapter is devoted to discussing policies that increase labor productivity.

• Rationalize mandatory benefits and provisions

This strategy should aim to design benefits packages that are valued by the majority of workers. This means frequently surveying workers about their willingness to pay for the benefits they currently receive and the benefits they actually need. It also implies assessing whether workers' needs are covered by the current system of social protection. The evidence to date is that they are not, as seen in low levels of coverage, the perception of implicit taxation on the part of employers, and the negative effects on employment. However, there are promising examples of changes in social protection programs that have been well received by workers. Recent pension reform in El Salvador, for example, resulted in an increase in affiliation of more than 50 percent in two years.

• Reassess minimum wages

Countries that choose to have a minimum wage policy to protect workers or redistribute income should reassess its design to prevent some major drawbacks. First, increases in minimum wages should be tied to increases in productivity. Since productivity growth changes across sectors, it is important to choose indicators of productivity growth that are related to the sectors that are more likely to employ minimum wage workers. This prevents major changes in labor costs and employment rates while providing useful benchmarks of productivity growth to individual firms lagging behind. Second, creating a minimum wage package that includes wages plus contributions to mandatory benefits would eliminate barriers to wage adjustment. By fixing a benefits package that includes what employers (and employees) pay as social security contributions and other provisions, contributions and benefits can be changed without affecting the overall minimum income package. This is because wages can adjust to changes in contributions or benefits without affecting the cost of labor. These changes are parallel to recent policies in OECD countries directed towards paying gross instead of net (of taxes) unemployment insurance benefits.

• Promote venues for social dialogue

Unions play an important role in the labor market. They are well placed to assess whether the quality and design of social security benefits respond to the needs of workers. They can also monitor productivity growth and ensure that wages increase accordingly. But labor unions can also exhibit monopolistic behavior, forcing wage increases above productivity growth. This is more likely to occur in instances where wage bargaining takes place at the sector level, since at this level unions do not internalize either economy-wide productivity growth or that of individual businesses. It can also occur when union leaders do not understand the adverse consequences of their decisions. Finally, it can occur when employers want to buy some peace after a period of tense labor relations. Therefore, opening permanent venues for dialogue between employers and employees, as well as improving the decision-making of employers and union representatives, can reduce monopolistic behavior, increase price competitiveness, and increase productivity growth.

opendix 9.1 Sector Classification by Wage Level and Factor Intensity					
		High wages	Medium wages	Low wages	
Labor-intensiv	ve sectors		Fabricated metal products	Food products Beverages Tobacco Textiles Apparel, except footwear Leather products Footwear, except rubber or plastic Other manufactured products	
Resource-inte	nsive sectors	Petroleum refineries Miscellaneous petroleum and coal products	Paper and paper products Printing and publishing Pottery, china, earthenware Glass and products Other non-metallic mineral products Non-ferrous metals		
Science-based	l sectors	Other chemicals Machinery, except electrical	Professional and scientific equipment		
Other factor-b	pased sectors	Industrial chemicals	Rubber products Plastic products Iron and steel Transport equipment	Wood products, except furniture Furniture, except metal Machinery, electric	

Source: OECD.

Appendix 9.2 Social Security Contributions, Job Security Measures and Employment

Using a panel of data from OECD and Latin American countries, we investigate the impact of mandatory benefits—including social security contributions, dismissal indemnity, and advance notice prior to dismissal—on employment. The data come from employment indicators from the OECD and from a large set of household surveys from Latin America. Employment indicators have been constructed with a common methodology to assure comparability between countries and with the OECD data. The following regression is then estimated:

$$Emp = \alpha_{1} + \alpha_{2}LAC + \alpha_{3}JS + \alpha_{4}SS + \alpha_{5}g + \alpha_{6}GDP + \alpha_{7}FemP + \alpha_{8}Pop15to24 + v + \varepsilon$$

where *Emp* denotes employment measured as a percentage of the population between 15 and 65 years old, *LAC* is a dummy that takes the value of 1 if the observation belongs to Latin America or the Caribbean and zero otherwise, and JS denotes the expected cost of paying dismissal indemnities and abiding by advance notice laws. (See Heckman and Pagés, 2001, for a complete description on how these variables are obtained.) These are the relevant policy variables whose effect on employment we want to capture. In addition, we control for a number of variables such as GDP growth (g), GDP level, female participation (FemP), and the share of the population between 15 and 24 years old (Pop15to24). Finally, ε is an error term and v is a country specific component of this error. We report three sets of coefficients for the variables of interest (JS, SS) depending on whether we use the overall sample, the Latin American sample, or the OECD sample.

pendix 9.2 - Table 1 The Effe Regress	ect of Job Security and Socia ion Results	Il Security Contributions on En	nployment:		
	Dependent variable: employment as percent of population				
Independent variables	Overall sample	Latin American sample	OECD sample		
Job security	-1.62 (-3.33)**	-1.79 (-3.19)	-1.86 (-1.68)*		
Total payroll contributions	-0.043 (-1.18)	16** (-1.98)**	-0.005 (-0.11)		
R ²	0.74	0.33	0.78		
No. of observations	103	42	61		
No. of countries	30	15	15		

Notes: Methodology: panel estimation with random effects. t-statistics in parentheses.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

CHAPTER

10

Removing Barriers to Improved Labor Productivity

Countries with high labor productivity tend to be wealthier societies. When each worker is responsible for a larger share of goods and services, real wages tend to be higher.¹ In addition, high wages motivate more and a broader range of workers—women, in particular—to participate in the labor market. This reduces the difference between product per worker and product per capita. Moreover, countries with high productivity can achieve high standards of living without necessarily losing price-competitiveness, since goods produced with more productive workers command lower prices, even at higher wages.

Unfortunately, the factors behind a high level of labor productivity are not well understood, as reflected by the large number of poor countries in the world. However, social scientists are gaining some insights into the reasons behind high productivity. Some of them such as those related to financial markets, infrastructure and the adoption of technology—are reviewed elsewhere in this book. This chapter focuses on factors associated with labor itself, such as the skills that workers bring to or attain in the workplace, as well as the level of effort they put into their jobs.

Theoretical and empirical research suggests that productivity growth is associated with education attained through formal schooling, and with on-the-job training attained in the workplace. Research also shows that cooperative labor relations are more conducive to productivity growth than are relations marked by conflict. Perhaps not surprisingly, Latin America scores low in all these areas. Progress in education has been slower than in other regions of the world. Although almost all children have access to school, high repetition and dropout rates result in very low rates of secondary enrollment. As a result, the region has a labor force with primary education but little secondary or higher education. This low level of schooling has not been remedied by on-the-job training. On the contrary, the failure of training systems in the region has meant that only the relatively well educated receive on-the-job training, amplifying the deficiencies and inequalities created by the education system. Finally, labor relations are marred by distrust, and workers in general are poorly motivated.

Public policy can foster productivity growth by providing incentives for poor families to keep their children in school and by distributing funds according to school performance. More on-the-job training is necessary, as is making schooling available around work schedules and giving tax subsidies to people who complete certain levels of adult education. The quality of training can be improved through certification programs for training providers, and by giving tax subsidies to firms that train their workers. Finally, public policy can support better labor relations by facilitating dialogue between employers and employees, promoting training for managers and employees, and advancing compensation mechanisms for workers who stand to lose their job or job status because of technological advances.

Education: A Necessary Step

In a given economic environment, business productivity can be improved, first, by introducing new technologies, and second, by increasing the efficiency of existing tech-

¹ This is particularly true in countries with democratic governments, as shown in Rodrik (1999).

Box 10.1 Education and Productivity

Education has been shown to impart knowledge and skills that generally result in higher productivity and wages in the labor market. The positive relationship between schooling and higher productivity is well established in the literature on microeconomics.

In the 1990s, many researchers attempted to link aggregate schooling measures to national productivity and income. Using cross-country data, most found that the initial level of schooling within countries was linked to subsequent increases in national income. However not all studies showed strong links between changes in schooling levels and income growth; some even found an empirical link between increases in women's schooling and slowdowns in growth (Pritchett, 1996, and Barro and Sala-i-Martin, 1995).

Is it possible to reconcile the conflicting findings regarding schooling and countrywide productivity? Several reasons drive inconsistencies in the aggregate investigations. One is that it is extremely difficult to collect comparable measures of schooling across countries. For example, the schooling level classified as completed primary in one country may be considered a completed first cycle of secondary in another. Average levels of quality may differ widely. The resulting measurement error would bias the results from finding that aggregate measures of schooling affect income growth (Krueger and Lindahl, 2000).

The relationship between women's activities and measured productivity may also play a role in the inconsistent aggregate findings. Since female labor supply tends to increase rapidly at high levels of schooling but not necessarily at basic levels, some of the benefits of increased schooling are not measured at lower levels of schooling. These benefits include healthier and better educated children, since women tend to use their productivity increases within the household even though their reservation wages in the market increase with additional schooling at low levels (Lam and Duryea, 1999, and Mammen and Paxson, 2000).

Even if the schooling data were better measured, the aggregate estimation procedures raise serious questions. Bils and Klenow (2000) note that the aggregate studies that find a positive relationship between level of schooling and per capita income growth may be overestimating the effect of schooling. They show that higher income itself leads to a higher demand for schooling, a normal consumption good. In other words, the fire is in part fueled in the reverse direction, with richer countries demanding higher schooling. This suggests that a one-time investment in schooling can reverberate for decades to come as the increases in GDP associated with the initial schooling generate higher demand for education.

In sum, while the jury is still out regarding the best estimation approaches with aggregate level data, the microeconomic and macroeconomic literature suggests a strong link between schooling and productivity.

nology. Decisions as to which approach to use depend not only on the managers and owners of the firm, but also to a large extent on the workers themselves. When management considers installing a new technology, it has to evaluate whether its employees have the skills to operate, service and maintain it. If these skills are not available, or if firms cannot find cost-effective ways to increase the skills and abilities of their workers, the process of adopting new technologies will be slowed.

Labor relations can also affect the adoption of new technologies and therefore productivity. Managers may choose to install a new production process, but workers fearing that such innovation will cause a loss of jobs may boycott it, reducing or eliminating the profitability of such an investment. On the other hand, managers may distrust workers and fear that new technologies will reduce their ability to monitor them.

All of these scenarios highlight the importance to

productivity growth of having a good education system, a flexible training system, and good labor relations. More educated workers can devise better and more efficient ways to produce more with fewer resources. However, equally important, new technologies and new ways to produce—fundamental engines of productivity—can only be adopted if firms have or can recruit the appropriate level of skills. Thus, education directly affects productivity by fostering innovation and facilitating more rapid adoption of new technologies.

Empirical evidence confirms this relationship between education and productivity (see Box 10.1). Most studies at the microeconomic level conclude that there is a significant relationship between these two variables. This relationship is more disputed at the aggregate level but most of the discrepancies with the micro studies are likely due to serious measurement errors. Indeed, a simple cross-country analysis between levels of education and total factor productivity growth shows the expected relationship—that is, countries with higher levels of education exhibit higher rates of productivity growth (see Figure 1.3 in Chapter 1).

Educational Levels in the Region

Are Latin America's educational systems turning out the kind of workforce necessary for productivity and income growth and price competitiveness? Sadly, the answer is no. Chapter 9 compared the average share of individuals with no schooling and with primary, secondary and higher education across regions of the world. In Latin America, both the share of workers without schooling and the share of workers with secondary and higher education are well below the world average. Where the region stands out is in the share of the population that has only primary education (either complete or incomplete). This share is higher than in any other region of the world, suggesting that the region as a whole has a comparative advantage in the production of goods that require low skills.

Obviously, this is a picture that only characterizes the average country in the region. There are important differences across countries that the average, by definition, does not capture. Figure 10.1 plots the share of population with no education or with primary or secondary education in several countries of the region, as well as the United States and two East Asian countries, Taiwan and Thailand.²

Only 3 percent of all the working-age population in the United States has less than secondary education. Unskilled labor defined as workers with no schooling or only primary schooling is a scarce factor in this country. Quite different is Taiwan, which is representative of the East Asian countries that have made great strides in schooling. Practically two-thirds of its working-age population have at least some secondary schooling. The difference between Taiwan and the United States is that one-third of the working age population of the former still has only primary schooling or less. The story is quite different for Thailand, one of the East Asian countries with relatively low schooling levels. About twothirds of its working-age population have primary schooling or less, and only about 20 percent have secondary schooling.

Latin American countries are classified in three groups. First are those with relatively high human capi-



Source: IDB calculations based on national household surveys.

tal stocks: Jamaica, Uruguay, Argentina, Chile, Panama and Peru. These countries have educational attainment levels similar to those of Taiwan. Around 60 percent of their populations have some secondary schooling, and relatively few people have no schooling.

In the second group, which is referred to as "intermediate stock," around 50 percent of the populations have no schooling or only primary schooling, and they are less well endowed with secondary schooling or higher education than the first group. Costa Rica, Ecuador, Venezuela, Colombia, Mexico, Brazil and Bolivia are classified in this group.

The third group—Paraguay, the Dominican Republic, El Salvador, Honduras, Nicaragua and Guatemala is labeled "low stock." Two-thirds or more of these populations have only primary schooling or less. Even taking these countries into account, however, Latin America is *not* a region with relatively abundant unskilled labor.

Why Did Latin America Fall Behind?

Latin America fell behind countries such as Taiwan and Korea in terms of schooling progress because of high rep-

 $^{^2}$ These shares are not identical to those used in Figure 9.1. The source for Figure 9.1 is the Barro-Lee updated data set, while Figure 10.1 uses the most recent household survey data.

etition and dropout rates in primary schools. While the region has actually had quite a good record in expanding access to schooling systems over the past 60 years, the major obstacle has been that relatively few children finish primary school, so there are few in the pipeline to even enroll in, much less finish, secondary schooling.

Coverage of Latin American educational systems expanded rapidly during recent decades. Among people born around 1930 who today are approximately 70 years of age, the proportion who enrolled in the schooling system was 72 percent. For cohorts born 10 years later, who today are around age 60, the proportion was 80 percent, and for those born in 1950 the share was 87 percent. For those born in 1970, who today are around 30 years old, the share is 95 percent. This means that, taken together, schooling systems expanded coverage by 30 percent in the course of 40 years.

However, there are still differences within Latin America. While Uruguay and Jamaica had already reached coverage rates of 95 percent for the cohorts born in 1940, it took Chile 10 years more to reach this stage. Peru, Costa Rica and Paraguay took yet another 10 years. Honduras, El Salvador, Nicaragua, and Brazil did not even reach the stage of near universal coverage for cohorts born in 1970.

Initial enrollment into educational systems is not the main problem in Latin America. The problem is the region's inability to retain students in the education system until they complete at least primary schooling. Among cohorts born in 1930, Korea and Taiwan already had high proportions (around 65 percent) completing primary schooling, while in the average Latin American country the share was barely one-third of the people in that cohort. Moreover, over the two decades that followed, 95 percent of the two East Asian countries' populations had complete primary education, surpassing all countries in Latin America. For the cohorts born around 1970, practically everybody in Taiwan completes primary school, yet more than one-third of this same population cohort does not complete primary school in Honduras, El Salvador, Brazil, Nicaragua or the Dominican Republic. Even the Latin American average shows more than 20 percent of the 1970 cohort without complete primary education. The only country where there is almost universal primary completion is Argentina.

Part of the problem may be that children in Latin America are entering the schooling system relatively late. For example, in 14 Latin American countries, it is only at age nine when enrollment rates reach 95 percent. In El Salvador, Honduras and Brazil, enrollment never reaches more than 95 percent between ages six and 21.

The other part of the problem is that retention rates at young ages are strikingly low. Right at the age when children would be expected to enroll in secondary school, the region's enrollment rates start to plunge. By age 18, more than half of the children are still in school in only five of 18 Latin American countries—the Dominican Republic, Bolivia, Panama, Chile and Argentina. Thus, few people have the possibility to enter secondary school or beyond.

After looking at this evidence, it is not surprising that the region's endowment of workers with secondary education is so poor relative to other regions and the world average. The vast majority of students reach only primary school and then stay at this level of formal schooling for the rest of their lives.

What Can Be Done?

There are at least two clear ways that public policy can help people accumulate skills. First, a household has to be able to afford the private costs of schooling if it is to invest in the education of its members, Even if their children attend public schools, households need to finance private costs such as books, clothing, nutrition, and perhaps most importantly for poor households, the opportunity cost of sending their children to school instead of sending them to work. If households lack the means to pay for even these basic investments, it is most likely that they will under-invest in human capital. Programs such as *Progresa* in Mexico or *Bolsa Escola* in Brazil, which provide direct financial support to households conditioned on investing in the education of their members, are perhaps among the best policy options to

³ Progresa is the Spanish acronym for the Education, Health and Nutrition Program, which provides cash transfers and a nutritional supplement to rural families in extreme poverty. Cash transfers are conditioned on children's school attendance rates of at least 85 percent, and regular visits to health clinics for check-ups and follow-ups. The cash transfer is given to the mother, who also has to attend a series of talks and courses on health practices. *Bolsa Escola* is a similar program that provides scholarships for disadvantaged children. Part of the cash transfer is held in a special account, which the beneficiary can access after completing a schooling cycle. Another cash transfer program is *Chile Joven*, but in this case the transfers are provided to young adults to encourage training. Detailed descriptions and evaluations of *Progresa* can be found at www.ifpri.org/ country/mexico.htm; and of *Bolsa Escola* at http://www.mec.gov.br/home/ bolsaesc/default.shtm.

enhance human capital accumulation by the poor.³ But even these could be complemented with school supplies, meals and transportation services for students to make the effect stronger.⁴

The second way public policy can help build human capital is by making investment in schooling an attractive option for a household by improving the quality of educational services. Resource allocation in the schooling system of most Latin American countries is shaped by payment commitments to large bureaucracies, and not by the level and quality of educational results (see IDB, 1996 and 1998). Higher-income families may have the chance to escape to private schools where there is competition and quality, but the poor are basically stuck with the public system. When the system is of poor quality, differences in human capital are intensified. The government can play a decisive role in ameliorating this problem if it devotes at least part of its efforts to generating information, setting quality standards, and assuring that schools receive funds from public resources based on the quality and quantity of the education they provide, instead of focusing only on bureaucratic and budgetary controls.⁵ There is also scope for introducing new ways of teaching the disadvantaged. Education by television is the prime example of an innovative yet still not fully exploited way to reach the poor in remote areas.6

The educational content of secondary schooling needs to be reformed as well. Part of the reason why dropout rates are so high is because students do not see much value in secondary schooling beyond being a way to get into college. Differences between the academic and vocational secondary tracks need to be reduced,⁷ and students in vocational schools must acquire better basic skills in mathematics and communication. Similarly, students in academic tracks need to acquire skills in computation and business. Finally, education curricula should reflect the growing importance of skills such as teamwork, cooperative problem solving, creativity, environmental awareness, flexibility and individual responsibility.

Most low-skilled people are already beyond school age, and will not benefit from improvements in the standard schooling system. Many dropped out because of the poor quality of public schools or due to pressing household financial needs. For these people, training policies are often considered the best way to reverse their disadvantage in the labor market. But are they really?

Is Training the Solution to an Unskilled Labor Force?

Human capital development policies are an essential element of a competitiveness policy, and Latin America has paid a heavy price for neglecting them. Developing more productive activities associated with a competitive economy requires not only access to financing and technologies (both of which can be obtained on the international market), but also to a skilled local workforce. If those skills are not made available, both firms and workers will have incentives to engage in conduct that traps the economy in a "low skill, bad jobs" equilibrium.⁸ Moreover, the increase in the demand for scarce skills over the last decade is clearly associated with a widening of wage differentials that is at the root of the lack of improvement in income distribution.⁹ Increased demand for skills and an inadequate supply of them combine to raise the wages of skilled workers and leave the uneducated and poor behind. The fact that Latin America's wage differentials have widened indicates that the countries have been unable to sufficiently increase the supply of skills.

What policies are needed to increase the availability of skills and, more specifically, what institutional arrangements are needed in the training system and in labor policies to that end? Training is different from other forms of human capital investment because both firms and workers have to simultaneously make investment decisions with different sets of preferences, time horizons and information. The training system is the set of institutions and rules involved in developing the

⁴ In the case of *Progresa*, a key issue is that, by definition, some of the poorest of the poor do not have access to its benefits because they live in remote areas where no school or health clinic exists. If the program were accompanied by supply-side efforts, or by support for temporary reallocation (during the school year) or subsidies for transport costs, it could perhaps reach these people.

⁵ This will be even more of a challenge for Latin America in the future for demographic reasons. IDB (2000) estimates that to meet the demographic challenge of a changing age structure over the next 10 years, the number of teachers in secondary schools will have to be increased from 1.8 million to 2.6 million just to keep pace with higher demand.

⁶ Notable successes in the region have included *Telecurso* in Brazil and *Telesecundaria* in Mexico (see IDB, 2000).

⁷ See Wolff and de Moura Castro (2000).

⁸ See Snower (1996).

⁹ See Székely and Hilbert (2000).

skills of new entrants to the labor market and updating the skills of workers already in the labor force. The system can comprise public regulations and institutions, such as traditional national training institutes, as well as private arrangements among firms, workers and unions, or, more commonly, a mix of both. In contrast to the traditional discussion of training policies that usually centers around the structure, functions and resources of a national training institute, we see training policies as the product of the more complex institutional and financial arrangements needed to train the workforce.

The inputs that a training system receives are the students exiting the educational system. Basic literacy and numerical skills, the staple of an educational system, are a prerequisite for the proper functioning of any training system. When the schooling system is not performing adequately, no training system is going to produce the number and quality of skills needed by worldclass firms operating in a global economy.

Training as a Public Policy Issue

Policymakers have always viewed the goal of increasing the skill level of the workforce as a legitimate area for public policies and resources. Public training institutions, many with a statutory authority to collect levies on firms, have been set up in most countries in the region. The creation of these institutions has been based on a pessimistic view of the capability of free markets to produce those skills in sufficient quantity and quality. Economists have, to some extent, fed this pessimistic view. The classical argument is that in competitive labor markets (where wages are equal to the marginal productivity of labor), firms would never invest in the development of transferable skills that would make their workers more "attractive" to other firms.¹⁰ If a firm invested in general transferable skills, it would never be able to recoup the costs of training in the form of wages below marginal productivity. The now-higher productivity worker would leave the firm for its neighbor that could pay a higher wage because it had not incurred training costs. For businesses, this represents a lost opportunity, since a more skilled and productive worker would increase profits. Without the training, workers also lose because they are less skilled and command lower wages. Training would be provided for firm-specific skills, however, because such training would not make workers more valuable to other firms. If general skills are in some way a prerequisite for the more firmspecific skills in which businesses are willing to invest, an inadequate supply of general skills would hinder the development of even such specific skills.

The main issue that counters this argument is that real labor markets are not perfectly competitive-there are matching and search costs that increase the value of the present worker-firm match and create rents that have to be negotiated. For instance, workers might choose to receive the training but not maximize the benefit by shopping for another job if the job search is costly. So they might in effect be willing to share the cost of training with their employers. Minimum wages and union activities, by raising the floor of the wage structure and reducing the spread between the highest and lowest wages, create rents that have to be negotiated between workers and firms. For instance, if a business provides training to a worker whose productivity is below the minimum wage, it will not have to increase that worker's wage. The impact of these labor market characteristics is that training increases wages, but less so than it increases productivity. Under these conditions, firms will invest in training workers in both general and specific skills because they can recoup the costs of training by paying wages below the (increased) marginal product of labor.¹¹

The available empirical evidence in developed economies suggests that firms do train their workers, that workers share the costs of training in the form of wages below productivity, and that there are multiple combinations of school and on-the-job training that result from different institutional arrangements of the training system. The businesses most likely to provide training to their workers are larger, unionized ones that use flexible production systems, are experiencing rapid technological progress and sales growth, have longer probationary periods and high firing costs, and operate in areas and sectors of low unemployment. The workers most likely to receive training are those who are more educated, married and predominantly male, and those who have received vocational training or have been recently hired.¹² Training provided by businesses is associated with significant wage gains that are larger than

¹⁰ See Becker (1964).

¹¹ See Acemoglu (1996).

¹² See Bishop (1997).



Source: World Business Environment Survey (1999).

those associated with training provided by schools. Formal as opposed to on-the-job training has an impact on productivity and on the worker's ability to innovate.¹³

This evidence is not just for developed countries. Although there is less data or literature on training provided by businesses in developing economies, the evidence available suggests that Latin American firms do in fact train their workers. A World Business Environment Survey conducted in 1999 by the World Bank and the Inter-American Development Bank found that the percentage of Latin American firms that train their workers is not too different from the United States and Canada. The survey includes information on the training provided to employees by manufacturing and services companies in 20 Latin American countries. It finds that three of four firms in the region train their workers, and that the extent to which businesses provide training is often based on the nature of the firm, just as in developed countries. Businesses that have recently introduced some innovation (be it in products or processes) are almost 30 percent more likely to provide training than those that have not innovated. Firms in the services sector are 5 percent more likely to train, and small firms are fully 25 percent less likely to do so. Foreign firms are slightly more likely to have training programs, while family-owned businesses are less likely. Though older and more established firms provide more training, this effect is minor relative to the other effects studied in the survey. In terms of workers, the pattern of training by skill level again is similar to that of developed countries: the more educated and skilled workers are the ones who employers train the most and for longer periods (see Figure 10.2).

The fact that businesses train their workers does not necessarily preclude public training policies. Firms most likely provide a lower level of training and a different mix of skills than would be socially optimal. Literature on the "new growth" theory shows that underinvestment in skills today leads to lower future growth. Therefore, the low level of today's investment has a cost for future generations. This in turn justifies intervention through public policies. The fact that most training is directed to the more educated workers suggests that there are distributive reasons that would justify public intervention. In the absence of public intervention, training can exacerbate the difficulties faced by the poorly educated and by women in trying to enter the labor market. There are also transitional reasons that justify public intervention. When operating in a low-skill environment, firms will not create skilled vacancies because of the difficulties of filling them, even if that would increase their profits. Workers, in turn, will not have the incentives to obtain training, given the lack of skilled

¹³ See Lynch (1994).

vacancies, even if obtaining them would increase their productivity and wages. This "low skill, bad jobs" equilibrium can only be broken by public intervention that increases the supply of skills and pushes the economy towards a "high-skill, good-jobs" equilibrium.

The evidence shows, then, that the free market by itself would not provide an adequate level and mix of workforce skills. To the contrary, it suggests that public policies and resources are needed for just that purpose. However, successful public policies need to be embedded in an institutional structure that coordinates the actions of workers and unions, firms and business organizations, and government. The challenge is to find the type of public intervention and institutional structure that would be the more efficient and cost-effective way to provide as many people as possible with relevant and high-status transferable skills.¹⁴

Institutional Set-up for Training Policies

The institutional setting of a training system is a means to solve the collective challenge of providing the workforce with relevant, transferable and high-quality skills. Despite a number of reform initiatives to improve the performance of school and training systems, countries of the region have been unable to date to deliver a skilled workforce. This low-skill setting is embedded in a network of supply-side problems that constrain businesses from developing innovative productive and marketing strategies. Efforts to enhance skills run up against constraints posed by the financial system, the system of industrial relations, and forms of organization of production.¹⁵ Because training is a long-term investment, firms dependent on short-term financial flows are less prone to have the long-term horizon needed to develop training programs that provide their workers with highquality skills. In the absence of strong private sector organizations (like the German Chambers of Industry and Commerce), firms do not have a reliable institutional environment to share information on the skills needed and on how to coordinate providing them. Weak unions do not have the clout to ensure that workers are taught high-guality and transferable skills, and are not just exploited as cheap labor. For their part, workers in such an environment do not have confidence in the system, so they are less likely to put in the effort necessary to learn the skills taught in training programs. And businesses in turn find it difficult to adopt the

world class market and production strategies that require a skilled workforce, do not use modern production technologies, and minimize innovation.

The most common institutional organization of training systems in Latin America is a national-level public training institute vested with statutory authority to impose a levy on businesses, or with a firm claim on budget resources. The system is complemented by a host of mostly unregulated private training centers, some of them industry-related, others educational, and some purely for-profit private ventures. National training institutes are normally governed in a tripartite fashion, with a ruling body that includes the public sector, private firms and unions or worker representatives. In most cases, these institutes operate under the authority and supervision of the Labor Ministry, but are autonomous or semi-autonomous enough to both regulate the sector and serve as the principal provider of vocational training. As a regulator, the institutes often have the authority to approve a firm's training programs, the costs of which can then be deducted from the training levy (see Appendix Table 10.1). As a provider of vocational training programs, the institutes are supposed to plan activities in coordination with the private sector representatives on their governing bodies.

The story of these institutions is part and parcel of the import-substitution industrialization (ISI) strategy followed by most countries in the region until the early 1980s. In a closed economy, information on the demand for skills can be obtained easily by an institution governed by corporative representatives of the few "important" firms and unions in what are deemed a nation's "strategic" sectors. In Latin America, training programs designed by and for the firms granted de facto monopoly power in developing those sectors were largely successful in terms of the relevance of skills taught and the placement of trainees. In the context of the ISI push for modernization, the training institutions were not all that different from any other educational system through which public resources are channeled to solve problems with externalities and coordination.

Brazil is perhaps the crowning achievement of the traditional model of national training institutes. The SENAI-SENAC system is superbly managed, supplies high-

¹⁴ See Finegold (1999).

¹⁵ See Wood (1999) and Culpepper (1999).

quality training, and has a number of highly-qualified training providers that operate in a geographically and sectorally decentralized fashion though various local, sector-oriented training schools. The system is governed by a powerful bureaucracy based on strongly corporate private sector representation, and trusted by both the public and private sector. Activities are financed with earmarked resources from the payroll tax, and the system has ample resources to produce training, contract special purpose programs, and subcontract the provision of training for other public institutions.¹⁶

The relative success of the SENAI-SENAC system is associated with its ability to solve coordination problems that the private sector faces in providing training. By imposing a levy on all firms, the system in reality forces businesses to share in the cost of training programs. Unions, through their representation on the governing body, can oversee the guality and relevance of training and induce workers to invest the effort needed to acquire the skills being taught them. Sector and geographical decentralization helps to make the system useful as a tool in local development programs. For this to happen, however, the trust of the private sector must be earned and preserved. On the one hand, there must be the organization, staff and resources necessary to provide the needed skills in a flexible and timely manner. On the other, effective private governance of the system requires an adequate number of private sector institutional representative bodies (the Chambers of Industry and Commerce) that focus on developing an enabling environment for the activities of private businesses. Bureaucratization of the system and a narrowing of the Chamber's interests in defense of protectionist policies have defeated the national training institution model in most other countries in the region.

As early as the beginning of the 1990s, many voices were cautioning the public about the demise of the traditional training model. Two forces, one internal and the other external, were clearly disruptive to the performance of the training institutions in the region. First, given their character of public monopolies with politically designated governing bodies, the institutions lacked discipline in personnel management, both in terms of employment volume and wage and benefit levels. This resulted in bloated payrolls that ended up eating up their operational budgets. As wage costs in the public sector are quasi-fixed, the successive waves of budget tightening eroded non-personnel costs and made it even more difficult to attract higher-cost qualified trainers.

Second, a more dynamic technological environment made it more difficult for these institutions to acquire and maintain the updated equipment and teaching materials required for worker training. The opening of economies hit the manufacturing sector particularly hard,¹⁷ and speeded the growth of a more modern and sophisticated services sector. Yet, training systems were mostly oriented to developing skills needed in manufacturing, and had little or no experience in providing training for the services sectors.

The problem in many cases was that powerful public bureaucracies were able to effectively oppose institutional and financing changes to national training institutions. Governments haunted by the duress of adjustment policies began to see training as a social policy instrument, instructing the training institutions to develop programs that could be used to temporarily alleviate unemployment, thus breaking what little was left of their links to the private sector. Attempts to develop new and more diversified financing sources collided with bureaucratic inertia that blocked the needed institutional and organizational changes.¹⁸ Combined with the scarcity of high-quality trainers, this produced training institutions disconnected from the realities of industry and the needs of workers.

The national systems that survived this crisis had to undergo radical institutional surgery. They diversified their sources of revenue and became a channel for governments to deliver short-term training, mostly for disadvantaged youth. Some institutes, such as INAFORP in Panama, INFOTEP in the Dominican Republic, SENA in Colombia and INCE in Venezuela, tried to break with a centralist past by developing regional governing bodies and regional centers that catered to more local needs. This implied sectoral decentralization, with different specialties in different regions according to local economic activity. Not all the institutes survived the surgery. Some of them—most notably CONET in Argentina—simply disappeared from the budget. Others, like SENCE in Chile, revamped their institutional structure and functions, and even got a different name (see Box 10.2). With a few

¹⁶ See de Moura Castro (1999).

¹⁷ See Tokman and Martínez (1999).

¹⁸ See Ducci (1991).

Box 10.2 The Chilean Model: Differentiating between Regulation and Provision

The training system in Chile is regulated by the Servicio Nacional de Capacitación y Empleo (SENCE) under the Labor Ministry. One of the distinctive characteristics of SENCE is that it is a pure regulator that does not own or operate training facilities. Law 19.518 empowers SENCE to administer an income tax rebate program (*franquicia tributaria*) for firms that directly provide or contract registered providers to develop training programs for their workers. The tax rebate is topped at 1 percent of the firm's payroll, with a minimum that favors smaller firms. Businesses present their training programs to SENCE, and if the programs meet quality and relevance criteria, the firms receive a tax rebate that covers a portion of the program cost. This operational mode makes full use of the variety of training providers available in the market, and lets firms choose the content of their training programs according to their needs. Smaller firms that do not have the managerial structure needed to design training programs can use intermediate organizations as brokers with training providers, and these activities also benefit from the tax rebate.

Another important reform of Law 19.518 is the regulation of an apprenticeship contract that uses the *franquicia tributaria* to subsidize training of workers before employment begins and for a period of three months after separation of the worker. SENCE also operates the *Fondo Nacional de Capacitación*, which finances training for disadvantaged groups along the lines of the *Chile Joven* model and is active in establishing placement systems at the municipal level.

exceptions, the training institutions that emerged—often viewed disdainfully by the reform movement and the private sector alike—were a badly diminished version of the training powerhouses of the 1960s and 1970s.

One experiment in institutional redesign was guite successful and opened new avenues for reform. In 1994, the government of Chile started a special purpose program for disadvantaged youth called *Chile Joven*. Though the program was designed to help contain the consequences of high levels of unemployment and low levels of labor market participation by disadvantaged youth, it marked a far-reaching departure from the traditional organizational model of training systems. The government set up a fund under the control of the Labor Ministry to finance the competitive contracting out of training services from public and private providers. The basic contract between the training fund and the provider established that the service would include classroom training and then on-the-job apprenticeships where trainees would get practical training using the tools and equipment of an actual productive firm.

This training model became an instant success in Chile and in the region. By 1999, almost every country was implementing a pilot version, and some, like Argentina, were using the *Chile Joven* model as the centerpiece for the re-design of their training systems.

The popularity of the *Chile Joven* model and its rapid spread throughout the region is explained by two of its

characteristics. First, the program shifted control of the resources for training away from the national training institutes and to the Labor Ministry. This enabled governments to effectively bypass the problems of personnel management that plagued the national training institutes and, perhaps more importantly, allowed alternative training providers (ranging from public colleges to private providers operating in a non-regulated environment) to compete for funding. Second, as the practical part of the training is carried out by the businesses themselves using their own equipment and facilities, there are no materials costs to the training system. A bonus consequence of this is that post-training placement rates increased because firms matched their demand for types of employees with their requests for trainees. The willingness of firms to incur the positive costs involved in taking on apprentices—including the wear and tear on equipment, the disruption of production, and the cost of inputs and trainers' time---serves as a signal that the training is relevant to the skills the companies need. However, the new system has relatively high costs and does not "accumulate" knowledge because of the absence of a centralized regulatory institution to set standards and produce the curricula and manuals for courses geared towards basic and non-specific skills.¹⁹

¹⁹ See de Moura Castro (1999).

Box 10.3 Linking Education and Training Systems in Mexico

The training system in Mexico has a unique structure. It is dominated by a public vocational education institution (CONALEP) that owns and operates training facilities and programs under the authority of the Secretary of Education. Though CONALEP's main source of resources is the public budget, it also sells training services to the private sector and to Labor Ministry programs.

Since the mid-1980s, the Secretary of Labor has financed two training programs, one for unemployed workers (PROBECAT), and another that subsidizes on-the-job training (CIMO), with an emphasis on small firms. These programs are financed and regulated by the national government, but much of their daily operations are carried out by the State's Labor Secretariats in coordination with the private sector and worker organizations, with support from the central level.

A skill certification program (CONOCER) is operated jointly by the Secretaries of Education and Labor with the participation of private firms. The program finances the development of standards and designs exams for qualification. The actual teaching is carried out and for the most part financed by the existing training programs of both Secretaries.

The new Mexican administration is benefiting from this diversity of interests in the training system through the Commission of Social Development, a supra-secretarial unit reporting directly to the President. Under its authority, the Consejo Nacional de Educación para la Vida y el Trabajo (CONEVyT) is charged with coordinating educational and training programs by using rules that allow workers to migrate between programs in order to attain certified and accredited skills. Under these rules, undereducated workers can use the knowledge acquired in training programs to obtain academic accreditation on a capacity basis, rather than on the usual time-served criteria. Academic progress can then be used to re-enter the training system at a higher level and complete a certified skill examination. By breaking the barriers between the educational and training systems, this arrangement promotes more efficient use of the existing institutional structure to increase the supply of skills. However, the system is still dependent on the ability of the training programs to match its supply of skills to the market's demand.

Another training system innovation during the 1990s was the certification of skill standards. Skill certification essentially accredits or certifies skills that workers acquire through on-the-job training or experience, making those skills transferable. Certification thus solves the informational problem of potential employers not knowing the skill level of a prospective employee. Besides, workers are induced to invest more effort in acquiring skills because of the more "portable" value of these skills with prospective alternative employers. Setting up such a system requires defining standards and licensing gualified examiners, activities that need to be developed in coordination with the private sector. Mexico has the region's largest skill certification program (see Box 10.3), but several other countries are also experimenting with skill certification.

International donors are also active in promoting innovations in the region's training systems. Particular mention is warranted of the German technical cooperation agency (GTZ), which is implementing pilot programs that are adapted versions of the German model of dual apprenticeship, tailored to a number of countries in the region. Often these experiences collide with a regulatory structure that does not allow for apprenticeship contracts. Or, they are hindered by the lack of strong private sector organizations that can enter into an effective partnership with the training institutions.

Despite the innovations and success stories, the institutional status of training systems in the region is in a fluid state. Policymakers and the public alike still feel that training systems are not meeting the needs associated with economic integration into world markets, and that this failure is costly in terms of worsening income distribution, increased unemployment, and lost opportunities for growth of more productive firms. However, attempts to reform the training system are hindered by limited information about the impact of training systems on the workers they claim to train and, therefore, on the reforms needed to increase the efficiency and distributional outcomes of these systems.

Evaluating Training Policies

The performance of a training system cannot be appraised independently of the performance of the educa-



Source: IDB calculations based on national household surveys.

tional system. Basic literacy and numerical skills are required for any system of training to work properly, and these need to be taught by the school system. If schools are not performing adequately, no training system is going to produce the number and guality of skills needed by world-class firms operating in a global economy. The available evidence suggests that educational systems in Latin America are not performing at an adequate level. Dropout rates are very high, in part because educational systems do not offer incentives for students to stay in the system if they are not going on to higher education. A very low proportion of 15 to 18year olds stay in full-time schooling after compulsory education. As a consequence, new entrants to the workforce have few of the basic skills needed for them to be able to participate in more complex and sophisticated training (see Figure 10.3). The result is that the training system ends up having to teach remedial skills, a task for which it is quite ill-suited, and which duplicates at a higher cost what should have been taught in the first place by schools.

An extensive body of literature on labor market programs in developed countries suggests that low-skilled workers do not benefit from participating in training programs, and that the resources invested in those programs are neither effective nor cost-efficient.²⁰ Until recently, there was little evidence on the impact of training programs in the region. This void has been partly filled by the evaluation of programs supported by international financial organizations²¹ and by a series of studies commissioned by the Inter-American Development Bank that evaluate the impact of training programs in the region.²²

These evaluations are quite consistent with the findings of evaluations of developed country training programs. The likelihood of being trained, even in free public programs, increases with the level of education. In Colombia, where the evaluation makes a distinction between public and private providers, the impact of training on wages is larger for trainees who attend private institutions, possibly because businesses intervene in the selection of the training program and provider.

Studies of new modalities of training programs such as *Joven* in Argentina and PROBECAT in Mexico show that any positive impact on placement rates is small and varies considerably among demographic groups, with the largest impact on young males. The studies that find a positive impact show that training generally increases wages by around 10 percent above pre-training wages. However, there is also evidence that some training programs have a negative impact on wages, results that are consistent with evaluations in developed countries. Last but by no means least, the studies show that young and adult females enjoy the biggest positive impact on after-training wages.

Finally, though evidence here is not as conclusive as above, the studies show that better-quality providers produce better results in terms of both placement and income. The study on Chile shows that incentives to training providers have a positive impact on program performance. This suggests that contracting out training should be accompanied by an analysis of the internal efficiency of providers in order to improve the overall performance of the system

What Should Be Done?

To integrate competitively into the world economy requires a sustained increase in labor productivity that can only result from better educational attainment by the population at large and a higher level of the supply

²⁰ See Heckman, Leland and Smith (1999).

²¹ See Jiménez and Kugler (1987), Paes de Barros, et al. (forthcoming), and Revenga, Riboud and Tan (1994).

²² The studies evaluated the programs in Colombia (Medina and Núñez, 2000), Argentina (Elias, Cossa and Ruíz-Núñez, 2001), Chile (Bravo and Contreras, 2001) and Mexico (Calderón and Trejos, 2000).

of and demand for skills. Training policies cannot be viewed in a vacuum: their effectiveness and success depends on a number of policies that structure the incentives of firms and workers to respectively demand and supply skills.

First and foremost is education policy. Universalizing basic education up to the 9th grade is a key first step, but it is far from sufficient to support significant improvements in skill development. School systems need to be flexible and attractive enough to convince students to stay in school beyond basic education. This is not necessarily an argument in favor of vocational education as a specialized, closed-end feature of the educational system. Rather, easing the transition between school and the labor market and vice-versa is crucial to give under-educated workers the opportunity to acquire the basic skills that are a prerequisite for participating in the more specialized training that firms may want to offer. In this sense, the Mexican initiative entitled Educación para la vida y el trabajo shows conceptual promise as it opens new channels of communication between schools, training and the labor market.

Tax policies could also play an important role in subsidizing both the cost of training for people who choose to invest in learning new skills, and the investment that businesses make in training their workers. At the very least, investment in human capital should receive the same tax treatment as capital investment. Chile's franquicia tributaria is an interesting example of how a tax rebate can be used to subsidize a wide variety of training programs, including those for disadvantaged groups. The benefit of this kind of intervention is that it does not interfere in the training decisions of firms and workers. However, in the absence of strong regulation based on objective criteria on the guality and relevance of training programs, this policy could end up wasting resources by encouraging opportunistic conduct by businesses and workers alike.

Labor market regulations can foster productivity, since productivity is a function of contractual relations and working conditions. The supply of and demand for skills will be fostered by contractual innovations (including apprenticeship contracts) that allow workers and firms to share in the cost of training through a reduction in wages, and that eliminate the legal presumption of an indefinite labor contract for trainees. However, a strong regulatory presence and effective enforcement of quality standards for training programs is needed for this policy to work. Training programs should also be included in collective bargaining, thus giving firms and unions the opportunity and the mechanisms to negotiate the level of investment aimed at skill development. Mechanisms to protect the income of unemployed workers (including severance payments and unemployment insurance) should include subsidies for training, preferably in the form of vouchers that workers can negotiate as part of their job search strategy.

There is clearly no "best" institutional model for a training system, though there are a number of do's and don'ts that should orient policies in this area. The poor record of the traditional national training institutions in the region, due in part to the corporate model of organization that isolated such systems from workers and firms, shows that these institutes must be redesigned. There needs to be strong public regulation of training systems in order to establish and enforce guality and relevance standards for training programs. Considering the role of labor market policies, the Labor Ministry rather than the educational authority would be the logical choice as the principal regulator. However, the regulator should be autonomous from any other public entity that operates training programs in order to avoid conflicts of interest arising from bureaucratic encroachment. As in any market, regulation operates best when separated from provision. Nevertheless, to earn the trust of the private sector, the regulator needs to interact with the institutional representatives of workers and firms (and not just with training providers), and be governed by their demands. The corporativist model works only if those institutional representatives are strong and focused on competitiveness (as seems to be the case in Brazil), rather than on the defense of the status guo. When unions and chambers of industry and commerce are weak, the corporativist solution degenerates into a bureaucratic guagmire that consumes inordinate resources with little or no social return. There should be more flexible forms of coordination with the private sector and with unions, including the creation of local, regional and sector-specialized councils that can support public training policies in a setting and on a scale more agreeable to the institutional capabilities of unions and the private sector. Skill certification also is important because it solves an informational problem by making the quality and quantity of workers' skills observable by potential employers. Certification, however, requires strong institutional participation by businesses, workers and unions in designing the content standards and mechanisms for accreditation.

Existing training systems in Latin America have been charged with remedial training and education, and it is very likely that they will continue to be involved in this area given the deficits in the basic skills of the labor force. However, since these programs have little impact on beneficiaries, and therefore very low social returns, they should not be financed without stringent and continuous evaluation that allows for the flexible redesign of their content, method of delivery, and clientele. On the positive side, these programs broaden the spectrum of training providers and have been strong forces for change in training systems. But they need to be integrated with placement and intermediation mechanisms, keeping in mind that the ultimate objective of remedial training is to place trainees in productive jobs where they can continue to develop their skills. This implies that actions to facilitate the job search, including subsidies and counseling, should be an integral part of remedial training programs. Labor Ministries could profit from this opportunity to enhance the structure and performance of the placement and labor market intermediation services they provide.

The past decade in Latin America has been a time of innovation of training systems, with governments implementing new programs and setting up new institutional structures. While this is a welcome process, most of these programs have been set up as transitional devices to help with unemployment and poverty. Authorities should not forget that the ultimate mission of training is to provide the population at large with the level and mix of skills needed to create more productive jobs associated with a more competitive economy. Every action that affects a training system-from remedial training to the more sophisticated skill certification process—should be evaluated in terms of its effectiveness and cost-efficiency in attaining that objective, rather than in containing the adverse social effects of unemployment.

Labor Relations and Productivity

Labor relations describe the employment relationship between three main players: employers and managers; employees and their unions; and the government. Compared to the impact of education or training, the rela-





Source: ILO (1997-98).

tionship between labor relations and productivity outcomes remains relatively under-researched. However, international comparisons of labor productivity suggest that factors such as worker motivation, the quality of management, union agreements, restrictive work practices and absenteeism are important in explaining crosscountry differences in labor productivity.²³ Overall, these factors determine whether labor relations are productive and the objectives of firms are in sync with those of workers; or instead, whether labor relations are marked by conflict and non-cooperation between workers and employers. Needless to say, the second environment is characterized by lower productivity than the first.

Labor relations in Latin America occur in the context of weak labor unions and declining union membership as a proportion of the workforce. While in some countries employers characterize labor relations as cooperative rather than adversarial, workers in those same countries often display low motivational levels and serious distrust of their employers.

In all but a few countries of the region such as Brazil, Mexico, Argentina and Nicaragua, union coverage is low and unions operate at the firm or sector level (see Figure 10.4). Average affiliation rates in Latin America are not that different from the industrial country average. However, there are large differences in cov-

²³ See Koehn and Caplan (1987) or Yates and Guhathakurta (1993) for an international comparison of productivity in the construction industry.

erage rates. Thus, while in countries such as Spain, France and Greece, collective bargaining agreements negotiated by a minority are extended to almost all employees, this is generally not the case in Latin American countries. As a result, the region's coverage rates are much lower than those in industrial countries with similar affiliation rates. Perhaps due to their weakness, unions do not exert much influence on wages, at least for less-skilled workers. In addition, the influence of unions on wages seems to decline as industries open up to competition from foreign countries.²⁴ Little influence by unions is not necessarily good news for business, however. Although the relationship between union activity and productivity growth is largely unknown, some studies find a positive link between these two variables.²⁵

Regardless of the influence that collective bargaining exerts on wages, employment conditions and productivity, the fact remains that this influence, as measured by affiliation rates, is waning over time. Union membership as a proportion of the workforce has declined in most countries of the world, and Latin America is no exception. The decline has been particularly pronounced in Mexico and Argentina, where unions had notably higher coverage in the 1980s.

Conflicting Perceptions

While there is little information about how the different actors view labor relations in the region, what is available indicates that the views of managers conflict with those of employees. *The World Competitiveness Yearbook* for 2000 reports the perceptions of top and mid-level managers on the nature of labor relations in 47 countries worldwide, including six Latin American countries. Responses to different questions in those six countries were fairly consistent. For example, to the question of whether labor relations are generally hostile or productive, Chile had the 17th most productive labor relations worldwide, while Brazil was 22nd and Mexico 25th. Argentina (37th), Colombia (42nd) and Venezuela (43rd) ranked among the countries with the most hostile labor relations worldwide. Similarly, when



Source: Latinobarómetro (1997).



Source: Latinobarómetro (1997).

executives were asked whether workers identified with company objectives, Brazil was ranked 18th, Chile 22nd and Mexico 26th. The countries where workers were less in sync with company objectives included Argentina (34th), Colombia (37th) and Venezuela (45th).

Regarding how workers view their employers, the 1997 Latinobarómetro survey asked respondents (mostly employees) whether they thought employers were honest. The number of affirmative answers was very low (see Figure 10.5). The highest regard for employers was in Mexico, Venezuela and Colombia, while the lowest was in Brazil, Argentina and Paraguay. The survey also asked whether employers had good relations with em-

²⁴ See Cassoni, Allen and Labadie (2000) for a study of how union influence on wages in Uruguay is affected by trade openness.

²⁵ See Nickell, Wadhani and Wall (1992) and Gregg, Machin and Metcalf (1993).







Source: Latinobarómetro (1997).

ployees (see Figure 10.6). The percentage of workers that responded affirmatively was again very low, with a similar breakdown by country, although workers in Ecuador and Nicaragua this time were also among the countries with more affirmative responses.

Combining the two types of indicators for the countries in which the four indices mentioned are available yields a measure that reflects both sides of the employment relationship (see Figure 10.7).²⁶ Absolute values are all very small, suggesting that industrial relations are far from optimal in any of the six countries considered. Nonetheless, the differences across countries are quite large. The combined index of labor relations yields its higher value in Mexico, while Argentina is at the bottom of the scale.

Do these results imply higher productivity growth for Mexico than for Argentina? Not necessarily. Indeed, as will be seen below, bad labor relations may be the result of having attempted to and perhaps succeeded in implementing substantial changes in work practices or technology that bring higher productivity growth. What the results do imply, however, is that persistently bad labor relations can reduce labor productivity levels relative to what they would be in a more cooperative scenario.

Finally, Latinobarómetro posed two questions that allow for an appraisal of some aspects of overall worker motivation. The first asked respondents whether they believe success depends on connections. In all the Latin American countries, more than half of respondents thought that was the case (see Figure 10.8), with the highest percentages in Brazil, Ecuador, Colombia, Honduras and Chile and the lowest in Panama, Mexico, Nicaragua, El Salvador, and Guatemala.

The second question asked whether respondents agreed with the statement, "Working hard is not a guarantee of success." Again, large numbers agreed (see Figure 10.9), particularly in Nicaragua, Honduras, Ecuador, Brazil and Venezuela, and less so in Chile, Bolivia, El Salvador, Guatemala and Costa Rica.

These results suggest that workers do not attribute a high value to effort because they perceive that there are other factors outside of their control that end up determining their ultimate success, or lack thereof. Such a scheme of incentives is ill suited for high performance because it does not reward high productivity.

Labor Relations and the Adoption of New Technology

Labor relations can affect and be affected by the rate at which firms adopt new technologies. In particular, workers may boycott the adoption of new technologies or new work practices for fear that such innovations will

²⁶ The measure is constructed by rescaling two indices from the *World Competitiveness Yearbook* and the two indices from the Latinobarómetro survey to range between zero and one, and then multiplying them. The result captures the four aspects and two sides of labor relations.


Source: Latinobarómetro (1997).

result in job losses. Some studies also suggest that such resistance is highly influenced by policy. ²⁷

One study of the productivity of cotton textile mills across countries during the early 1900s²⁸ found that differences in productivity were mostly associated with the number of machines operated by each worker. The number of mills was not associated with relative prices of capital and labor, but to differences in the ability of workers to resist employers' attempts to increase the ratio of mills per worker. Worker resistance was associated with a fear that the introduction of new work practices would result in employment losses. However, across countries, differences in policies gave workers varying degrees of power to resist the introduction of new technologies. In countries such as India, where the state granted trade protection to textile industries, workers succeeded in blocking the adoption of a higher mill per worker ratio. In other countries where the state granted less protection to textile industries, workers had to adopt these changes. Thus, the evidence suggests that in countries where policies grant vested interests to workers, technology adoption and productivity growth will slow down, and therefore, growth in the standard of living will be slower.

The predictions of these studies at the firm level coincide with the findings of a recent study by Forteza and Rama (2000) at the aggregate level. They find that in countries where a higher share of the labor force is organized in unions, the overall state of the economy has to deteriorate further than in countries with lower trade union density prior to undertaking substantial economic reforms. Moreover, the greater the union membership, the slower the recovery after reforms. The authors use the share of workers organized in unions as a measure of the vocalness of workers who stand to lose. The greater the resistance of vocal groups potentially hurt by economic reforms, the more difficult it will be to implement economic reforms. In addition, the stronger the resistance to reforms, the more likely it is that the reforms will be watered down and therefore lose their effectiveness in improving economic performance.

What Should Be Done?

The previous discussion suggests that, although poorly understood, there are significant links between labor relations and the level and growth of productivity. These results coincide with the notion that human beings are complex entities and therefore their relationship with work and productivity must also be complex. Much more analysis at the theoretical and empirical level is necessary to draw definite lessons for policy, but given the current state of knowledge, some conclusions can be ventured. Employers, employees and the state should invest in promoting cooperative and productive labor relations by:

• Removing legislative barriers to high performance incentive schemes. Laws that strictly regulate benefits, types of contracts, types of incentives and other aspects of compensation reduce the possibilities of employers to offer incentives that motivate workers to innovate, create and excel at their jobs. Payments based on parameters such as individual productivity, team productivity, or profits have been shown to increase labor stability and productivity.²⁹ Although the labor codes of various Latin American countries force firms to distribute a certain percentage of profits to workers, variable payment systems work best when they target factors that can be affected by individual workers or groups of workers. A positive example is the recent experience

²⁷ See Parente and Prescott (2000), Baily (1993) and Baily and Gersbach (1995) on the importance of work practices in explaining cross-country differences in productivity.

²⁸ See Clark (1987) and Wolcott (1994), as quoted in Parente and Prescott (2000).

²⁹ See Wadhani and Wall (1990), Kruse (1993), van Dijk, Sonnemans and van Winden (2000), and Azfar and Danninger (2001).

of Brazil, which in 1994 introduced a measure mandating firms to share profits or the results of other targets with workers. It is encouraging that the measure did not fix any particular percentage to be distributed (as occurs in other countries of the region), but rather left the matter to be negotiated between workers and employers. Still, it is unclear yet whether this measure has contributed to increased productivity in Brazil.³⁰

• Creating permanent venues for social dialogue, both at the firm and aggregate levels. Government should play the role of facilitator, particularly when there is a history of conflictive labor relations.

• Promoting and enforcing laws that ensure the dignity and rights of workers and managers.

• Investing in the education of managers and union leaders. In particular, leaders who have lived in hostile environments can benefit from courses in conflict negotiation and team-building that promote a cooperative environment and finding common ground between the objectives of workers and companies. In addition, both sides can benefit from a greater understanding of the other party, which can be achieved by teaching management skills to union leaders and better human resources management skills to managers.

• Compensating workers who stand to lose from innovation. Latin American countries should advance policies that compensate workers who stand to lose from technological innovations and new work practices. The alternative-slowing down the process of innovation and productivity growth-may make sense from the point of view of those who stand to lose, but it has costly consequences in terms of aggregate welfare. Therefore, more attention should be paid to compensate the losses incurred by these workers. Prior to the design of such a policy, however, it is important to consider that the easier it is to find a new good job, the lower the loss incurred by a worker and the less the compensation required. Thus, focusing on policies that insure that workers transit smoothly from job to job is an essential part of the package. This involves improving existing job search facilities by computerizing vacancy registries, encouraging the private sector to report vacancies, and linking regions in a single registry. It also involves assisting displaced workers in finding new jobs through counseling and job search training. Finally, it may also require the funding of training to update the knowledge of workers in new areas.

Even after taking these steps, there remain any

number of reasons—salaries and benefits, firm-specific skills, motivation and career ladders—why workers might want to stay in their old jobs. Displaced workers could lose acquired rights when transiting from job to job, suffering a considerable loss in welfare even if they find new jobs immediately. Existing severance payments and other firing cost schemes widespread in the region may seem appropriate compensation, but in truth they often imply hidden costs in terms of productivity. This is because placing all the burden of compensation on the employer can slow the decision to adopt new technologies. Mechanisms such as unemployment insurance benefits are better suited to ensure workers against the risk of displacement. These mechanisms pool a large but relatively infrequent risk among all employed workers, allowing the few unlucky ones to obtain compensation. Unfortunately, unemployment insurance is plagued with moral hazard problems that should be dealt with carefully when designing the scheme. Introducing restrictive clauses that limit eligibility to workers who have held a job for a minimum period, or that provide payments of limited duration that decline over time, reduces but does not eliminate moral hazard problems. In countries with limited administrative and monitoring capabilities, or with a large number of informal workers, unemployment insurance mechanisms may not work. In those cases, mechanisms based on compulsory individual savings accounts, such as those used in Colombia or Peru, may provide some cushion to displaced workers. Unfortunately, those mechanisms do not pool risk, and thus require that each worker prepares for a painful event on his or her own terms. An alternative when possible might be a mixed version of this scheme, such as the one recently approved in Chile that combines individual savings and pooled insurance mechanisms.

 $^{^{30}}$ See Marinakis (1999) for an assessment of variable pay mechanisms in five countries of the region.

Appendix	Table 10.1 Cha	racteristics of	Latin America	n Training Syste	ems					
			Fina	incing						
		Does the in	nstitute receive res	ources from:			Institut	tional structi	Ire	
Country	Name of national training institute	An earmarked payroll tax? If affirmative, rate (%)	The budget ?	Private sector other than payroll tax?	Can firms deduct cost of their own training programs from tax?	Supervised by:	D. Structure of governing body c	becentralized and/or diversified?	Owns and operates training facilities?	Firms must submit training programs for their approval?
Barbados	NATIONAL TRAINING BOARD	0.5 - 1	Yes	Yes	Costs incurred by employers are subsidized by the Employment and Training Fund	Min. of Labour	Tripartite. The council includes three employers and three academic and two union represen- tatives	ца	8	Yes
Bolivia	INFOCAL	P		Yes	Ъа	Min. de Desarrollo Humano	National Office and nine Department Directories with the participation of the Confederación de Empresarios Privados de Bolivia	Yes	Yes	e C
Brazil	SENAL/SENAC	2.5	Both are private entities financed by parafiscal con- tributions.	Yes	With agreement from SENAL, but only for courses authorized by and provided through them	Min. do Trabalho		Yes	Yes	Yes
Colombia	SENA	0.5 - 2.0		Yes	Up to 50% of cost of training authorized by SENA can be de- ducted from training tax	Min. de Trabajo y Seguridad Social	Tripartite	Yes	Yes	Yes
Chile	SENCE	ла			Yes (up to 1% payroll and slid- ing scale for smaller firms)	Min. de Trabajo y Seguridad Social	Tripartite	Па	ца	Yes
Costa Rica	INA/SINETEC	N	Yes	Yes	Ň	Min. de Trabajo y Seguridad Social/ Min. de Educación Pública	Tripartite. Govern- ment, academic, and employers council		Yes	Yes

Appendix 1	Table 10.1 Char	acteristics of	Latin Americar	ו Training Syste	ims (cont.)					
			Fina	ncing						
		Does the ir	nstitute receive res	ources from:			Instit	utional structu	Ire	
Country	Name of national training institute	An earmarked payroll tax? If affirmative, rate (%)	The budget ?	Private sector other than payroll tax?	Can firms deduct cost of their own training programs from tax?	Supervised by:	Structure of governing body	Decentralized and/or diversified?	Owns and operates training facilities?	Firms must submit training programs for their approval?
Dominican Republic	INFOTEP	-	Yes	Yes	Employers can deduct the cost from their contri- bution for train- ing authorized by INFOTEP	Sec. de Estado de Trabajo	Tripartite	Yes	Yes	Yes
Ecuador	SECAP	0.5	Yes		Yes	Min.de Trabajo y Recursos Hu- manos	Tripartite	Yes	Yes	
Guatemala	INTECAP	1	Yes	Yes		Min. de Trabajo y Prevision Social	Tripartite	Yes	Yes	Yes
Jamaica	THE HEART TRUST	m	N	Yes	Trainee emolu- ments with a cap of \$50 per week per trainee	Min. of Labour	Board of Directors (tripartite)	ы	No	Па
Mexico	CONALEP	па	Yes	Yes	па	Secretaría de Educación Pública	na	Yes	Yes	па
Nicaragua	INATEC	2	Yes	Yes			Tripartite			
Panama	INAFORP	иа	Yes, from special contributions to the Education Insurance Fund	Yes	Twice the trainee income earned during the fiscal period of contrib- uting employer	Min. de Trabajo Desarrollo Laboral	Tripartite	Yes	Yes	ца
Paraguay	SNPP	1	Yes	Yes		Ministerio de Justicia y Trabajo	Iripartite	Yes	Yes	Yes
Peru	SENATI	0.75			na		Tripartite	Yes	Yes	na
Trinidad & Tobago	CIPRIANI LABOUR COLLEGE		Yes		na	Min. of Labour	Bipartite		Yes	
Uruguay	DINAE/JUNAE		Yes			Min. de Trabajo y Seguridad Social	Tripartite	Yes	No	Yes
Venezuela	INCE	2	Yes	Yes	Only when ap- proved by INCE	Min. de Educación	Iripartite	Yes	Yes	Yes
Source: Intervie	ews with officials from la	bor ministries, labor	training institutions a	and CINTERFOR-ILO.						

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Summary

Almost without exception, richer and more developed countries have better roads and ports, more reliable electricity systems with broader coverage, and more sophisticated telecommunications services. The relationship across countries between income levels and the quality of infrastructure is too pronounced to be the result of a simple unidirectional link from one variable to the other. Infrastructure is an important determinant of productivity and growth, as it helps reduce transportation costs, expands the scope of the market, and facilitates the transmission of information and knowledge. As more and more industries become part and parcel of the knowledge economy, greater reliance is placed on the infrastructure sectors to provide the services that make possible the increasing flow of information. Higher income levels feed back into larger demands for energy, transportation and communication, strengthening the link between economic development and infrastructure. Furthermore, and perhaps more importantly, both investments in infrastructure as well as overall economic development are sensitive to the institutional environment. Well defined property rights, a predictable requlatory environment and a modicum of transparency in public decisions are required for investors to commit large resources in assets that are immovable, lack secondary markets, have no alternative uses, and can only be profitable in a long horizon. To a greater or lesser extent, these elements of the institutional environment also affect other investment decisions, whether they involve physical assets, human capital, or establishing private or public organizations.

High fixed costs and the likely presence of network externalities would appear to make the provision of infrastructure services a natural monopoly. As a result, most countries have traditionally provided these services through state-owned enterprises. But burgeoning demand for infrastructure in the face of limited public financing and major inefficiencies have recently forced governments to allow private capital into these industries. Latin America has been the leading region in this process, with total investments with private participation representing more than 43 percent of the total for all developing regions (see Table 1). But privatization alone has been insufficient to assure competition and

le I	Private Capital Participation in Info (Billions of US\$)	rastructure, 1990-99		
	()	Latin America	Developing countries	Latin American participation (%
Energy	y (electricity and gas)	73.9	192.8	38.3
Teleco	ommunications	116.0	249.0	46.6
Transp	port (ports, airports and railways)	49.2	106.1	46.4
Water	and sanitation	12.9	31.4	41.1
Total		252.0	579.3	43.5

Source: World Bank (2001).



Source: IDB calculations based on World Bank (2000).

Note: Each dot represents a country. Latin American countries are shown in red.

efficiency. A variety of regulatory schemes have been put in place to achieve these objectives. Although progress has been remarkable, the results have been mixed and final consumers have not always benefited from these improvements.

Ports and Transport

Until the end of the 1980s, Latin American ports operated, in practice, under the economic protectionist model that prevailed in the region. But the mechanisms of import protection have since been dismantled. Average tariffs in Latin America have fallen from 26 percent at the beginning of the 1980s to a current level of about 10 percent. The spread of containerization and other technological changes in international transport services have substantially reduced the cost of trading with distant countries. With the entry into world trade of large-scale providers of cheap products, the competitiveness of many Latin American products in world markets depends now more than ever on further reducing transport costs. As it happens, ports can be an important source of such reductions: an improvement in port efficiency from the 75th to the 25th percentile in the world rankings reduces shipping costs by the equivalent of 9,000 kilometers. Although hypothetical, this calculation is painfully relevant because Latin American ports are among the most inefficient in the world, according to business leaders cited in The Global Competitiveness Report. Efficiency of ports is only partially a matter of quickly loading and unloading ships; it also depends on administrative effectiveness, especially in completing customs procedures. In Latin America, imported goods spend an average of seven days in customs warehouses, twice as long as in the most advanced countries.

There are three types of public port management models in the region: (i) public ports for general cargo imports, where the basic infrastructure is owned by the state but operations are private; (ii) specialized ports that are completely private and serve large export sectors; and (iii) concessions of up to 30 years aimed at promoting the modernization of port facilities and services.

There is no single formula to improve the efficiency of ports. Distinct elements must be combined in proportions that vary from country to country, taking into account, among other factors, the possibilities for competition between different ports, the volume of trade, and the characteristics of the country's major exports. It is clear, however, that regulation is needed that provides for private initiative but prevents the monopolization of services, and that eliminates the juridical uncertainty so common in Latin America. Although definitive solutions are still not in place, ports have ceased to be an instrument of protectionism and have become part of the machinery of competitiveness.

Electricity

Although the process of privatization and reform of electricity sectors has not reached all countries of the region, Latin America has been the world leader in power sector reform. Generation has expanded, electricity losses have been reduced, and large industrial consumers have benefited from lower prices. Having said that, it is also clear that much remains to be done: in most countries, competition is limited and hampered by concentration, service coverage has not expanded to marginal areas or to low-income consumers, and the regulatory system has not achieved adequate levels of transparency, simplicity or certainty. Nor is there a stable or standard regulation model. Thus, while there have been major achievements, and the new regime certainly is an improvement over the old one, significant problems could threaten these advances over the long term.

Some of the difficulties are due to technological

constraints common to all electricity markets, regardless of the country. Others arise because countries lack the institutional development and human resources implicit in the models adopted. Because institutions take time to develop, sometimes it is preferable to have an evolutionary rather than a big bang approach to reform. It is critical to keep the wires business, transmission and distribution independent from supply, generation and commercialization. A constraint-free transmission system is of vital importance for the market, and its expansion should not be limited by narrow efficiency considerations. Even if competition is not feasible in the short term, care should be taken not to foreclose future options for competition (as would be the case, for example, if a regional integrated energy market were to become feasible in Central America). Consequently, any solution requires a certain level of regulatory intervention, and even then it will not completely solve the trade-off between having reliable investors and low prices. One criterion for selecting an approach to improve competitiveness may be to minimize the regulatory transaction costs in the short term in order to buy time to develop the necessary institutional capacity over the long run.

Regardless of the approach, many issues remain unsolved or are awaiting the results of ongoing pilot programs in the region. The jury is still out on how to best regulate a small system, or on the type of market arrangements that minimize the exercise of market power. How much vertical integration to allow in a constrained competitive system sometimes is more an art than a science. And how to involve the demand side in the market and realize the potential of retail competition are also subjects of debate.

Telecommunications

Because of technological innovations over the past decade, information technology has become an essential factor in production, inducing a huge explosion in the demand for telecommunications services. In general, state-owned monopolies had neither the right incentives nor the required funds for investment to meet this new demand. In addition, new technologies in the industry do not have significant increasing returns to scale, undermining one of the reasons why some segments were considered natural monopolies.

The Latin American countries have been leaders, however, in adapting their regulatory framework to address new challenges in telecommunications. Typically, this process includes separating telecommunications services from the central government, creating incentive-oriented regulations, and separating regulatory and operational functions. The final feature of these reforms is private capital. In some cases, this capital must compete from the outset, while in others the new private incumbent is granted a period of exclusivity to compensate for required investments.

Latin America's telecommunications reforms have improved efficiency, fostering telephony penetration and improving the quality of services. But they have also increased prices. Some case studies show that privatized monopolies have high returns, which shows that improvements are not always fully transferred to final consumers. Informational rents are high, but they seem to decline when competition is introduced.

Despite improvements, Latin America still has a long way to go in advancing telecommunications. Internal and external gaps are still huge, and universal access today involves not only basic telephone services, but also more advanced customer-oriented services such as data transfers and Internet access. Regulations have to foster competition and protect consumers from potential monopolies, while also dealing with network access and inter-operability. The regulatory challenge is to develop consistent regulations that treat similar products in a coherent way, encourage innovations, and serve the best interests of all users. This page intentionally left blank

11

Ports and Transport'

Tariff and non-tariff barriers are no longer the major hurdles to international trade that they once were for Latin America. In light of the trade liberalization of the late 1980s and 1990s, the countries of the region today must turn their attention to transport costs if they want to better integrate into the global economy. This chapter will show the importance of transport costs and discuss how economic policies at the national level can reduce them.

Distance, of course, is the main factor behind transport costs. But distance is not everything. Among the many other variables that affect transport costs, the efficiency of ports is the most important, and the one that can be most directly affected by government. Port efficiency is so critical that an improvement in the international rankings from the 75th to the 25th percentile could represent a reduction in transport costs for a country equivalent to shortening its distance with its trading partners by 9,000 kilometers.

The question, then, is what explains the huge gaps in port efficiency between locations like Hong Kong, Singapore or Belgium, on the one hand, and some of the Latin American or African countries, on the other? To some extent, differences in the physical infrastructure of ports are behind those gaps. But that is only part of the answer. Many of the least efficient ports are the result of an inadequate regulatory and institutional environment that impedes competition, fosters organized crime and slows the introduction of modern techniques of cargo handling and port management.

This chapter shows the progress that some Latin American countries have made in correcting these problems. Although many different models of port management have been adopted, experience indicates that the recipes for success usually share some common ingredients. These include private involvement in port management, flexible labor restrictions, and the curtailing of monopoly power either through regulation or competition.

The Growing Importance of Transport Costs

There has been a major shift in national policies around the world regarding international trade over the past two decades. Tariffs have been reduced in virtually every country and non-tariff barriers have been severely curtailed. In Latin America, average tariffs declined from almost 26 percent at the beginning of the 1980s to 10 percent by the end of the 1990s. Most analysts welcome these outward-looking policies, as it is widely accepted that trade is good for growth.²

These reductions in artificial trade barriers imply that the relative importance of transport costs has increased.³ Worldwide, transport costs represent around 5 percent of trade value (see Figure 11.1). This figure—which if anything may seem low—is mainly driven by developed countries, which account for more than 70 percent of world imports, and whose proximity to one another is reflected in relatively low freight costs (4.2 percent).

If freight costs are disaggregated by region, some turn out to be substantially higher than the worldwide

¹ See Micco and Pérez (2001) for a more detailed version of this chapter.

² For recent empirical assessments, see Frankel and Romer (1999), Ades and Glaeser (1999) and Dollar and Kraay (2001). For a skeptical view of the importance of trade policies, see Rodríguez and Rodrik (1999).

³ See Amjadi and Yeats (1995) and Radelet and Sachs (1998).



Source: UNCTAD (1999), based on IMF Data.



Source: World Bank (2000) and IMF (2000).

average. Although Latin America appears to have low transport costs relative to other developing regions (7 percent compared to 8 percent for Asia and 11.5 percent for Africa), the Latin American figure is weighted by Mexico's proximity to its main trading partner, the United States, and its resulting low freight costs. When Mexico is excluded, the region's average transport costs rise to 8.3 percent, more similar to that of other developing regions.

The effective rate of protection provided today by transport costs is often higher than the rate provided



Source: IDB calculations based on U.S. Census Bureau, Department of Commerce.

by import tariffs. Import freights paid by Peru are almost twice as large as the average import tariff of 12 percent. In several Central American countries—including Costa Rica, El Salvador and Nicaragua—freight costs account for more than double the average import tariff of less than 5 percent (see Figure 11.2). For many Latin American countries, the main obstacle to gaining access to the U.S. market is no longer the tariff, but the transport cost. Two extreme cases are Chile and Ecuador: import tariffs represent less than 1 percent of the value of their exports to the United States, while transport costs are 12 percent or more of that value (see Figure 11.3). Consequently, any international integration strategy must take into account the effect of transport costs and their determinants.

Do transport costs affect trade and economic development? The literature that applies the gravity approach to the study of international bilateral trade shows that geographical distance, which is used as proxy for transport costs, is negatively related with trade and income levels.⁴ Limao and Venables (2000) show that raising transport costs by 10 percent reduces trade volumes by more than 20 percent. Using the same approach, Redding and Venables (2000) claim that transport costs explain more than 70 percent of cross-country variation in per capita income and more than 50 percent of the variation in manufacturing wages. Thus, in their view,

⁴ See Bergstrand (1985).

transport costs are the most important determinant of income gaps between countries worldwide. In a different analysis, Radelet and Sachs (1998) find that doubling shipping costs (for example, from an 8 percent to 16 percent CIF band) is associated with a reduction in GDP growth of slightly more than half of one percentage point.

What Factors Explain Maritime Transport Costs?

Transport costs may be an important barrier to trade and could have an important effect on income. But why do some countries have higher transport costs than others? Is it only a matter of distance? Can government policies affect these costs? This section addresses these questions by using a qualitative and quantitative description of the determinants of transport costs.⁵ The analysis focuses on international maritime transport costs (more specifically, *liner* maritime transport costs), given their relative importance and the availability of data.

The services provided by shipping companies make them by nature a transnational industry that serves more than one country. In general, these companies have access to international capital markets and are able to hire workers from all over the world.⁶ Therefore, we would not expect differences in capital or labor costs to be the main factors in explaining differences in transport costs across countries.

The obvious and most studied determinant of transport costs is geography, particularly distance. The greater the distance between two markets, the higher the expected transport cost for their trade. According to our own estimates based on liner maritime charges paid by U.S. imports from all around the globe, a doubling in distance increases transport costs by 20 percent (see Appendix Table 11.1). Using shipping company quotes for transporting a standard container from Baltimore to selected worldwide destinations, it was found that an extra 1,000 kilometers raises transport costs by \$380 (or 8 percent for a median shipment). Breaking the journey into an overland and a sea component, an extra 1,000 kilometers by sea raises costs by only \$190, while the same distance by land raises costs by \$1,380-4 percent and 30 percent of a median shipment, respectively. In addition, if a country is landlocked, transport costs rise by \$2,170, almost 50 percent higher than the average cost. In other words, being landlocked is equivalent to being located 10,000 kilometers farther away from markets.

Trade composition can also help explain differences in transport costs across countries. Because of the insurance component of transport costs, products with a higher unit value have higher charges per unit of weight. On average, insurance fees are around 2 percent of the traded value, and they represent around 15 percent of total maritime charges. Therefore, high value-added exporting countries should have higher charges per unit weight due to this insurance component. On the other hand, some products require special transport features and therefore have different freight rates.

Directional imbalances in trade between countries imply that carriers are forced to haul empty containers back. As a result, either imports or exports become more expensive. Fuchsluger (2000) examines this phenomenon in bilateral trade between the United States and the Caribbean. In 1998, 72 percent of containers sent from the Caribbean to the United States were empty. This excess of supply in the northbound route implied that a U.S. exporter paid 83 percent more than a U.S. importer for the same type of merchandise between Miami and Port of Spain (Trinidad and Tobago).

Maritime transport is a typical example of an industry that faces increasing returns to scale. The classical economist Alfred Marshall put it clearly long ago: "... a ship's carrying power varies as the cube of her dimensions, while the resistance offered by the water increases only a little faster than the square of her dimensions." Besides increasing returns at the vessel level, there are economies of scale at the seaport level. At the Port of Buenos Aires, the cost of using the access channel is \$70 per container for a 200 twenty-foot equivalent unit (TEU) vessel, but only \$14 per container for a 1,000 TEU vessel. In general, even though most of these economies of scale are at the vessel level, in practice they are related to the total volume of trade between two re-

⁵ This section is based on LSU-National Ports and Waterways Institute (1998), McConville (1999) Fuchsluger (2000), Limao and Venables (2000), and Fink, Mattoo and Neagu (2000).

⁶ Shipping companies prefer to sail their ships under open-registry flags. In fact, according to UNCTAD (1999), Panama, Liberia, Cyprus and the Bahamas account for more than 40 percent of the world fleet.

gions. Maritime routes with low trade volume are covered by small vessels, and vice versa. Similar features can be observed in air and land transport.

In addition, the development of containerized transport in recent years has been an important technological change in the transport sector. Containers have allowed large cost reductions in cargo handling, increasing cargo trans-shipment and therefore national and international cabotage. In turn, this increase in cabotage has induced the creation of hub ports that allow countries or regions to take advantage of increasing returns to scale.

Commercial routes more liable to competition and less subject to monopoly power will tend to have lower mark-ups. Monopoly power can be sustained either through restrictive trade policies imposed by government or by private anti-competitive practices (cartels). The former includes a variety of cargo reservation schemes, such as the UN Liner Code. Private anti-competitive practices include the practice of fixing rates of maritime conferences.⁷ The econometric analysis in Appendix Table 11.1 reports evidence that agreements between liner companies serving the United States seem to have at most a mild effect, adding an estimated 6.7 percent to liner maritime transport costs in 1998. This may be because, as some studies have shown, the power of maritime conferences has declined in recent years, forcing shipping companies to merge as a way of retaining their monopoly power.

Similar restrictions and anti-competitive practices can induce inefficiencies or monopoly power in ports. For example, workers in many countries are required to have special licenses for providing stevedoring services, and in general these restrictions imply high fees and low productivity.

Finally, and most relevant for its policy implications, the quality of onshore infrastructure is an important determinant of either land or maritime transport costs. It accounts for no less than 40 percent of predicted transport costs for coastal countries, and up to 60 percent for landlocked ones. If a country with relatively poor infrastructure—such as Ecuador or Brazil, ranked 75th internationally—were able to upgrade to the 25th percentile (the level of France or Sweden), it would reduce transport costs by between 30 and 50 percent.⁸ Although this is hypothetical, it underscores the relative importance of onshore physical infrastructure and its operation. The estimates in Appendix Table 11.1 for transport costs of merchandise entering the U.S. market confirm these findings. Based on these estimates, an improvement in port efficiency from the 75th to the 25th percentiles in the world rankings reduces shipping costs by the equivalent of 9,000 kilometers.

Maritime Transport Costs and Port Efficiency

The previous section stressed the importance of port efficiency. But what exactly does that mean, and what are the factors behind it? Port efficiency is related to activities that depend on port infrastructure, such as towing and tug assistance or cargo handling, as well as to activities related to customs requirements. As stated by Raven (2000), "the (in)efficiency, even timing, of many port operations is strongly influenced (if not dictated) by customs." However, legal restrictions and procedural flaws can also impair the services more closely related to port infrastructure. As mentioned earlier, for example, seaport costs are artificially increased in the many countries where workers are required to have a special license for providing stevedoring services. Some ports still receive cargo without specifying the presentation of a Standard Shipping Note, which is inconceivable in modern port practice. In many ports, it is virtually impossible to obtain a written and accurate account of the main port procedures, and sometimes port regulations are not clear about the acceptance of responsibilities (for cargo in the warehouse or on the quay, for instance). All of this generates unreasonably long delays, increases the risks of damage and pilferage of products (in turn raising insurance premiums), and, as a consequence, considerably increases costs associated with port activities.

Port efficiency varies widely from country to country and, especially, from region to region. Some Asian countries, like Singapore and Hong Kong, have the most efficient ports in the world, while several African nations (Ethiopia, Nigeria, Malawi) and South American ones (Colombia, Venezuela, Ecuador) have the most inefficient ports. Table 11.1 presents estimates of port

 $^{^7}$ Maritime conferences enjoy an exemption from competition rules in major traders such as the United States and the European Union.

⁸ See Limao and Venable (2000).

Table II.I	Port Efficiency Variables by Region

	Port efficiency (7=best, 1=worst)	Customs clearance (days)	Container handling charges in ports (US\$/TEU)
North America	6.35	3.5	261.7
Europe (except East)	5.29	4	166.7
Middle East	4.93	na	na
East Asia and the Pacific	4.66	5.57	150.5
East and South Africa	4.63	12	na
North Africa	3.72	5.5	na
Former Soviet Union	3.37	5.42	na
Eastern Europe	3.28	2.38	na
Latin America	2.9	7.08	251.4
South Asia	2.79	-	na
West Africa	na	11.7	na na

Notes: Efficiency variables per region are not directly comparable to each other because the availability of countries is not the same. Thus, this should be considered a complementary rather than substitute measure.

Source: World Economic Forum (1999), World Bank surveys, Cámara Marítima y Portuaria de Chile (1999), and LSU-National Ports and Waterways Institute (1998).

efficiency by geographic region. The first column is a subjective index based on surveys reported by the World Economic Forum in *The Global Competitiveness Report* for 1999. North America and Europe have the best rankings, followed by the Middle East, East Asia and the Pacific. Latin America and South Asia, in turn, are perceived as having the least efficient ports. The second column indicates the typical delay in days to clear customs.⁹ Latin America is second only to Africa in terms of major customs problems, with a median delay in clearing customs of seven days. In this group, Ecuador (15 days) and Venezuela (11 days) are the worst offenders.

As should be expected, port efficiency is reflected in handling costs and therefore in maritime transport costs (see Figure 11.4). While efficient ports in East Asia have lower charges, Latin American ports have the most expensive handling services (third column of Table 11.1). This relationship is clearer when we take into account wage differentials across countries and even when we isolate the influence of physical infrastructure quality on port efficiency (Figure 11.5) Where ports are most efficient, like Singapore and Belgium, the (relative) cost of handling services is lower. At the other extreme, handling costs are high in countries like Ecuador and Brazil, where ports are least efficient.

Therefore, port efficiency is not just a matter of more or better physical infrastructure. To support this important point, Appendix Table 11.2 presents econo-



Note: Adjusts for distance, trade volume, containerization, conferences, product type, etc. Does not include Canada. Source: Appendix Table 11.1.

metric evidence showing that, in addition to port infrastructure, port efficiency is influenced by the quality of the regulatory and institutional environment in which ports operate. As a proxy of the degree of regulation, the variable "mandatory port services" is used to measure the extent to which port services are mandatory

⁹ As reported in business environment surveys by the Inter-American Development Bank and the World Bank.



Source: IDB calculations.

for incoming ships. (See Appendix 11.1 for data definitions.) The results suggest that while some level of regulation is necessary for port efficiency, excessive regulations can be damaging. Argentina has a moderate level of regulation of its seaports, while Brazil imposes too many requirements. In the same vein, the variable "cargo handling restrictions" captures the severity of the restrictions imposed on foreign suppliers of cargo handling services, which tends to discourage competition. The measure of "organized crime" also turns out to be highly significant and suggests that much port inefficiency is due to the quality of the institutional environment. In terms of our sample, a reduction in organized crime from the 75th to the 25th percentile would imply an improvement in port efficiency from the 50th to the 25th percentile.

Towards a Latin American Model of Port Management?¹⁰

Because the regulatory and institutional environment is so important for port efficiency, many countries have welcomed the private sector in port management (see Box 11.1). This has been a global trend affecting both developed and developing economies. In the latter, private investment commitments in 112 projects amounted to more than \$9 billion between 1990 and 1999. In Latin America alone, the private sector has become in-

Box II.I Organizational Models for Ports

Maritime transport literature characterizes ports according to the ownership of their infrastructure and superstructure. Accordingly, there are three types of ports: service ports, tool ports and landlord ports. Under the service port model-commonly used for public ports in Latin America in the 1960s-the Port Authority is in charge of management of infrastructure and superstructure, as well as overall operation of the port. The Port of Singapore is a publicly owned port of the service type, but there can also be private service ports, such as that of Hong Kong. The tool port can be best described as one in which the Port Authority owns the infrastructure and superstructure, and its services are licensed to private firms. Most public ports in Latin America functioned under this scheme during the 1980s, and many Central American countries continue to do so. (Panama is an exception.) Finally, under the landlord port system, the infrastructure belongs to and is managed by the Port Authority, which grants concessions to private firms for port superstructure and to provide all port services. The concessionaire can undertake the investments deemed necessary to best provide services.

volved in 64 projects worth \$3.9 billion. Although the main purpose of these initiatives has been to improve seaport efficiency, privatization has also been motivated by the need to reduce the fiscal burden of port losses. Even though it is too soon to pass final judgment, the Latin American experience seems to show that private involvement increases port efficiency when supported by labor reform, and when seaport monopoly power is either adequately regulated or reduced by competition.¹¹

Private involvement in public seaports has been the result of new market conditions and global trends in maritime transportation. The new export-led growth paradigm adopted by many countries has put pressure on port authorities to improve seaport efficiency, while

¹⁰ This section is based on Baird (1999), Cámara Marítima y Portuaria de Chile (1999), Estache and Carbajo (1996), Foxley and Mardones (2000), Gaviria (1998), Hoffman (2000, 1999a), Nombela and Trujillo (1999), and Viloria (2000).

¹¹ Private involvement in managing and financing ports to date has been largely limited to captive facilities. These facilities, typically for bulk cargo, are often vertically integrated into production processes and not actively promoted for use by third parties.

containerization and other technological changes in maritime transport have forced seaports to modernize their installations and operational methods. New investments and administrative and labor reforms have been required for ports to successfully compete for cargo handling. More often than not, however, governments have been unable to financially commit to this challenge, so private sector involvement has become critical. Still, changes have been gradual and followed different paths. At the beginning of the 1980s some countries allowed private participation for seaport services such as towing, pilotage and stevedoring.¹² Since 1981, private stevedore firms have been allowed to perform all transfer services in Chilean state-owned ports, a system known as the multi-operator model. Meanwhile, Colombia allowed private operation of terminals and berths alongside major port districts.¹³ As a first step toward privatization in the United Kingdom, the National Dock Labor scheme was abolished, liberalizing the labor market. In Asia, concessions for container operations in the port of Kelang (Malaysia) and the Manila International Container Terminal were awarded in 1986 and 1988, respectively. Most of these initial experiences had a positive impact on port efficiency.

During the 1990s, private participation in public ports became more pronounced and led the way to concession contracts that allowed private firms to operate ports and make investments to improve the quality of services. Pioneering this process in Latin America were Panama and Colombia. The former granted its first concession at Manzanillo International Terminal in 1993, which started operations by 1995, and the latter offered its first port concession in 1993. Mexico was also an early reformer. The Ports Law enacted in 1993 allowed private firms to provide all port services. The major container terminals have since adopted the single-operator scheme.

Most public ports in Latin America are currently implementing the landlord port model. Under this system, the infrastructure of the port belongs to the port authority and the superstructure (including services such as pilotage and towage) is given in concession to a private firm. However, the reasons why countries have turned to this model have varied, as have the ways in which they have carried out the process. Argentina and Brazil, with little transcontinental commerce but with a large fiscal burden, were mainly driven by the fiscal impact of concessions. Colombia and Venezuela were mostly concerned with opening their economies and improving port efficiency.

Regulation regimes also differed: countries with little intra or inter-port competition implemented more restrictive regulations in order to curtail monopoly practices. The ports of the Andean Community, which are far away from each other and have poor road connections, became more regulated. On the other hand, given the proximity of MERCOSUR ports to one another, there was less regulation in order to ensure competitive price levels. A good example is the competition for cargo between the ports of southern Brazil and those of Buenos Aires and Montevideo. Competition between them has been enhanced by improved highway infrastructure that allows for more rapid connections with the interior of those countries.

Reforms have not reached all countries, however. Central American ports such as those in El Salvador, Guatemala, Honduras and Nicaragua are still service ports where modernization and labor reforms are yet to come. In Costa Rica, ports have already licensed stevedoring services, but investment and prices at the ports are still controlled by the government. The exception in the Central American region has been Panama.

Initiatives by most countries in the region in the 1990s to reform the maritime sector have led experts to define a new "Latin American model" that comprises the following features: ¹⁴

• Public ports are of the landlord type and mostly serve import cargo, while a high percentage of bulk goes through privately owned and operated terminals. For example, in 1998, 86 percent of Chilean liquid bulk went through such ports.

• Opportunities are available for private firms and foreign investors to establish new ports. An example is the new private terminal in Zárate, Argentina.

• Concessions have been granted for 12 to 30 years in order to promote private investment in modernization of port infrastructure and superstructure.

Though not enough time has elapsed to pass final judgment on the reforms, several results are clear. In most cases, labor productivity has increased and handling cargo costs have decreased. Efforts have been made

 $^{^{12}}$ In the United Kingdom, Thatcherism went further and privatized the ports and the Port Authority.

¹³ These private berths would handle mainly liquid and solid bulk.

¹⁴ See Hoffman (2000, 1999a).



to promote competition between proximate ports, but land transport infrastructure still poses a serious obstacle to such competition.

National experiences have been diverse, and each one brings a lesson. The Chilean case shows that better management can significantly improve efficiency even without any additional investment. The Brazilian experience stresses the key role of labor reform. Argentina shows that competition is a good substitute for regulation, while Panama highlights the increasing importance of cabotage in international trade.

Chile

Prior to 1981, the *Empresa Portuaria de Chile* (EMPORCHI) was in charge of 11 major public ports and also had a monopoly on cargo handling. The main aim of EMPORCHI was to improve port efficiency and increase investment, especially in the ports of San Antonio and San Vicente, which by the early 1970s were unable to receive wheat, corn, sugar and many other bulk commodities. As a monopolist, EMPORCHI created a system of cargo handling under which two groups of workers coexisted: stevedores required to have a license to operate, and workers hired directly by EMPORCHI to handle cargo from the ship to the port. Because of high wages for night work, ports did not operate at night, and EMPORCHI shifts did not match those of the stevedores. These conditions led to high costs and port inefficiency.

In 1981, EMPORCHI's monopoly was abolished and a multi-operator system was introduced under which all

cargo handling services were licensed to private firms that could meet quality and security requirements. The personal licenses of stevedores were abolished, eliminating their monopoly power. Although the state compensated 2,700 workers with \$50 million, this scheme proved to be very successful.

In 1979, experts advised the Chilean government to invest \$200 million in seaports to improve port services, an expenditure that was beyond the country's fiscal capabilities at that time. However, cargo handling (including cabotage) of all public ports increased from 22 million tons in 1979 to 66 million in 1998 without any significant investment during this period (see Figure 11.6). Port tariffs remained low and competitive, although Chile did not modernize its ports as did most Latin American countries during the 1990s.

In spite of this initial success, the division of cargo among several stevedore companies limited incentives to invest in modern transfer equipment and did not permit an efficient use of limited backup yard space. This problem was exacerbated by the huge increase in trade during the 1980s and 1990s. The issue was finally addressed in 1997, when the Port Modernization Law was enacted and 11 port authorities were created. The law prohibited port authorities from handling cargo or berthing. Instead, they have to lease the ports to private firms under a single-operator scheme. In addition, port authorities are encouraged to share revenues derived from annual rent and operational revenues with the private firms. The concessions are granted for periods of 15 or 20 years with the possibility of extension to a maximum of 30 years. In 2000, four of the concessions-San Vicente, San Antonio, Valparaíso and Iquique—initiated operations. The lease of these four ports in 1999 represented \$300 million in income for the government. No lease was granted for the Port of Arica, in part because port authorities imposed excessively high infrastructure requirements, which made the project unprofitable and would likely to have led to excessive investment.

The concession process prompted labor unrest at public ports. As a result, the government reached an agreement with workers to create a safety net that if fully used will cost about \$30 million. One consequence of the plan was that 760 of 1,750 workers accepted early retirement.

Three important lessons can be derived from the Chilean experience: (i) improvements in efficiency may

not require additional investments in infrastructure; (ii) even though a multi-operator system may be successful, it may not provide the right incentives for investment; and (iii) concessions may provide an important service by preventing white elephant investments.

Brazil

In a country as diverse as Brazil, any generalization is bold. Still, it seems safe to say that until 1993, when the Port Modernization Law was enacted, most Brazilian ports were highly inefficient, excessively bureaucratic, and constantly under-funded. The results were tariffs three to six times higher than the international average, long waiting times for ships, and deficient service provision. The situation has since improved, but inefficiency is still rampant in some ports.

The government decentralized the port system and started dismantling the public agency Portobras in 1990. Three years later, the Port Modernization Law allowed private participation in cargo handling services and liberalized port tariffs in order to promote competition between neighboring ports. The original plan was to award concessions for 36 public ports, but the process has lagged, putting Brazil at a disadvantage with neighboring Argentina, where the reform has been more aggressive. One reason is that reforms at Brazil's ports have faced constant resistance from labor unions.¹⁵ The Port Modernization Law gave more flexibility to the number of workers per "squadron," but this has not been fully implemented in many ports. Difficulties in reducing the number of employees have constrained the possibility of decreasing port costs. For example, in 1998, the average cost of handling a 20-foot container in Buenos Aires was \$130, while in Santos, Brazil, it was \$350. An important reason is that 50 workers are reguired for handling the cargo of a ship at Santos, compared to only 14 in Buenos Aires.

However, in two Santos terminals currently operated by private firms, waiting time for ships went from several days in 1997 to less than a day by 1999. Concessions of small ports such as Itaji, Laguna, Cabedelo and Porto Velho were well advanced in 1999—75 percent of all the port infrastructure had been leased to the private sector. The operation of ports by private firms reduced waiting times for ships, and ports have become more competitive within the region. The tariff structure at Santos has been also modified, allowing a more market-oriented structure that has resulted in reduced tariffs for users of these port terminals. Container handling charges were \$328 per TEU in 1998, down from \$550 in 1996.

The main conclusion of the Brazilian experience is that labor reform in port activity is essential to accomplish port concessions that increase productivity and reduce tariffs.

Argentina

As early as the 1970s, Argentina allowed the private sector to manage stevedoring at the public port of Buenos Aires. This early modernization effort never rendered satisfactory results in terms of productivity because of over-regulation and the overlapping supervisory functions of state entities, strong labor unions that separated stevedoring and loading services, and a lack of investment by the port authority. In addition, other public ports were still operating under the service model, functioning inefficiently and charging very high tariffs for cargo handling.

In 1990, the first steps were taken to deregulate and decentralize public ports in a more comprehensive fashion. Deregulation consisted of abolishing restrictive working practices at ports and on vessels, and liberalizing rates for pilotage, towage and stevedoring. In addition, foreign ships were allowed to practice cabotage. The government dismantled the Ports Administration and transferred property of the major ports to the provinces, which were given the responsibility of establishing their own port authorities in charge of maintaining the port infrastructure and granting concessions to private firms.¹⁶

The Buenos Aires port was divided into the Dock Sud and Puerto Nuevo. The central government kept the latter and leased its six terminals to five different firms handling different types of cargo. In each terminal, a single stevedoring firm was allowed to operate under a single operator scheme. To date, the achievements of this port have been remarkable: cargo handling increased 50 percent and labor productivity surged by 275 percent over 1990-95. This progress has allowed Puerto

¹⁵ By 1998, the Brazilian Port Union had 66,000 affiliated workers, compared to 690 workers in Argentina.

¹⁶ Smaller ports—some of them long since out of service—were transferred to the provinces, which were allowed to operate or lease them to private firms or shut them down.



Nuevo to compete with South America's largest port,

Santos in Brazil. As of 1997, Puerto Nuevo's cargo handling had surpassed that of Santos (see Figure 11.7). Currently, foreign firms can also participate in the

construction of new private ports in Argentina, as has been the case of a terminal in Zárate, which is being remodeled for container handling.

The Argentine case shows that even when some port services are supplied by the private sector—as was the case before 1993—excessive regulation can constrain improvements in port efficiency. The country's experience since then shows that competition, whenever possible, is preferable to regulation.

Panama

Panama was one of the first Latin American countries to privatize a public port. The first privatization took place in 1993, when a concession was granted to the Manzanillo International Terminal (MIT). The MIT started operations in 1995 and was so successful that it opened the way for other port operating concessions. The Colón Container Terminal (CCT) and the Port of Cristóbal started operations in 1997, while the Port of Balboa did so in 2000.

This process also led to dismantling the National Port Authority and establishing the Panama Maritime Authority (PMA) in 1998. The PMA is the landlord authority that awards port operating concessions to private firms and also regulates the maritime industry. The advantage of Panamanian ports such as MIT is their proximity to the Panama Canal, making them ideal hubs. MIT currently handles 70 percent of all containers that go through Panama. MIT's throughput increased from 161,000 TEUs in 1995 to 878,000 TEUs in 1999, and most of the cargo is for trans-shipment. In fact, 70 percent of all containers handled in Panamanian ports are for trans-shipment.

The experience of Panama highlights the increasing importance of cabotage in international trade.

Conclusions

The reduction of tariffs and other artificial trade barriers has increased the relative importance of transport costs as a barrier to trade. Any strategy aimed at integrating a country into the global trading system has to seriously consider transport costs. Besides distance and other variables that no government can change, the most important determinant of maritime transport costs is seaport efficiency. But seaport efficiency is not just a matter of physical infrastructure. The quality of the institutional and regulatory environment in which ports operate may be much more important. Organized crime, in particular, has a deleterious effect on port services. Some evidence suggests that excessive regulation may impede efficiency, and a number of success stories in Latin America show that private involvement in port management leads to efficiency and lower costs whenever it is accompanied by labor reform, and when monopoly power is reduced through either regulation or competition.

Appendix II.I Data Definitions

- Cargo handling restrictions: Zero-to-one index that captures restrictions and special requirements imposed on foreign suppliers of cargo handling services. The index takes a value of 0 if no restriction exists, 0.25 for minor restrictions, 0.5 if a joint venture condition is imposed, 0.75 if major national participation in the company is required, and 1 if foreign companies are simply forbidden to provide cargo handling services. Source: Fink, Mattoo and Neagu (2000).
- Containerization: Percentage of cargo transported by containers. Source: U.S. Import Waterborne Databank (U.S. Department of Transportation).
- Container handling charges: Correspond to container handling charges in ports (US\$/TEU). For 19 countries, we have information from the Transport Division of the World Bank. For 12 countries, of which eight are in the World Bank sample, we have information (as an index) from the Cámara Marítima y Portuaria de Chile. For four Central American countries, of which only Panama is in the previous samples, we have information from the LSU-National Ports and Waterways Institute. Using ratios, we put all samples in the same unit used by the data from the World Bank.
- *Cooperative agreement*: Dummy variable signaling the presence of carrier agreements on maritime routes: cooperative working agreements that do not have a binding rate authority. Source: Fink, Mattoo and Neagu (2000).
- *Customs clearance*: Corresponds to time (days, median) to clear customs, based on surveys by the World Bank of importers in each country. The specific question is: "If you import, how long does it typically take from the time your goods arrive at their port of entry until the time you can claim them from customs?" Source: World Bank's business environment surveys.
- *Distance:* Corresponds to the distance between the foreign port *i* and the U.S. customs district *J*. Data provided by Fink, Mattoo and Neagu (2000).

- Foreign GDP per capita: GDP per capita of the exporting countries to the United States. Source: World Development Indicators 2000 (World Bank).
- Infrastructure index: Corresponds to the simple average of four indices: main telephone lines per capita, kilometers of paved roads, kilometers of railroads, and the number of paved airports, the last three variables per country surface area. To homogenize these four indices, we divide each by its standard deviation.¹ Source: World Development Indicators 2000 (World Bank) and The World Factbook 2000 (Central Intelligence Agency).
- Mandatory port services: Zero-to-one index that captures the extent to which port services are mandatory for incoming ships. This variable is constructed adding 0.125 for each of the following services if they are mandatory: pilotage, towing, tug assistance, navigation aids, berthing, waste disposal, anchorage and other mandatory services. Source: Fink, Mattoo and Neagu (2000).
- Maritime transport costs: Calculated as import charges divided by weight. Source: calculated from data of the U.S. Import Waterborne Databank (U.S. Department of Transportation).
- Organized crime: One-to-seven index ranking based on surveys of representative firms in each country. The specific question is: "Organized crime does not impose significant costs on business and is not a burden" (1=strongly disagree, 7=strongly agree). Source: The Global Competitiveness Report (1996-2000).
- Port efficiency: One-to-seven index ranking port efficiency, based on surveys of representative firms of each country. The specific question is: "Port facilities and inland waterways are extensive and efficient" (1=strongly disagree, 7=strongly agree). Source: The Global Competitiveness Report (1996-2000).

¹ Based on Limao and Venable (2000).

- *Price fixing agreement:* Dummy variable signaling the presence of carrier agreements on maritime routes: conferences and other price-fixing agreements. Source: Fink, Mattoo and Neagu (2000).
- Total liner volume: Total volume of imports transported per maritime route (where we define routes as "from foreign country to U.S. coast"). Source: constructed from data of the U.S. Import Waterborne Databank (U.S. Department of Transportation).
- Unit weight: Value of total U.S. imports divided by total weight, and calculated per maritime route (where we define routes as "from foreign ports to U.S. customs districts"). Source: calculated from data of the U.S. Import Waterborne Databank (U.S. Department of Transportation).

Appendix Table II.1

Determinants of Maritime Transport Costs, 1998: Regression Results

		De	pendent variab	le: Charges/Wei	ght	
Independent variables	0	LS estimations			IV estimations	
,	1	2	3	4	5	6
Distance (km)	0.18 (9.53)***	0.19 (9.73)***	0.18 (10.41)***	0.18 (8.18)***	0.17 (8.24)***	0.18 (8.75)***
Unit Weight	0.55 (50.36)***	0.55 (49.82)***	0.55 (49.55)***	0.55 (55.40)***	0.55 (49.82)***	0.5 (45.42)***
Policy variables						}
Price-fixing rate agreement	0.07 (1.81)*	0.03 (0.68)	0.01 (0.20)	0.07 (1.63)	0.02 (0.57)	0.01 (0.22)
Cooperative agreement	-0.02 (-0.88)	-0.03 (-1.37)	-0.01 (-0.23)	-0.02 (-0.83)	-0.03 (-1.29)	-0.01 (-0.24)
Containerization	-0.04 (-3.23)***	-0.04 (-2.78)***	-0.04 (-3.38)***	-0.04 (-3.50)***	-0.04 (-2.84)***	-0.04 (-3.58)***
Economies of scale Total liner volume (Foreign country to U.S. coast)	-0.02 (-3.83)***	-0.03 (-3.12)***	-0.03 (-3.30)***			
Total liner volume (Instr.) (Foreign GDP)	_	—		-0.03 (-2.07)**	-0.04 (-2.62)***	-0.04 (-1.80)*
Port efficiency GDP per capita (proxy for infrastructure)	-0.06 (-5.27)***			-0.06 (-4.83)***		
Port efficiency (Global Competitiveness Report)		-0.06 (-4.00)***			-0.05 (-3.53)***	
Infrastructure index (proxy for port infrastructure)	-		-0.06 (-2.00)**			-0.06 (-2.03)**
No. of observations R² (adjusted)	314,034 0.465	308,549 0.465	314,034 0.463	314,034 0.465	308,549 0.465	314,034 0.463

Notes: t-statistics in parentheses. All estimations include fixed effects for products (4,828 products) and for U.S. district (31 districts).

Regressions allow the observations to be independent across exporting countries, and interdependent within each country.

* Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Appendix Table 11.2 Determinants of Port Efficiency, 1998: Regression Results

	Dependent variable: port efficiency (from The Global Competitiveness Report)				
Independent variables	1	2	3		
Infrastructure	0.33	0.35	0.30		
	(2.14)**	(2.29)**	(2.41)**		
Cargo handling restrictions	1.46 (1.145)	0.34 (0.743)	-		
Cargo handling restrictions (squared)	-1.23 (-0.88)				
Mandatory port services	4.31	3.90	4.21		
	(2.31)**	(2.04)**	(2.33)**		
Mandatory port services (squared)	-6.84	-5.96	-6.20		
	(-2.56)**	(-2.29)**	(-2.41)**		
Organized crime	0.63	0.57	0.57		
("Organized crime is not a problem")	(5.28)***	(6.82)***	(6.58)***		
Constant	0.97	1.32	1.38		
	(1.51)	(2.85)***	(2.78)***		
No. of observations	42	42	42		
R²	0.716	0.712	0.706		

Notes: t-statistics in parentheses.

* Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

CHAPTER

12

Electricity

Latin America has been the world leader in power sector reform. In the 1980s, Chile was the first country to introduce comprehensive reforms aimed at opening the sector to private participation and competition. By the 1990s, Latin America had the largest share of private electricity projects among all the developing regions: of a total investment of \$193 billion in the developing world, \$74 billion was placed in Latin America (World Bank, 2000). Brazil, Argentina and Colombia are among the top ten developing countries in the world in terms of private investments in the electricity sector, with projects worth \$29 billion, \$12 billion and nearly \$6 billion, respectively. Chile, Argentina, Brazil, Panama and Colombia are among the leaders in investment per capita (see Figure 12.1).

However, the process of electricity sector reform has occurred in waves, and so far has not reached all countries in the region. Chile was followed by Argentina in the early 1990s, and shortly thereafter by Bolivia and Peru. By the mid-1990s, reforms had spread to Brazil and Colombia, and in more recent years to several Central American countries, a trend that may eventually lead to the complete physical and regulatory integration of their electricity sectors. The major missing players in the reform process have been Mexico and Venezuela, where transfers of electric assets to the private sector have been small, and reforms truly scant.

Reform efforts must be viewed against the backdrop of the failures of the old regime. Lack of incentives for efficiency and tariff levels that did not reflect actual costs led to the generally poor performance of stateowned enterprises that accumulated huge financial deficits. Inadequate incentives were to a large extent related to the political abuse of utilities. Rent-seeking groups were allowed to capture the sector and distort objectives. The consequences included generalized and poorly targeted subsidies, inefficient and insufficient expansion, and the use of the sector as a type of employment agency subject to corruption.

Reform of the electricity sector has produced several positive outcomes. Generation capacity has been expanded vigorously in sectors that have been reformed, with the major exception of Brazil, where greenfield activity has been slow to take off. Between 1990 and 1999, the private sector invested \$16 billion in new capacity, and by the end of the period the threat of power shortages had been reduced in most countries. Most privatized distribution companies substantially increased their efficiency by cutting technical and nontechnical losses and reducing redundant staff while at the same time providing better service quality. The Chil-



Source: World Bank (2001).

eans were pioneers in improving the efficiency of their privatized companies, and they later profited from the development of this expertise by participating in the privatization of many distribution companies in Argentina, Brazil, Peru and Colombia. A good example is CODENSA, the privatized Bogota distribution company that halved losses from 24 percent to 12.5 percent, increased customers per employee from 800 to 1,900, and reduced the frequency of service interruptions and mean interruption time by more than 30 percent in only two and a half years. Losses in Argentine and Chilean utilities are even lower, between 5 and 10 percent.

Wholesale prices have also been reduced in countries where competition has been introduced—up to 30 percent in Argentina and 20 percent in Colombia. Cross subsidies from non-residential to residential customers have been partially or totally dismantled in many countries.

In spite of these outcomes, there is growing concern over several unwanted consequences of the reform:

• Although new investors have entered the market, they have been few. Competition is generally limited and hampered by concentration.

• The main beneficiaries of lower prices have been large customers, and in some countries, prices are still high. There is no significant expansion of service coverage. Serving unprofitable segments remains a problem.

• Security of supply seems to have improved as a result of reforms, but the blackouts in Chile in 1998-99 and in Brazil in 2001 have raised concerns about the adequacy of the incentives introduced by the reforms.

• State-owned enterprises are still major players in some countries. They carry the burden of social programs and priorities, and some continue as vehicles for transferring rents to particular interest groups. Rather than being scaled down, some of these enterprises have in fact extended their participation.

• The regulatory system has not always evolved towards improved transparency, simplicity or certainty. Regulators, governments and legislators frequently clash over jurisdiction, interpretation and implementation of the reforms.

• Lack of competition and poor regulatory institutions have made for the transfer of rents to the private sector.

Thus, while there have been major achievements, significant problems threaten the direction and sustainability of the reforms over the long term. This chapter identifies and examines the main issues in the design and implementation of regulatory reforms of Latin America's power sectors.

Constraints to Liberalizing Power Sectors

Recent reforms of Latin America's power sectors have been largely motivated by the need to relieve governments of the heavy burden imposed by state-owned enterprises and to avoid further deterioration of services. According to the new paradigm, attracting private sector investors would reduce the financial burden and minimize regulatory problems by enlisting market forces to attain efficiency in the competitive segments of the market. A new incentive framework and even new regulatory institutions would be established to foster competition and efficiency, and to protect the consumer. Finally, social considerations would be addressed by using well-targeted instruments that are free of distortions.

In practice, it has proven difficult to put such reforms into effect. Privatization is under way in most Latin American countries, but a large segment of the industry remains under government ownership. Similarly, activities have not always been unbundled, and the market structure remains integrated in many countries. Competition is in most cases limited to the very largest loads, and true retail competition seems a long way off. In many countries, the new regulatory framework is still not fully implemented and there is a lack of suitable regulatory institutions. The basic sources of the difficulties are technical and institutional.

Technical Features of the Electricity Industry¹

For nearly a century, the power sector has been thought of as a "natural" monopoly where efficient provision requires a regulated public or private monopoly. Most utilities have historically met their obligations by jointly providing the four primary electricity supply functions: generation, transmission, distribution and retailing.

¹ This section is based on Blumstein (2000), Borenstein and Bushnell (2000) and Joskow (1997).

The generation segment involves the creation of electricity using different technologies. The transmission of electricity involves the use of wires, transformers and substation facilities to transport electricity between generation and distribution centers. This includes the interconnection and integration of generating facilities into a synchronized network through scheduling and dispatching generating facilities to balance demand and supply (in real time), and management of equipment failure as well as network constraints. Finally, the distribution and retailing functions are related to delivering the final product to consumers at relative low voltages. Distribution requires wiring and transformers to reach customers, while retailing functions include metering, billing, making arrangements for supplies of power from generators, and other demand management services. Typically, retailing and distribution have been viewed as integrated functions.

Since the optimal scale of generating plants has declined,² the feasibility of competition in generation is now widely accepted. These technological developments, along with ideological changes, have opened the way for private participation and deregulation around the globe. As a consequence, regulators in many developed and developing countries have implemented reforms to improve the incentives for efficient operation of electricity utilities. In general, these structural and regulatory reforms are following the basic model applied to other network industries. Potentially competitive segments (generation) are being separated structurally or functionally from natural monopoly seqments (transmission and distribution). Prices in the competitive segment have been deregulated, and services provided by the monopoly segment have been unbundled from the supply of competitive services. Prices in the monopoly segment are determined by power incentive regulations, and non-discriminatory access to "essential" network facilities has been mandated.

While the basic regulatory framework is straightforward, there are several key attributes of the supply and demand of electricity that have important implications for whether and how competition can be introduced:

• Electricity is extremely costly to store, so there must be a continuous balance between generation and consumption in real time. This task becomes more difficult because the demand for electricity varies widely from hour to hour and from day to day. Electric power networks are not switched networks like telephones, where a supplier can make a physical delivery from one point to another without affecting the entire network. Because of the property of transmission, an imbalance of supply and demand at any location on an electricity grid can threaten the stability of the entire grid. Therefore, a transmission system is not only a simple transportation network, but also a complex coordination system where efficient network administration requires complete coordination of all generators and consumers in the system. Moreover, significant challenges arise for accurately measuring and settling consumer and generator financial obligations in a competitive electricity market.

• In general, the supply of electricity faces binding constraints at peak times. Generating units have hard capacity constraints that make marginal costs high once the level of production is near the full plant capacity. Currently, demand for electricity is almost completely inelastic in the short run. Almost no end-use consumers of electricity even have the technology to observe, let alone respond to, real-time prices that reflect the time-varying cost of procuring electricity at the wholesale level (generators' costs). Thus, little or none of the continuous balancing of supply and demand can be done on the demand side unless the grid operator forcibly curtails consumption.

• Because storage of electricity is extremely costly and capacity constraints on production from a plant cannot be breached for significant periods without risk of damage, there are hard constraints on the maximum amount of electricity that can be delivered at any time. The combination of this inelastic short-run supply (at peak time) and short-run inelastic demand makes shortterm prices for electricity extremely volatile in the wholesale market. This situation is exacerbated if markets are not completely competitive. As many studies show,³ tight supply conditions in electricity markets put sellers in a very strong position to exercise market power, raising prices above the level at which a competitive market would clear.

These inherent characteristics of the electricity industry raise many issues that any regulatory scheme must consider. Prominent among them are the need to con-

² The technological innovation in combined-cycle generating technology reduced the minimum efficient scale of new generating facilities.

³ See Wolfram (1999) for England, Borenstein, Bushnell and Wolak (2000) for California, and Wolak (1997) for Norway, Australia and New Zealand.

trol and prevent monopoly power in the wholesale market, the need to maintain free access to bottleneck facilities, and the complications and trade-offs arising from having to simultaneously maintain system reliability and the security of supply while keeping price volatility low.

Institutional Endowments of Countries

Referring to the United States, Joskow (2000b) states that antitrust policy must be designed keeping in mind the organizations or institutions that will be in charge of enforcing it. This advice becomes even more critical in the case of Latin American countries where institutions that in other regions are taken for granted—such as the rule of law, clear and accepted property rights, an independent and competent judiciary, mechanisms for peaceful dispute resolution, contract enforceability, and quality public bureaucracies and competition agencies—are either absent or incipient.

Although both starting points and objectives have been somewhat different, power sector reforms in Latin America have followed more or less the same lines as those of pioneering OECD countries. The notion that their approach should have considered the particular context in their countries seems to have been given scant attention by Latin American policymakers. Indeed, reform efforts appear to have been based on ideological considerations that assumed that the market could be trusted to solve the problem. A more cautious approach might have considered that, while some basic elements are essential, there is no universal model, and the success of sector reform depends on the institutional setting and the timing of the reforms. Unless those tacit or implicit elements are replicated or replaced with local versions, and unless reforms are coherent across the economy, transferring a model out of context is a considerable gamble. Indeed, while blueprints, best practices, international codes and standards and harmonization may prove useful for some of the more narrow technical issues, large-scale institutional development requires discovering local needs and capabilities.

Clearly, inefficiencies in the regulatory environment are not inevitable. Consistent regulations, along with regulatory institutions with clear incentives and sufficient resources, can in principle overcome any such inefficiencies. In practice, however, such problems are not easily solved in a country with a weak judiciary or a tradition of political interference in judicial decisionmaking. Furthermore, lack of expertise and regulatory experience may seriously constrain the possibilities for achieving sustainable electricity market reform.

Obstacles to Power Sector Reform in Latin America

Sustainable power sector reform in Latin America must address five major technical and institutional issues: separation of the roles of the state and the sequence in carrying out the reforms; achievement of workable competition in the competitive segments of the market; regulation of the non-competitive segment; adequacy of pricing, subsidies and incentives for long-term investment; and architecture of the regulatory institutions.

Separating the Role of the State and the Sequence of Reforms

Table 12.1 shows that privatization of power sectors is far from complete in Latin America. In most countries, the state still controls sizeable amounts of the generation, transmission and distribution segments. Under these circumstances, problems may arise within the government itself, since the government assumes roles with respect to the electricity industry that range from legislator to regulator, owner and purchaser of electricity. This can cause conflicts of interest and erode regulatory power. Efficient governance requires that the various roles be separated, and that there be clear rules to define the rights and responsibilities of individual agencies, particularly for handling conflicts between different government interests and between government interests and those of private citizens or nongovernmental organizations.

While separating the roles of the state was almost an axiom among reformers, the evidence so far suggests that attaining this objective in Latin America has not been easy. The line between policymaking and regulation is still blurred. This is evident, for example, in the ongoing struggle in Colombia between the regulator and the ministry regarding liberalization of the natural gas market, as well as in El Salvador, where the responsibility for energy policy has not been clearly

Table 12.1 Shar	ble 12.1 Share of Private Sector Participation						
(In p	percent)						
	Generation	Transmission	Distribution				
Argentina	60	100	70				
Bolivia	90	90	90				
Brazil	30	10	60				
Chile	90	90	90				
Colombia	70	10	50				
Costa Rica	10	0	10				
Dominican Republic	60	0	50				
Ecuador	20	0	30				
El Salvador	40	0	100				
Guatemala	50	0	100				
Jamaica	20	0	0				
Mexico	10	0	0				
Paraguay	0	0	0				
Peru	60	20	80				
Trinidad and Tobago	40	0	0				
Uruguay	0	0	0				
Venezuela	20	10	40				

Source: Espinasa (2001).

defined or vested in any particular institution. Furthermore, the lack of independence of regulatory institutions appears to be an issue in all countries in the region. For example, in Guatemala the regulator is placed directly under the Ministry of Energy, while in Colombia enforcement and oversight functions are performed by an organization that appears to be highly politicized. Consequently, the balance required between regulatory commitment and flexibility has been difficult to achieve.

Current reforms have been the result of negotiations between stakeholders who required compensation. Reformers were right in assuming that losers would oppose reforms—not only because they lost, but because compensation would make them winners. The problem is that the privileges, subsidies and all sorts of rentseeking activities provided through compensation may have created an interest in a stalled reform, preventing the extension of the benefits of reform to those who most need them.

Because most utilities in Latin America were vertically integrated state-owned enterprises prior to the reform process, reformers in the region were spared the type of stranded cost debates that plagued liberalization in the United States and Europe. Nonetheless, by introducing stranded costs of its own, the sequence of reforms has proven to be critical to the performance of the region's post-reform sectors. The textbook approach to sequencing the reforms would start with establishing a sound regulatory framework, continue by restructuring government assets and organizing the markets, and then proceed to privatization, starting with the distribution segment. This sequence has many advantages: it allows the sector to develop the desired structure, facilitates privatization by giving clear signals to investors, assures the presence of financially sound buyers in the wholesale markets, and avoids the presence of state-owned enterprises in competition with private companies. Unfortunately, the window of opportunity for the reform is usually very short, forcing governments to deviate from this ideal sequence.

Thus, lack of resources for investment in generation has forced most Central American and Caribbean countries to engage in costly build-operate-and-own (BOO) or build-operate-and-transfer (BOT) operations before undertaking the necessary reforms. This has left the burden of the power purchase agreements (PPAs) to financially weak state-owned enterprises. The lack of a clear regulatory framework and the urgency of these operations has allowed independent power producers (IPPs) to exact high rents and impose inflexible conditions like "take or pay" contracts that exacerbate the financial problems of the government-owned companies. Furthermore, accusations of corruption have surrounded many of the PPAs contracted prior to the reform.

As part of the reform bargain in Colombia, most distribution companies were not privatized and remained subject to the incentives and political patronage of the old regime. Thus, these companies continued to show high inefficiencies, such as billing only 70 percent of the energy because of physical losses, theft, lack of measurement and poor billing. Furthermore, many of these companies serve low-income and rural markets with limited payment capacity and high distribution costs that make them dependent on unreliable subsidies from the central government.

In Brazil, the reform process started with the privatization of distribution companies, which was the right thing to do. But it took an extremely long time to complete the regulatory framework and to put in place the wholesale energy market. This delay, together with other uncertainties, has been one of the main causes of the current lack of appetite for greenfield investment in generation in Brazil's electricity market.

Box 12.1 Electricity Markets in Latin America

The pioneer and its followers. Since the reform of the early 1980s, the wholesale market in Chile has consisted of regulated contracts with distributors and free contracts directly between generators and large customers (larger than 2Mw). A centralized dispatch model is used to price exchanges among generators, which are the only participants in the spot market. There is no market-clearing price that results from the interaction of supply and demand, but rather prices are set by an administrative system. The Chilean system is not designed to increase competition, but rather to promote private investment in generation and distribution. Chile's success in privatizing its power system without jeopardizing the continuity of service led Peru, Bolivia and other countries in the 1990s to follow its example.

The first generation of power pools. The Chilean experience was not accepted in its entirety in all countries. By the early 1990s, Argentina had learned from Chile's experience that to ensure broader competition it was necessary to vertically and horizontally unbundle the sector's structure and to establish limits to cross-ownership. Changes in generating technology, such as the gas turbine, had lessened the importance of economies of scale and permitted the potential number of participants to rise. The wholesale electricity market model in Argentina differs somewhat from the Chilean model in makeup and details. The system operator is not a club restricted exclusively to generators, but includes all the market agents, making it less vulnerable to capture. Dispatching continues to be based on costs, but the basis is the generators' semiannual statements of costs, including hydraulic power. Spot prices are used for trade between generators, but distributors (at a stabilized price) and large users can also buy on the wholesale market.

A second generation of power pools. Colombia, which also has a predominantly hydraulic system, decided to break even further from the Chilean model. In the mid-1990s, it adopted a system of centralized auctions similar to the England and Wales pool. Although bilateral contracts are permitted, they are financial in nature, similar to contracts for differences, and use the pool price for settlement. The price formation process is also similar to that of England and Wales, with identical bid patterns for hydraulic and thermal generators. The Colombian model was novel for the region. Today it is still the only market that sets the price based on bids from participants rather than on costs. Colombia was also the first market to include suppliers as participants.

The newcomer. Initially attracted to the Colombian model, the Brazilians ultimately concluded that local conditions demanded local solutions. The Brazilian power system is over 95 percent hydraulic, has a large storage capacity, and is made up of groups of physically interdependent reservoirs and plants that are located in the same river basin. Coordinated operation of the system could account for about 20 percent more power than would be obtained if producers were to make their offers individually. Interdependent decision-making by the generators means that it is virtually impossible for them to know the cost of water for each individual. This stands in the way of daily auctions such as those used in the England and Wales pool. The system adopted in Brazil involves a long-term contracts market and a spot market for the balances administered by the system operator with the help of a complex mathematical model.

Achieving Workable Competition

Establishing competitive markets for electricity has become a more difficult task than anticipated in most Latin American countries. In addition to the plethora of implementation problems that have plagued markets in more developed countries, Latin American countries face difficulties of their own. Small size, country risk and the strategic behavior of big investors conspire against the minimum number of players needed to ensure competition in the market. As a result, there is a trade-off between competition, which keeps prices down but increases investors' risk, and the comfort usually sought by lenders for infrastructure projects. In several countries, a growing market and the reliance on hydroelectric resources has made an energy constrained system more the norm than the exception, exacerbating price volatility and market power. In still others, lack of human resources, weak or a lack of institutions to oversee and regulate competition, and the ambiguous role for the judiciary have made it difficult to oversee competition and enforce regulatory measures.

It should be stressed that effective competition is not a question of "yes" or "no". There are degrees of competition, and the real question consequently concerns whether it is possible to create "workable competition." Since there is no general standard for what constitutes such a market, some kind of qualified judgment based on an evaluation of barriers to competition and actual market performance is inevitable.

In the debate on electricity market reforms, attention has focused on spot markets for electricity, or electricity pools. In most places, this market has been organized as some form of auction, but the details of the auction vary considerably. In some countries, participation is limited to (major) generators, while in others, participation is basically open to all, including consumers and traders of electricity. In some countries, participation in the electricity spot market is mandatory (for large generators), whereas in other places electricity may be freely traded outside the pool. The format of bids varies enormously with regard to time period (hourly, daily), price offers (single, multiple) and detail (plant, generator, location). Market prices may be uniform (e.g., according to the marginal successful bid) or discriminatory (according to individual bids), sometimes containing payments for capacity and other services. In some countries additional auctions are held for regulatory power and ancillary services.

Latin American countries have adopted different designs for their spot markets, but most use a type of cost-based pool following the pioneering Chilean example (see Box 12.1). The exceptions are Colombia, which has an England and Wales (pre-reform) type of pool, and El Salvador, whose pool resembles the Nordic model.

There is no ideal market design, since no one can fully prevent market power. But the difficulty of coping with market power may be exacerbated by a poor market structure. Perhaps the most obvious examples are those in which an insufficient number of competitors has been established before market-based exchange is introduced. Market failure is often the result of excessive optimism with respect to what transactions may be efficiently delivered by decentralized means, given the size of the market. When markets are small, the real question is not so much whether there are measures that can make competition effective, but rather what can be done to mitigate the consequences of imperfect or nonexistent competition.

Even by the standards of most markets, electricity generation in most Latin American countries is heavily concentrated. The three biggest producers in Argentina and Brazil, where competition is greatest, control 30 percent and 40 percent of the respective national markets. In the other countries, this measure of concentra-

Table 12.2	Market Share of the Three Largest Firms
	/T ()

(In p	ercent)		
	Generation	Transmission	Distribution
Argentina	30	80	50
Bolivia	70	100	70
Brazil	40	60	40
Chile	50	100	50
Colombia	50	100	60
Costa Rica	100	100	80
Dominican Republic	50	100	50
Ecuador	50	100	60
El Salvador	90	100	80
Guatemala	70	100	100
Jamaica	90	100	100
Mexico	90	100	100
Paraguay	100	100	100
Peru	100	100	100
Trinidad and Tobago	100	100	100
Uruguay	100	100	100
Venezuela	90	90	90

Source: Espinasa (2001).

tion stands at 50 percent or more (see Table 12.2). Concentration is also high in the natural monopolies segments. Since market power is a fact of life in the electricity sectors, regulation is a must.

Other factors that conspire against vibrant competition are vertical integration and the limited scope for retail competition due to weak industrial bases and small per capita residential consumption. It is not clear in these cases whether the separation by segments of the electricity market will persist or is even desirable. In Guatemala and El Salvador, there are no limits to vertical and horizontal reintegration. In Colombia, various models of integration and public and private ownership coexist, and limitations to concentration have been legally challenged. Reintegration makes it more difficult to control anti-competitive behavior and imposes an additional burden on regulators.

Since competition in electricity markets in the region is limited, most power pools are "cost based," with the system operators performing economic dispatch using an optimization algorithm fed with technical information and fuel cost provided by thermal generators and the cost of water for reservoirs. (The only exception is Colombia, as described in Box 12.1). While discretion in presenting the information and use of capacity charges varies by country, the main function of the power pool is to price exchanges among generators. Nonetheless, even this limited spot market may be captured in a concentrated market with poor governance, as has been shown in Chile. However, given the difficulties in operating a fully decentralized market even in the most developed countries, the cost-based approach does not seem to have been such a bad idea after all, particularly in small countries. Here, market size may render competition unworkable and more cautious approaches may be required.

The lack of strong and complementary institutions undermines the performance of the reformed industry and may even slow the pace of reform. For instance, at best, the absence of a relevant competition policy and competent antitrust bodies leaves the regulator with the burden of overseeing competition; at worst, this task is left in the hands of unqualified bodies subject to capture. Consequently, the number of workable options for market architecture is limited. Legal uncertainty is also an important issue arising out of institutional constraints. It can discourage investors and also give them the wrong incentives, and investors may seek comfort in the capture of judiciary and regulatory institutions.

Before concluding that concentration is inevitable, those measures that do exist for improving competitive conditions should of course be given due consideration. Some of these constraints may be removed or lessened through time and effort, thus making feasible the type of workable competition that reformers originally had in mind. For instance, a larger market could be formed by integrating regional markets, as intended with the Central American countries. Such an institution would not be easy to create and will take some time to develop, as the experiences of the much more integrated economies of the European Union have shown. In addition, there is still a need to carefully craft the transition periods to avoid having the interests created during the interim period prevent the attainment of the ultimate goal. If markets are not workably competitive, then market-power mitigation mechanisms must be put in place. Finally, it is important to mention that the experiences of Chile and, to a lesser extent, Peru, seem to suggest that privatization and incentive regulation themselves have played a major role in stimulating improved performance in these countries. When initial conditions are not favorable, gradual development may be desirable.

Regulation of Noncompetitive Segments

Electricity transmission and local distribution are usually considered natural monopolies. Typically, a country has one company operating its transmission network and a number of regional monopolies operating its distribution networks. With the exception of some ancillary services, there is little scope for actual competition in the provision of electricity transport services (though benchmarking may be possible).

The regulatory regime for the network business may take many forms, but some form of incentive regulation is required to achieve efficiency; purely cost-based regulation is unlikely to produce cost efficiency. Regulations must take into account the incentives both for short-run operation of existing networks as well as for extending the networks while meeting quality constraints.

The tariff system should help finance the expansion of the transmission grid. Because transmission costs are usually a small portion of the customer price, efforts by the regulatory agency to "fine tune" the allowed rate of return on transmission are unlikely to significantly reduce consumer prices. Most importantly, if this rate is too low, there will be insufficient investment, causing congestion costs and strengthening local market power. Consumers will pay a high price in the long run for a small reduction in price in the short run.

Countries have adopted different price-setting mechanisms for the three broad segments (generation, transmission and distribution) of the electricity industry. The mechanisms include the cost of service (or market), price caps, and the efficiency standard scheme (see Table 12.3).⁴

The efficiency standard scheme first developed in Chile and later adopted by Bolivia, is based on the cost of a model distribution system. It is a combination of yardstick regulation, price caps and replacement cost accounting. Critics point to the enormous information burden that this method imposes on the regulator.⁵ The

⁴ The generation segment refers to the cost of generation that is passed to the regulated final consumer, and the transmission and distribution components refer to the wire portion of such services. The generation component is referred to as "market" when the prices at which the retailer buys energy in the wholesale market are passed on to the consumer adjusted by losses with some sort of smoothing. "Cost of service" refers to the traditional method used by utilities in the past, and "efficiency standard" refers to the Chilean method for the wires segment.

⁵ See Joskow (2000a) and Jones (1993).
	Generation	Transmission	Distribution
Argentina	Market	Price cap	Price cap
Bolivia	Marginal cost	Price cap	Efficiency standard
Brazil	Market	Cost of service	Price cap
Chile	Marginal cost	Cost of service	Efficiency standard
Colombia	Market	Price cap	Price cap
Costa Rica	Cost of service	Cost of service	Cost of service
Dominican Republic	Market	Cost of service	Cost of service
Ecuador	Market	Cost of service	Efficiency standard
El Salvador	Market	Price cap	Efficiency standard
Guatemala	Market	Cost of service	Efficiency standard
Jamaica	Cost of service	Cost of service	Cost of service
Mexico	Cost of service	Cost of service	Cost of service
Paraguay	Cost of service	Cost of service	Cost of service
Peru	Marginal cost	Efficiency standard	Efficiency standard
Trinidad and Tobago	Cost of service	Cost of service	Cost of service
Uruguay	Cost of service	Cost of service	Cost of service
Venezuela	Cost of service	Cost of service	Cost of service

Table 12.3Price-setting Mechanisms

Source: Espinasa (2001).

inability of the Chilean system to transfer to final consumers the gains in efficiency obtained at the generation level has prompted a review of the procedures.

It is not yet possible to assess the success of methodologies used in Argentina, Brazil and Colombia because there have been no periodic reviews. The outcome of Argentina's review, currently under way, will shed light on this issue. It is easier to understand the difficulties faced by small countries because of asymmetries between the regulator and the regulated.

Price Volatility, Subsidies and Fostering Private Investment

Deregulation leads almost by definition to more price volatility. When price controls are lifted and pricing decisions are decentralized, it is to be expected that prices will react more rapidly and with greater amplitude to shifts in underlying supply and demand conditions. This expectation has been corroborated by the experience of most deregulated electricity markets, including those in England and Wales, Scandinavia, and, more recently, El Salvador and California. Both consumers and investors complain about price volatility, although for different reasons. Consumers see any price hike as permanent, while investors fear that low prices will never recover and prefer a guaranteed stream of revenues to reward their investment. Not surprisingly, consumers and investors agree on the appropriateness of government subsidies to solve their problems if prices are not to their liking.

The underlying causes of price volatility are usually volatility in demand or supply conditions, market design flaws, and market power. Given the unique characteristics of the electricity sector it should come as no surprise that prices fluctuate considerably when there are changes in demand or supply conditions. Changes in the weather, in general economic conditions, or in the supply of fuels would more or less immediately feed into electricity prices. Such price fluctuations are unavoidable in a deregulated market, and to some extent they may be desirable signals for the efficient use of a scarce resource.

On pure efficiency grounds, economists tend to advocate a hands-off policy regarding price volatility that results from fluctuations in demand and supply conditions. To the extent that price volatility is considered a cost to market participants, instruments exist that can hedge against the associated risk. Indeed, as a response to fluctuations in market prices in most deregulated electricity industries, secondary markets have developed that offer the required hedging instruments (fixed-price contracts, futures, forwards, etc.).

Nevertheless, politicians and regulators may be unwilling to expose consumers to the full consequences

Box 12.2 Blackouts: A Tale of Two Crises

California and Brazil are facing severe power shortages. Pundits have been quick to point to similarities between the two crises in order to reinforce whatever their preconceived or ideological point of view happens to be as to what causes such events: lack of adequate investment, unexpected rise in demand, failure or lack of deregulation, etc.

But while it may be tempting to draw quick conclusions from this parallel, a closer look finds significant differences in both the causes and the management of these respective crises. Keeping these differences in mind helps better analyze the apparent coincidences.

Lack of adequate generation resources at a critical transitional period during the implementation of reforms was certainly at the core of the problem in both markets. Deregulation implies adopting new coordination mechanisms between distribution and generation, a process that requires some adjustment and makes the system vulnerable in the early stages. However, how these mechanisms will work in a particular system is not always clear beforehand. For example, most analysts of California's problems agreed that the lack of long-term contracts as a hedge against volatility limited the entrance of new investors, exacerbated opportunities for generators to exercise market power, and eventually led to the bankruptcy of distributors. Brazilian distributors, on the other hand, were fully contracted as part of the transitional arrangements, and for all practical purposes the spot market did not exist. Thus, when the government pushed for an emergency program to bring thermal plants on line, there were few buyers among the distribution companies. Moreover, the lack of adequate provisions to hedge foreign exchange risks in imported natural gas further diminished investors' appetites. While it is partly true that the crisis was caused by a sudden lack of supply and the generally volatile nature of Brazil's primarily hydroelectric power supply, it is also true that the system itself had no provisions to allow for adequate handling of a mishap.

A common feature of both the Californian and Brazilian reforms was the unusual long debate that preceded them, which gave time for special interests to entrench themselves and introduce significant modifications to the processes that ultimately made them more vulnerable. Five years after the first privatization of a distribution company in Brazil, the system still lacked a clear framework for private investment in generation. Local politicians and interests associated with the old state-owned enterprise managed to paralyze the privatization of generation assets. In California, the debate led to a compromise system with a long transition period that increased its vulnerability.

Both governments were slow to understand the real dimensions of the crisis and react to it with a credible plan. State and federal regulators blamed each other for the California crisis and failed to agree on a strategy to solve it. Furthermore, California's regulators dug their own grave by foreclosing the price option as a tool to manage the shortage. In Brazil, turf wars delayed establishment of an adequate contingency plan, despite early warnings that one was needed.

In one critical respect, the Brazilian experience diverges from that of California. The Brazilian government was willing to use the market to allocate the shortage to avoid rolling blackouts. The government imposed a rationing quota and left large users free to trade their share or sell it in the spot market. A surcharge was imposed on heavy residential users, but they were granted bonuses if they saved more than their quota, while consumers failing to meet their quotas were subject to temporary disconnection. If this strategy survives legal challenges and is successfully implemented, it may become one of the best lessons Californians may learn from the Brazilians.

of the market. Clearly, such a response may be reasonable if there are no hedging instruments. However, impeding price movements correspondingly reduces the incentive to develop such instruments. It is only when the development of such instruments is unlikely (due, for instance, to weak financial markets) that price regulation can be advocated as a means of protecting market participants against the costs of price volatility. Moreover, the dampening of natural price movements may increase the shortage problems that were the main concern in the first place. For instance, the incentive to maintain reservoir levels high depends on the expectation of future prices—which is reduced if prices are capped. Dampening seasonal price movements also gives perverse signals to consumers, as in the 1999 Chilean crisis when consumer-regulated prices and reservoir levels were simultaneously falling.⁶

All this having been said, it may nonetheless be advisable to introduce temporary measures to protect consumers against price volatility in order to avoid unnecessary disruptions to the market reform process. In-

⁶ See Fischer and Galetovic (2000).

la	Table 12.4 Households with Electricity, by Income Decile							
	A <u></u> AA	(In percent)				, 1.04 , 1.1.04 , 0.04 ,		
	Decile	Bolivia 1999	Dominican Republic 1998	Honduras 1999	Guatemala 1998	Mexico 1998	Br	azil
		10	77		26	01		
	2	18	83	40	41	89	65	85
ļ	3	57	80	62	51	94	74	91
	4	68	86	64	56	96	81	94
	5	82	92	73	60	97	88	96
	6	86	93	77	58	98	92	98
	7	91	89	80	68	98	95	99
	8	97	97	81	83	99	97	99
	9	98	96	86	79	99	98	100
	10	97	97	82	91	99	99	100

Source: Household surveys.

tervention in the marketplace is of course less controversial if there is excessive price volatility due either to market design flaws or the abuse of market power. It is important, however, to determine which of these possibilities is the real cause. It is of little use to tamper with market design elements if the real problem is the abuse of market power. The repeated terrorist attacks on the Colombian transmission grid in 2000-2001 led to a de facto fragmentation of the market and provided strong incentives for generators to exercise market power. Thus, spot market prices during the first guarter of 2001 showed unusual spikes until the regulator intervened the market to acknowledge its fragmentation.

Analysts have been unanimous in blaming the lack of demand response as one of major reasons behind the collapse of California's electricity market in 2001.⁷ Even limited applications of real-time pricing (RTP) only to large consumers should have been enough to dampen the price spikes and ameliorate the blackouts. Nonetheless, the fear of high transaction costs and an insufficient understanding of the importance of demand elasticity prevented the timely adoption of such measures. In this respect, there are some lessons that California can learn from Latin America (see Box 12.2).

In some Latin American countries, governments have subsidized prices to avoid passing on the volatility in oil prices or the stranded cost of the reform to consumers. Conversely, some countries have granted special conditions to investors, tax holidays, and higher prices for local renewable energy, the cost of which will ultimately be borne by consumers or taxpayers. While some of these measures may be justified on individual grounds, they may create problems of their own. Given that the financial burden of the electricity sector has been a major problem for most governments, it is not realistic, nor perhaps advisable, to make investment in the electricity industry dependant on public money.

A more critical issue is that of expanding electrical service to those segments of the population that still lack access to it. As indicated in Table 12.4, access is heavily skewed against the poor. Well-designed subsidies could help extend service coverage to unprofitable markets, alleviating some of the constraints to access faced by the poor.

In order to improve investment incentives, market institutions that allow for risk management should be encouraged. It is also essential to reduce regulatory or political risk. One could argue that a weak government, susceptible to capture by industry interests, would provide an environment conducive to private sector investment. However, there is little doubt that the best guarantee for efficient investment is stable and predictable regulations. The difficulty is, of course, how to establish and commit to such a policy.

⁷ See Borenstein (2001).

The Architecture of Regulatory Institutions

One of the main hypotheses of this chapter is that the Latin American countries lack the political and regulatory institutional conditions necessary to support the types of reforms they are implementing. Reforms and institutional conditions should conform. One way to go about this is to improve regulatory institutions and human resource endowments. Otherwise, reforms have to be modified to better fit actual institutional conditions until existing constraints are overcome. In considering options for regulatory architecture, the reformer must have a clear model of how government works and its limitations. This should include the asymmetry between the regulator and the regulated, the problems implied by multiple tasks and agencies, the compromise between commitment and flexibility, and the nature of the constraints involved in choosing the regulator.

• Capture by the state or capture of the state

Any system of regulation faces two opposite risks. According to the "grabbing hand" view,8 one risk is that the regulatory agency may become hostage to the political interests of the politician or bureaucrat. Even if the old state-owned enterprise is partitioned and privatized, unless there are adequate checks and balances, politicians will continue rent-seeking activities using regulation as their new vehicle. The opposite risk is that the government may become an agent of private principals. Small countries with weak institutions and few restrictions on market structure may end up in a situation where powerful firms are able to shape the rules of the game to their own advantage. In network utilities, the outcome could be vertical and horizontal integration, increased prices, and provision contract clauses transferring all the risks to the state and yielding handsome profits to the powerful firms.

Both captures are equally worrisome, and in many cases it may be impossible to fully avoid them. Developing a consistent and predictable regulatory environment requires creating regulatory institutions that are sufficiently independent to withstand pressure from particular groups, including interested politicians. At the same time, these institutions must have limited powers so that they do not unduly interfere in the operations of industry players. Achieving this theoretical goal in small and weak countries remains a work in progress and will take some time and effort. The task may be less painful if, as suggested by Joskow (2000b), regulations are framed taking into account the people who will have to implement them.

Multi-task and multi-agency problems

Any system of regulation can be viewed as a contract between firms, regulators and the executive and legislative powers that is likely to be incomplete and subject to renegotiation. The reasons for this perspective include not only unforeseen external circumstances, but also changes in objectives and shifts in the balance of power or the strategic behavior of the parties (due, for instance, to a learning process). In order to minimize transaction costs during the life of the contract, the first step of a regulatory system is to establish the architecture, rules and processes that can improve commitment by all parties. The separation of roles is thought to improve commitment because it helps create checks and balances between the regulators and prevent regulatory capture by interest groups or the regulated firms. However, effective separation requires bureaucratic procedures that may increase the costs of transaction. Separation may also be hampered in practice by the lack of specialized expertise or cooperation between the various regulatory agencies.

While separation of regulatory powers may be a good way to avoid capture, in practice the scarcity of human resources may limit the use of this option. In most small countries there is only one agency in charge of regulation and enforcement, and in some, the regulator is in charge of several infrastructure sectors. In countries such as Colombia and Chile, where the functions of regulation and control are split into two different agencies, the control of market power has been difficult to implement, and jurisdictional conflicts have been frequent. This problem is exacerbated by the lack of adequate regulatory bodies in countries of the region. Strengthening antitrust agencies throughout Latin America could improve the potential efficiency of regulatory outcomes, especially for electricity, because it would give room for more ex post monitoring controls that are less prone to capture by the industry.

In large federalized countries like Argentina and Brazil, there is a role for the states or provinces in the

⁸ See Shleifer and Vishny (1998).

regulation of the local transmission and distribution business. This requires a minimum level of expertise at these levels. While it may be argued that being close to the regulated firm helps the task of the regulator, this advantage must be weighted with the duplications and use of scarce human resources that it implies. Careful and balanced distribution work between the federal and local agencies is a must.

• How much flexibility?

Since regulation is an incomplete contract between regulators and business, there is a trade-off between the credibility of the regulatory commitments and the flexibility required to accommodate unforeseen circumstances and changes of interests of the various actors. When there is little credibility because the rule of law is weak or property rights are poorly protected, the advantages of flexible regulation must give way to the strength of rigid rules. This explains the extreme rigidity of some power sector regulatory systems in the region that followed the Chilean example.

The Chilean experience exemplifies the trade-off: the rigidity of its regulatory system was key to assuring potential investors that their investment would not be expropriated by the regulator, but it had the undesirable effect of making the regulatory framework unresponsive to changes in the environment, as shown by the 1998-99 drought.

The California experience demonstrates that the design of electricity markets is an unfinished business. Adjustments are inevitable, and the challenge is to create a system that ensures efficient rule changes. Panama and some states in the United States have adopted similar approaches, setting up market surveillance groups made up of independent outside experts to "institutionalize change."9 Their experiences suggest two lessons. First, the experts must be perceived as independent and objective. In small and medium-sized countries, this probably means hiring experts from outside the country. Most knowledgeable people within the country will be perceived as biased, at least initially, because of past connections with the industry. Second, the experts must have a broad mandate. They should be charged with assessing not only the performance of the market, but also of the system operator and the regulator. And they should be able to recommend changes in structure as well as rules.

Choosing the regulator

Another issue related to the possibility of capture is the choice of regulator. Estache and Martinot (2000) consider three types of regulators: "careerists" who are more likely to move to the industry they regulate once they finish their tenure in the civil service; "professionals" who are usually former industry managers willing to keep some influence on the regulatory process; and "politicians" who see the civil service as part of their political career. Given the implicit incentives of these types, it would be optimal to shift the balance of power towards the politicians and away from the professionals and even the careerists. This conclusion is at odds with the standard recommendation given by practitioners. The usual reasoning is that politicians do not necessarily respond to their main constituents, the electorate, and are also prone to capture by special interest groups. The length of tenure of the regulators may also help fight capture: shorter tenures may reduce this risk. However, the standard recommendation is in favor of longer tenures, under the presumption that this allows for greater independence and regulatory stability. What this shows is that the issues related to the choice of regulator imply a series of trade-offs that should be resolved in the context of each individual country. No blueprint has yet emerged, and choosing a good regulator remains more an art than a science.

Corruption may be viewed as a result of poor selection of officials and inadequate incentives. According to this view the solution to the problem may therefore involve finding better people and improving their incentives. Some countries (including the United Kingdom) have appointed as regulators people with little or no previous connection to the industry, sometimes coming from other industries or from academia. However, that option may be of little use for some countries, given the constraints on human resources and their limited institutional endowment. One wonders if a solution would be to establish regulatory boards with international representation, maybe as a scheme of international collaboration for parallel improvement of institutions in different countries.

⁹ See Ariza, et al. (2001).

Conclusions

The main proposition of this chapter is that while power sector reform has made significant progress in Latin America, major challenges remain. Some of these challenges arise because of the technological features of electricity markets, and others because many Latin American countries lack the institutional development and human resources implicit in the models that have been adopted. As a result, gains from reforms have varied from country to country. Nonetheless, successful reform should be measured with a pragmatic yardstick, weighing what is desirable with what is feasible.

As countries have privatized and attracted private investment, substantial improvements in productive efficiency have been achieved and a process of institutional learning has been put in place. However, the consumer has not always benefited from these improvements, competition remains an elusive goal in many countries, and investors are still reluctant to commit their capital in greenfield developments without considerable guarantees and demanding high prices. Service coverage is still limited in some countries and, with a few exceptions, subsidies have not been used wisely. Government still has a significant presence as an entrepreneur in many countries, and the separation of roles has been hard to accept. Thus, regulation is a work in progress.

Some of the other key lessons from experiences with power sector reform include the following:

• Institutional constraints prevent establishing an effective regulatory and investment environment. Because institutions take time to develop, it is sometimes preferable to take an evolutionary rather than a big bang approach to reform. However, to avoid getting locked into a limited design, there must be a clear vision from the outset of the long-term goal, and well-defined conditions that can trigger major changes.

It is critical to keep the wires business, transmis-

sion and distribution independent of supply, generation and commercialization. However, it is still unclear how to involve the demand side in the market and realize the potential of retail competition.

• Even if competition is not feasible in the short term, care should be taken not to foreclose future options for competition when present constraints are removed.

• The existence of a constraint-free transmission system is of vital importance for the market, and its expansion should not be limited by narrow efficiency considerations. The public sector must still play an active role in the expansion of transmission grids in most countries.

• It is now widely accepted that institutional and technical constraints prevent competition in small markets. While the jury is still out on the debate as to how to best regulate a small system or the type of market arrangements that minimize the exercise of market power, there is no doubt that the worst action would be to ignore the problem and simply expect that players will behave properly.

• Regulatory intervention is always required in the power sector, but how to achieve it remains an open question, given information asymmetries and institutional constraints that make enforcement more difficult. One criterion for the design of the regulatory system may be to minimize the regulatory transaction cost in the short term in order to buy time to develop the necessary institutional capacity. The main consideration when designing or evaluating a regulatory framework should be a straightforward assessment of the people and organizations that will be in charge of implementing and enforcing it.

• Given the limited amount of research on regulation of power sectors, the best piece of advice for the moment would be to be pragmatic, take institutional weaknesses into account, avoid turnkey solutions, and stay abreast of international developments. CHAPTER

13

Telecommunications

Information has joined capital and labor as a fundamental factor of production, implying a huge increase in recent years in the demand for information processing and transmission. For example, globalization has prompted the expansion of international telephone traffic in Latin America by about 15 percent annually over the past 20 years, about four times the pace of the global economy.¹ This fast-growing demand has put tremendous pressure on telecommunications, which has become a large and rapidly growing industry.

Telecommunications is both the core and infrastructure of the new global information economy. It is crucial for many industries like banking and other services, and it facilitates trade in goods and services. Moreover, companies today not only set up subsidiaries abroad to take advantage of cheap labor for making manufactured goods, but they also process information abroad. Swiss Air's accounting transactions, for example, are processed overnight in India.

Even before the huge explosion in demand for telecommunications services, which began less than 20 years ago, the quality and density of telecommunications networks had been recognized as major indicators of the level of economic and social development. Highly developed countries can afford more developed networks, and the availability of telecommunications seems to contribute to economic growth and competitiveness. Not surprisingly, the state of telecommunications varies considerably between developed and developing countries, as well as within countries. Developed countries have on average around five times the number of main line and cellular phones per capita as developing countries (see Figure 13.1). Latin America is the region with the third highest telephony penetration (measured as the sum of main lines and mobile phones). The ratio between developed and developing country penetration fell from six to five between 1985 and 1999, with Latin America reducing its gap a little faster than the average developing country.

For developing regions, particularly Latin America, the internal "relative gap" in telecommunications is even more dramatic than the international one. The same strong relationship observed between economic development and telecommunications service across countries is observed within countries. Figure 13.2 presents main lines per capita by income decile in three Latin American countries. Less than five percent of people in the lower quintile have access to telephones at home, whereas around 80 percent have access in the highest decile. The difference between the level of penetration in the lowest and high-



Source: ITU (1999).

¹ A similar pattern is observed worldwide.



est decile is most pronounced in Brazil, the country with the worst income distribution in the region.

To close these gaps, over the past decade many developing countries have reformed their telecommunications sectors, changing their regulations, introducing private capital, and liberalizing the market in order to increase efficiency and investment. Latin America has been a leader in these reforms. By 1999, more than two-thirds of the countries in the region had fully or partially privatized the main operator, and around half had reformed regulation to introduce competition. The conventional wisdom supported by case studies shows that privatization by itself is not enough to both improve sectoral performance and fully distribute its benefit to final customers. Privatization also requires an effective regulatory framework and competition to discipline firms.

There is still a long way to go in Latin America internal and external gaps remain large. Moreover, developing countries must concentrate not only on the gap in basic telephone services but also on the introduction and diffusion of advanced, customer-oriented services like data transfers and Internet access.

Recent Trends²

For decades, telecommunications was thought of as a mature industry where services were provided by a se-

cure state-owned post, telephone and telegraph monopoly. Changes were slow and incremental. The absence of competition was motivated by network harmonization requirements, the obligation to provide universal service, and, principally, the existence of large fixed costs in several parts of the network, whose duplication was not desirable. The telecommunications industry was generally believed to be a "natural monopoly."

Several pivotal events beginning in the 1980s altered these precepts and sparked dramatic changes worldwide in the telecommunications sector. The most important were rapid and significant technological changes, the growing awareness of the inefficiency of incumbent monopolies, the huge distortion in relative prices induced by cross subsidies, and fiscal considerations.

Technological development created momentum toward deregulation. Some traditional market segments, as well as new ones such as data transfer, could now be efficiently served by new players. Mobile communications, which have low fixed costs, have become a close substitute for local networks, reducing incumbent market power. Extreme cases are Paraguay and Venezuela, where more than 50 percent of total telephone subscriptions are mobile phones. Moreover, infrastructure costs have declined rapidly due to increased capacity and functionality. This trend toward lower infrastructure costs has undermined one of the rationales for maintaining a monopoly in telecommunications services.

In addition, the growing awareness of the inefficiency of incumbent services has put great pressure on policymakers to reform the sector. Monopolists typically had little incentive to reduce costs due to the "cost plus" nature of most regulations. This poor incentive system increased marginal costs and therefore implied high prices for final consumers. In addition to high costs, price structures were severely distorted due to cross subsidies, which conspired against sound business practices. Cross subsidies among services were substantial, with business, mobile and long distance services subsidizing residential, local and rural ones.³ Under this price

² This section is based on Laffont and Tirole (2000) and ITU (1999, 2000).

³ In theory, the optimal price structure should follow Ramsey pricing, meaning that products or segments with lower demand elasticity should pay a higher portion of fixed costs. See Viscusi, Vernon and Harrington (1997).

	Services under exclusivity	Commencement of exclusivity	Period (years)
Argentina	Local, national and international long distance	1990	10 (7 extended by 3)
Bolivia	Local, national and international long distance	1995	6
Brazil	Local, national and international long distance	1998	0.5 (during license awards)
Chile	None		
Colombia	None		
Ecuador	Local, national and international long distance	1995	5
El Salvador	None		
Guatemala	None		
Honduras	Local, national and international long distance	1995	10
Mexico	National and international long distance	1990	6
Nicaragua	Local, national and international long distance	1995	4
Panama	Local, national and international long distance	1997	5
Peru	Local, national and international long distance	1994	5
Venezuela	Local, national and international long distance	1991	9

Table 13.1	Exclusivity	Pariad of the	Incumbent	Operator
1adie 12.1	EXCLUSIVILY	renou or the	Incumbent	operator

Source: ITU (1999).

distortion, inefficient entrants benefited from the regulatory price umbrella to skim the cream off the market (business users) in central business districts and for specific long-distance services.

Moreover, in recent years, progress in telecommunications technology has demanded huge investments. The advent of high capacity and intelligent networks has multiplied the number of products offered (for example, toll-free or paying numbers, routing of calls, data transfers, home banking, etc.). In addition, digital technology, telecommunications, cable TV, broadcasting and computers are becoming a single industry, posing new challenges for regulatory frameworks. This new environment, along with the gap that most developing countries currently have in teledensity, has required huge infrastructure investments that governments cannot afford. This has pressured governments to introduce incentive regulation and open their telecommunications markets to private investment.

Ownership Trends and Regulatory Changes

The new technological environment and the demand by consumers for efficient, innovative and inexpensive communications have been the driving forces behind the reform and liberalization of telecommunications regulations around the world. Typically, this process started with the separation of state-owned postal and telecommunications services from the central government, followed by the corporatization of the telecommunications operator. Separation was usually accompanied by adoption of more commercial forms of accounting and decision-making, as well as by more incentive-oriented regulation and a clear separation of operational and regulatory functions. The next stage typically involved total or partial privatization of the commercial operator. At this stage, some countries allowed competition in the market, whereas others opted for granting a period of exclusivity to the newly privatized incumbent to compensate for investment and coverage requirements (see Table 13.1).

Starting in the mid-1980s, many network industry incumbents in the telecommunications sector became subject to price caps. This regulatory method aimed to head off the practice of passing cost inefficiencies on to prices. Average price caps allow the incumbent to adjust its relative prices to take into account differences in marginal costs and demand elasticities across the different products offered.⁴

Unfortunately, there is a trade-off between incentive scheme regulations and the extraction of monopoly

⁴ See Laffont and Tirole (1994).



Source: ITU (1999).

rents. This reduced ability of the government to extract monopoly rents from the private operator brings into question the credibility of the price cap: large rents as well as large losses are politically hard to sustain due to political pressures. Moreover, price caps give regulators substantial discretion over the operator's profit. Under this set-up, regulators can either be captured by the regulated firm (regulatory capture) or they can "expropriate" the operator once it has already invested in fixed assets (regulatory taking). These potential problems reinforce the need for two conditions that are difficult to find in developing countries: regulatory independence vis-à-vis the regulated firm and interest group, and stable rules.⁵

On the other hand, high-powered incentive schemes (price caps) create concerns regarding the quality of service provided. The operator will be willing to reduce quality if the reduction in costs compensates for the fall in demand (which in the case of utilities could be very inelastic). For example, British Telecom reduced its service quality when a price cap was introduced, forcing the regulatory agency to introduce new quality requirements.⁶

Latin America has seen its share of high-powered incentive schemes in the telecommunications industry. Table 13.2 presents the end-user tariff regulation in selected countries of the region for 1999. As mentioned, reforms in this sector have come with private participation. Most countries in the world have privatized in order to attract private and foreign investment, which has dramatically changed the ownership profile of incumbent operators. Latin America has been very active in privatizing telecommunications (see Figure 13.3). More than a decade ago, Chile was the first country in Latin America to sell its state-owned telecommunications company (see Box 13.1). Today, the major telecommunication operator in nearly every country in the region is

⁶ See Newbery (2000).

ble 13.2	End-User Regulation in Selected Latin American Countr	ries
	Type of regulation of end-user tariff	Cross subsidy for long distance
Argentina	Price cap	Yes
Bolivia	Price cap	na
Chile	Price cap	No
Colombia	Cap prices only to operators who have a dominant position or are a monopoly	No
El Salvador	Price cap	No
Mexico	Price cap for services with monopoly or dominant provision	Yes
Panama	Price cap	па
Peru	Price cap	No

Source: ITU (1999).

⁵ See Levy and Spiller (1996).

Box 13.1 Telecommunications Deregulation in Chile¹

At the beginning of the 1970s, state-owned monopolies provided all telecommunications services in Chile. Firms lacked funds for investment, prices were regulated, and there were large cross subsidies. In 1982, the government decided to deregulate the sector in order to introduce competition. The incumbent in each segment (local and long distance) was corporatized, prices were liberalized, and interconnection was made mandatory in order to allow entry. The law established the complete separation between regulation and operational functions.

The deregulation did not produce the desired outcome, however, as only tiny firms entered the market, and the network grew only slightly faster than before deregulation. A possible reason may have been that price freedom was not credible (given the presence of two big state monopolies).

In 1987, the Antitrust Commission determined that local and long distance telephony were not competitive, forcing the regulator to create a mechanism to fix tariffs. The reform reduced government discretion in price setting, thereby increasing private interest in the sector. Indeed, a year later the two big telecommunications companies were privatized.

After 1987, the sector grew rapidly, and phone density increased from 6.7 per 100 persons to 16 in 1997. The new private firms had big increases in efficiency that brought them a high rate of return (around 17 percent and 45 percent for local and long distance telephony, respectively), but did not bring significant reductions in customers' bills. In fact, local phone charges went up between 1987 and 1996.

The rate setting process for local telephony in 1994 did not introduce any substantial decline in prices because, quoting Perry and Leipziger (2000), "[it] appears to have been more the result of bargaining between the authorities and the firm than the outcome of rigorous technical analysis." During this process, the incumbent firm launched a fierce attack on the regulator through the media and did not allow it to have access to all of the firm's cost information (increasing its bargaining power).

The extremely high returns in long distance service created pressure both to reduce the regulatory ambiguities that generated legal entry barriers and to force Telefónica (the main local provider) to divest its share in the main long distance company (Antitrust Agency decision). These reforms, plus the nondiscriminatory access policy to the "local loop" (the market of local calls), induced many new long distance carriers to enter into the market, in turn drastically reducing the returns of both businesses (from 45 percent to less than 10 percent) as well as prices for consumers.

either fully or mainly owned by private capital. In some countries where the main operator still remains under state ownership, there have been attempts at privatization, but these initiatives have been cancelled or postponed indefinitely. In Colombia, the sale of Telecom was announced in 1991, but strong labor opposition led to its cancellation the following year. A similar situation occurred in Uruguay, where a national plebiscite interrupted the privatization initiative in 1991.

Some countries have already allowed competition in the telecommunications industry, and others have been moving in that direction (see Figures 13.4a and b). Due to technological advances and international experience, it is now widely accepted that entrants should be able to compete in most segments of the telecommunications industry, but competitive providers still need to use part of the local network that is controlled by the incumbent. This is the case with long distance calls, for example. This raises a difficult question: how should access charges be set? These charges may represent half of the cost for competitors and a substantial portion of the incumbent's income, implying that these agents would have an interest in affecting the regulator's choice. On the other hand, the standard wisdom regarding the efficiency of price equaling marginal cost does not hold in this situation because access charges must help the incumbent firm to cover its fixed cost.⁷

The prevailing dominant paradigm for setting access is the forward-looking long-run incremental cost. But, as discussed by Laffont and Tirole (2000), it raises some concerns. Since the incumbent does not make any profit with this access charge, it will try to use the bottleneck to increase its market power in the competi-

¹Based on Perry and Leipziger (2000) and Serra (2000).

⁷ Following the Ramsey price rule, access charges should consider the elasticity of demand of the final consumers of competitor firms.



Source: ITU (1999).



tive segment, restricting competitor entry by using nonpricing methods. Moreover, this method leaves regulators with the power to set individual prices, which gives them much discretion.

In addition to the one-way-access pricing issue, local competition is raising two-way interconnection issues. In this case, each carrier has to buy termination access from the other network. This is the case for mobile telephones. In principle, carriers have a mutual interest in reaching an agreement, but this is not the case if there is a clear dominant local operator (the incumbent). In addition, these agreements may facilitate tacit collusion between local service providers.

To promote local competition, regulators have followed different approaches to allow entry into this segment. In the United States, the 1996 Telecommunications Act envisioned three types of local entry: 1) facilities-based entry by mobile operators or by fixedlink operators such as cable companies (and perhaps in the future, electricity distribution networks); 2) resale entry in which a third party pays for the right to resell incumbent services; and 3) mixed entry whereby entrants lease some facilities (transmission) and provide others (switches). The latter is entry through unbundled network elements. Table 13.3 presents the advantages of each of these entry procedures as well as the methods used by different countries in Latin America.

Even though Latin America has been one of the two leading regions in the liberalization process, privatization in many countries in the region has been tied to a period of exclusivity ranging between four and 10 years (see Table 13.1). As a consequence, the region has moved forward in the liberalization of new services like mobile telephones and the Internet, but has remained fairly closed in more traditional services (see Figure 13.4a). It is important to mention that some analysts have blamed lack of competition for high prices and depressed demand in the region during the 1990s.⁸

The Effect of Reforms

As shown in Figure 13.1, Latin America is far behind developed countries in terms of telephone penetration, but once differences in per capita are considered, the level of penetration is neither especially high nor low for its level of development (see Figure 13.5).⁹ A similar result is found for Internet hosts per capita. Given how far Latin America has come in the process of privatization and regulation, this suggests that reforms have been irrelevant, unless it can be proven that Latin American countries started far behind.

⁸ See ITU (2000).

⁹ Regressing the number of main line plus cellular phones (in log) on PPP-adjusted (in log) GDP per capita, a dummy variable for Latin America is not always significant for standard levels. In fact, when we control for GDP per capita in log square and cubic, the Latin American dummies are significant at 6 and 14 percent, respectively.

Table 13.3 | Modes to Opening Local Markets

Type of competition	Advantages	Examples		
Facilities-based competition	 Creates conditions for effective competition Reduces demand for regulatory intervention Upgrades networks and services Pressures incumbent to upgrade network and services 	Argentina, Brazil, Chile, Colombia, Guatemala, Mexico, Peru		
Resale	 First step in the path towards effective competition Quick and low-cost deployment of services Efficient use of existing infrastructure Not restricted to the places where new entrants have been able to build competing infrastructure Opportunities for small and medium size-enterprises to serve niche markets without having to build their own infrastructure 	Argentina, Chile, Colombia Guatemala, Mexico, Peru		
Combination method (both approaches)	• Includes advantages of both approaches plus the benefit of efficient entry of new carriers; no misallocation of resources due to availability of both approaches to select mode of entry	Argentina, Chile, Mexico, Peru		

Source: ITU (1999).



Note: Each dot represents a country. Latin American countries are shown in red. Source: IDB calculations based on ITU (1999).

Figure 13.6 analyzes the evolution of main line plus mobile phones per capita in nine Latin American countries before and after they privatized their incumbent operators. For each country, we normalized the series to be 1 in the privatization year, noted as "t0" in the figure. On average, after privatization, these countries increased the rate of growth of penetration per capita from around 5 percent to 14 percent per year.¹⁰ This increase in the rate of growth comes with a decline in



Note: t0 is defined as the year of privatization of the incumbent operator (the scale is normalized to 100). Countries that had available data on main lines and mobile lines for the period plotted are Argentina, Barbados, Bolivia, Chile, Guyana, Jamaica, Mexico, Peru and Venezuela. Source: ITU (1999).

the waiting list for main lines. Figure 13.7 shows that after privatization, the waiting list fell by more than 50 percent in the five countries of the region for which data are available. It is interesting to note that the waiting list in these countries was growing before privatization, suggesting that the declining quality of

 $^{^{10}}$ A similar result is found if we only focus on main lines per capita (result not reported).



Note: t0 is defined as the year of privatization of the incumbent operator (the scale is normalized to 100). Countries that had available data on waiting lists for the period plotted are Argentina, Chile, Mexico, Peru and Venezuela. Source: ITU (1999).



Note: t0 is defined as the year of privatization of the incumbent operator (the scale is normalized to 100). Countries that had available data on international incoming traffic (minutes) for the period plotted are Argentina, Bolivia, Peru and Venezuela. Source: ITU (1999).

the public incumbent could have fostered the privatization process in these countries. Using other measures of quality, such as faults per main line in use and the percentage of digitalization, produces similar results: there is an increase in the quality of the service provided after privatization of the main incumbent.

Assuming that privatization of the incumbent accompanies the introduction of private capital in long distance service, Figure 13.8 describes the evolution of international incoming and outgoing calls before and after privatization. Interestingly, the international incoming traffic does not show any change, but outgoing traffic shows a clear increase. This result suggests that the relative price of international long distance service for local users falls in relative terms to the one paid by customers in foreign countries.

The econometric analysis in Appendix 13.1 shows that the previous results are a common feature of privatization processes around the world. On average, privatization increases the number of main line and mobile phones by around 7 percent.¹¹ Focusing on quality measures, privatization reduces waiting lists by around 60 percent and the number of faults per line by 30 percent. In addition, the privatization process fosters the rate at which the network is digitalized. These results suggest that privatization increases the quality of service, but also that this is accompanied by an increase of around 14 percent in the cost of local telecommunications services. Along with the fact that international outgoing calls increase more than incoming calls, this suggests that the price of local calls increases in relative terms to the price of international ones. This might be explained by the reduction of cross subsidies from international to local services.

Consistent with these results, some case studies show that incumbent firms enjoy high returns after privatization. For example, Serra (2000) shows that the local incumbent in Chile had returns over assets of around 20 percent after privatization, and the dominant long distance firm had a return of around 45 percent. In the latter case, these high returns fell to around 7 percent after competition was allowed in 1995. These results show that the asymmetric information between the regulator and the "monopoly" allows firms to enjoy high information rents. These rents vanish or are reduced when rent extraction comes in the form of competition.

The rate of growth of telephony and prices between 1995 and 1999 was analyzed in order to compare the performance across countries with different levels of competition.

¹¹ For main lines, this increase is around 4 percent, and for mobile phones, 50 percent.

The International Telecommunications Union (ITU) provides access to the level of competition in the local and mobile segment for different countries in 1998. Appendix 13.1 shows that competition fosters the mobile market. In fact, countries that have monopolies in their market have an annual rate of growth 20 percent points lower than countries that allow competition in this segment. On the other hand, the ITU competition measure for the local service segment does not appear to be related to either a significant positive effect in the evolution of the number of main lines or to a significant reduction in prices (even though in both cases they have the expected sign). There are two potential explanations for this result. Even though a country has more than one firm providing local services, each firm would tend to be a local monopoly in its area, and, therefore one should not expect a competitive market. A second potential explanation is that many countries imposed initial investments that were compensated for by granting temporal monopolies (see Table 13.1).

New Regulatory Challenges

To date, the main objective of most legislative and regulatory changes has been to pave the way for privatization, establish a regulatory authority, or introduce competition in some segments of the industry. But a recent wave of reforms has aimed at accommodating the sector to the new reality of digital telecommunications in which cable TV, broadcasting, and IT industries are merging into a single industry that must be regulated in a coherent and integrated manner. Under this new scenario, there are a large number of potential new players. Other network operators such as cable companies and railroad, electricity, gas or water utilities can be efficient providers of transmission facilities if the public switched-telephone network is to be duplicated. Moreover, large software companies and media can also play an important role in the industry. This is not the future but the present—there are any number of mergers on practically any given day between telecommunications companies and cable TV, Internet providers, etc. A clear example in Latin America is Telefónica. In addition to its huge share in the conventional telecommunications industry, Telefónica has increased its participation in other businesses such as the Internet (e.g., Terra.com) and cable TV (Intercom in Chile).

This convergence is making traditional regulatory definitions and boundaries out of date. Pressure for parallel convergence in regulation will increase as long as two "different" industries continue to provide services previously provided by the other (e.g., telephone and cable TV). More importantly, these pressures will increase when the Internet's video and telephony quality improves, making it a clear competitor with the traditional supplier of these services. The Internet presents special problems because it is developing so fast that regulations have trouble keeping up with innovations. These problems become worse when those innovations concern services or products that, if offered by conventional means, would be highly regulated.

To deal with this changing scenario, countries like Malaysia and Singapore in recent years have centralized the telecommunications, broadcasting and computing industries under a single regulatory authority. If a nation still prefers having separate bodies regulating each of these "segments," great attention has to be paid to cooperation between these agencies to avoid wasteful duplication of effort or, worse still, contradiction and uncertainty.

Besides the challenges posed by the new digital era, old challenges persist as well, particularly in Latin America. Universal access is still a critical issue in the region. Policies have to reduce the huge gap between rich and poor in conventional connectivity, and now they have to address universal Internet access as well. To finance universal service, regulations have to avoid cross subsidies that introduce price distortions. Countries such as Chile, Colombia, Guatemala and Peru have implemented a bidding process in which specific projects are awarded to bidders that offer to provide the services at the lowest subsidy.

Regulations must continue to foster competition and protect consumers from potential monopolies. They have to deal with network access and inter-operability, and reduce obstacles to competition such as the cost and difficulties consumers have in keeping their telephone number if they switch providers. This increases the switching cost to move from one provider to another. The challenge is to develop consistent regulations that treat similar products in a coherent way, encouraging innovation and serving the best interests of all users.

Conclusions

Over the past decade, information technology has become an essential factor in production, inducing a huge explosion in the demand for telecommunications services. This fast-growing demand, plus the new technologies that have burst onto the scene, have put great pressure on the telecommunications industry, which has undergone important transformations in recent years. In general, state-owned monopolies had neither the right incentives nor the funds for investment to address these new challenges. In addition, new technologies in telecommunications have reduced fixed costs, undermining one of the reasons why some segments were thought of as natural monopolies.

Latin America has been one of the leaders in the transformation of the telecommunications industry. Typically, this process starts with the separation of telecommunications services from the central government, followed by the corporatization of the telecommunications operator. Incentive-oriented regulation and a clear separation between the regulatory and operational functions are then introduced. The next step is to bring in private capital, which in some cases must compete from the outset, and in others is granted a period of exclusivity to compensate for initial investments.

In general, these reforms have fostered telephony penetration and improved service quality, but they have increased prices as well. It seems that the efficiency improvements induced by reforms are not fully transferred to final consumers. Some case studies show that privatized firms have high returns in countries where regulated private monopolies remain, showing that informational rents are high. These abnormally high returns seem to decline when competition is introduced.

Despite much progress, Latin America still faces the daunting challenge of closing the gap with the developed countries in terms of access to quality telecommunications services. Furthermore, most countries in the region have to make a particular effort to offer more equitable access to low-income customers and areas. Regulations must be improved in order to protect customers from potential monopolies while at the same time fostering investment and innovation in the sector.

Appendix 13.1

The appendix tables that follow constitute an econometric study of the effect of telecommunications reform on industry performance. Telecom variables come from the International Telecommunications Union database and the PPP-adjusted GDP per capita from the World Bank. Appendix Table 13.1 presents a fixed effect estimation of the impact of privatization on some performance variables. Given the shape of the relationship between telephony penetration and PPP-adjusted GDP per capita (see Figure 13.5), we control our exercise using a cubic polynomial in the latter variable. In addition we introduce year dummies to take technological progress into account. To see the effect of privatization, we construct a variable that is equal to one if the process has already taken place.

Finally, to study the effect of competition in telecommunications, Appendix Table 13.2 looks at the rate of growth of some performance variables between 1995 and 1999 in cross-section regressions.

opendix Table 13.1 Effects of Privatization: Panel Regression Results							
	Dependent variable (logs)						
Independent variables	Main and mobile lines per capita	Main lines per capita	Mobile lines per capita	Faults	Digital lines ¹	Waiting list	Cost of a one-minute local call
Per capita GDP (log)	-17.85 (-10.58)***	-20.55 (-13.56)***	10.54 (0.61)	-0.33 (-2.01)**	26.65 (9.26)***	-0.48 (-2.56)**	0.41 (2.87)***
Per capita GDP (log squared)	2.39 (11.57)***	2.76 (14.90)***	-0.40 (-0.20)				
Per capita GDP (log ^3)	-0.10 (-12.09)***	-0.12 (-15.78)***	-0.02 (-0.20)				
Post-privatization dummy	0.08 (3.33)***	0.04 (2.10)**	0.51 (4.90)***	-0.30 (-4.50)***	8.62 (5.76)***	-0.67 (-6.04)***	0.14 (2.82)***
Constant	41.40 (9.19)***	48.56 (11.98)***	-61.65 (-1.25)	7.02 (4.27)***	-238.76 (-10.46)***	-5.85 (-4.01)***	-0.06 (-0.07)
R ² adjusted No. of observations	0.99 1,795	0.99 1,830	0.93 984	0.89 842	0.89 1,334	0.83 1,266	0.99 970

¹ Variable in levels.

Notes: All specifications include country and year dummies. Post-privatization dummy takes a value of one for years after privatization and zero otherwise. t-statistics in parentheses.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

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Appendix Table 13.2 Effects of Privatization: Cross-Section Regression Results

	Dependent variable					
	1					
Independent variables	Mobile and main lines	Main lines	Mobile lines	Cost of a one-minute local cal		
Per capita GDP (log)	5.94	-18.93	42.97	0.75		
	(-0.36)	(-1.49)	(0.70)	(1.24)		
Per capita GDP (log squared)	0.59 (0.31)	2.32 (1.55)	-5.02 (-0.73)			
Per capita GDP(log ^3)	-0.02 (-0.230)	-0.09 (-1.600)	0.21 (0.800)			
Initial amount of main plus	-0.07	-0.07	-0.33			
mobile lines (1995)	(-2.32)**	(-3.25)**	(-4.09)***			
Dummy of privatization	0.09	0.07	0.44	0.26		
	(1.51)	(1.39)	(2.24)**	(2.38)**		
Dummy of local competition	0.08	0.03	0.82	-0.06		
	(1.17)	(0.56)	(3.27)***	(-0.64)		
Dummy of mobile competition	0.24 (3.70)***					
Constant	0.43	0.39	0.96	-0.02		
	(7.38)***	(8.11)***	(4.06)***	(-0.18)		
R ² adjusted	0.17	0.27	0.50	0.08		
No. of observations	119	123	96	75		

Notes: t-statistics in parentheses. Dummy of privatization equals one if the incumbent operator was privatized sometime between 1995 and 1999. Dummies of local and mobile competition take a value of one if the market is open to two or more enterprises, and zero otherwise. In the case of mobile lines, the data corresponds to the market (analogue or digital) that is more competitive.

* Significant at the 10% level. ** Significant at the 5% level.

*** Significant at the 1% level.

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Summary

With the explosion in information technology in recent years, the importance of technological innovation has come to the fore more than ever. This is particularly true with regard to the Internet, undoubtedly one of the most rapidly adopted inventions in history. The increase in digital communication flows and in Internet sales is changing the way in which business transactions are conducted. This new technology globalizes the geography of markets and deepens the trend toward a world marketplace.

The emergence of the new economy opens new opportunities for Latin America but also poses formidable challenges to it. Chapter 14 will show that the new information technologies bring the promise of increased productivity and growth potential through a variety of channels. They can reduce transaction costs among firms and between firms and customers, increasing the efficiency and the scope of markets. They can speed up information flows, fostering the diffusion of technology and the formation of human capital. Information technologies can make governments more accountable, transparent and efficient, and provide better communication between public entities, firms and customers.

As a latecomer to the Internet revolution, Latin America has a long way to go to catch up. Only 0.5 percent of Latin Americans had access to the Internet in 1999, compared with more than 30 percent in the United States. And there were only three Internet hosts per 10,000 people in Latin America, compared to 173 in the developed countries. The benefit to arriving onto the scene late, of course, is that it conceivably could enable Latin America to catch up at a faster pace and a lower cost. But that will depend on the environment for innovation in the countries of the region—and in that respect, the adoption of the Internet could also prove to be no different than that of other technological changes.

Chapter 15 discusses how the degree of innovativeness in a country helps explain the extent to which new technologies may be more effectively absorbed. In fact, the higher the country is on the innovative ladder, the more effective it will be in terms of achieving technological development and, in particular, adopting the Internet. Not surprisingly, countries such as the United States, Japan and Great Britain appear at the high end of this relationship, while Latin American countries are typically concentrated at the bottom.

What is surprising about this relationship is that it is valid even when isolating the fact that countries with better telephone infrastructure—which, of course, are the richer ones—are also the ones with more Internet hosts. Thus, the capacity to innovate and assimilate new technologies is not just a matter of income or infrastructure endowment. This point is important to economic development, since technological development is a key factor in achieving more competitiveness and, thus, higher rates of growth. If Latin America does not fare well in terms of innovation, it will be difficult for the region to achieve technological depth.

While Costa Rica and Chile are leaders in innovation in Latin America, they are still below the world average, and the region as a whole ranks low with respect to other groups of countries. In contrast, some East Asian countries surpass the world average by a wide margin.

Apart from income levels and infrastructure, a number of economic and institutional channels can have a major influence on the ability of countries to climb the innovative ladder. These include education, access to credit, the rule of law, and economic openness. Education is clearly vital, since successful innovation and the assimilation of technology hinges to a considerable extent on the skills of the labor force. As was shown in Part III of this book, the conventional wisdom that Latin America's labor force is unskilled is in fact a myth. However, it is also true that the region's human resources do not measure up to the labor force in East Asia, the most successful region of the developing world with respect to technological absorption.

As shown in Part I, access to credit is key to business growth in Latin America. In the case of businesses involved in the new economy, such access is even more important because enterprises are usually small and business start-up costs large.

Public institutions are also important to technological innovation and absorption. The fast pace and rapidly changing environment associated with information technologies mean that institutional problems such as bureaucratic delays, corruption, property rights issues, and a weak rule of law can be costly indeed to the business community.

Finally, economic openness plays a pivotal role in spurring innovation and technological absorption. Imports of machinery and equipment are important channels for transfer of knowledge from developed to developing countries. Absorption in the latter of the latest technological developments and processes typically spurs domestic innovation.

Although a number of variables at the macro level may ultimately determine how much a country innovates, the actual practice of technological innovation takes place within a more specific institutional context

or system. This can be the realm for supportive government interventions. Chapter 16 uses a systemic approach to examine systems of innovation in Latin America. It focuses on the interrelated practices and institutions that provide the context for all-important microeconomic decisions regarding investments in technological innovation. These decisions depend not only on narrowly defined microeconomic considerations but also, in a most fundamental way, on the opportunities and constraints that result from the entire series of linkages between firms along the same or related production chains, between firms and research institutions, and between local and foreign companies. They also depend on the system for human resource development, the labor market, and a country's general policy framework. Latin America is found to have underdeveloped innovationoutput systems, where human capital is insufficient and underutilized, linkages among firms and between firms and research institutions weak, and knowledge flows limited. It is thus not surprising that Latin American countries are falling behind in the technological race.

The systemic issues raised here are not all directly amenable to policy intervention. Bearing in mind this limitation, the policy discussion centers on the role of government in developing proactive strategies to catch up with the world's technological leaders. The assumption is that implementing such strategies will enable the countries of the region to gradually transform their national innovation systems into more mature and facilitative frameworks. These in turn can support the efforts of businesses to create and apply modern knowledge to the production of higher-quality and lower-cost products.

14

The Promise and Challenge of Information Technologies

Information technologies help produce, gather, distribute, consume and store information. They are more important than ever before simply because in a relatively short period of time they have become ubiquitous in daily life. This is particularly true of the Internet, access to which has increased hundreds of times over in recent years (see Figure 14.1). Terms that did not exist only a few years ago-worldwide Web, e-mail and Intranet, among countless others-are now part of people's every day vocabulary. With minimal effort, consumers can go on-line and comparison shop between hundreds of vendors around the world. They can download music, photographs and film from the Web in a matter of minutes. Complex banking and other financial transactions can be done from the home. People can listen to or watch live news from almost anywhere in the world. And all this is just the tip of the iceberg.

Is this for real? Is the Internet just a somewhat different way to communicate, a technological curiosity not so different from traditional methods of communication such as the telephone, the fax or the regular mail? Or are we entering a new era, a global economy on steroids?

While the Internet does seem to be something more than just a fancy way to provide and receive information, the extent to which it contributes to an economy is in fact unclear. Some commentators argue that the world is posed to enter a third industrial revolution that will transform the economy in such a way that the old laws of economics will no longer apply. Sooner or later, it has been claimed, the law of supply and demand will cease to exist.

As much as information technologies "amplify brain power in the same way that the technologies of the industrial revolution amplified muscle power,"¹ the ultimate test of their benefit is their potential impact on



Source: ITU (2000).

productivity, either by creating new products or producing existing ones more efficiently. After all, faster productivity growth is the key to higher living standards, and more growth is the basis of modern growth economics. Any economy can grow by increasing its labor inputs, so long as the labor is available. Similarly, any economy can grow by increasing its use of physical capital, but investing in capital carries a cost and requires people to cut back on current consumption. If an economy can increase its productivity, real incomes will rise over time without the necessity of increased use of such inputs.

The most important new boost to growth potential and productivity, and the one so widely touted by the

¹ See The Economist (2000).

Box 14.1 How Latin American Businesses Can Benefit from the Internet

Researchers argue that the potential savings in transaction costs through the use of the Internet is especially high in the health care sector, since that sector is large, information-intensive, and highly dependent on paper records. Moving the processing of health claims to the Internet would require aggressive efforts to standardize claims formats, but savings could indeed be huge. In the United States, some maintain that savings amount to more than 50 percent per claim. The Internet also offers great potential in medical records management, not only for cutting costs, but also for improving the quality and effectiveness of care. Assuming that privacy concerns can be adequately addressed, patients and providers would benefit enormously from converting paper medical records into electronic forms.

The Internet can also have a major impact in the financial sector. This has been the case for the developed countries, although the experience of the banking sector in the United States shows how shifting to the Internet can pose new dilemmas. Financial services based on a provider-client relationship tied to geography and the provider's knowledge of the customer stands in stark contrast with savings offered by on-line markets for standard financial products. In the lending industry, customers may use the Internet to shop for information and compare rates. As consumers grow more comfortable with on-line transactions, it would not be surprising if loans were to start originating on-line as well. With the now legal "digital signature" law recently enacted in the United States, this may occur sooner rather than later. If so, consumers will save through lower margins plus lower costs in processing applications.

 1 See Arrow (1962), Rivera-Batiz and Romer (1991), Romer (1986 and 1990) and Young (1991).

media, is the technological breakthrough spearheaded by the United States. The contribution to productivity growth from the use of information technology, including computer hardware, software and communications equipment, surged in the second half of the 1990s. The use of information technology accounts for a large share of productivity increases in the United States.

Latin America, on the other hand, has arrived late to the information technology dance. Can the region push its way to the dance floor and still benefit from this revolution? In fact, there are reasons to be optimistic about Latin America's chances of benefiting from the Internet revolution. For one, being a latecomer has its advantages. The dissemination of e-commerce and other Internet applications will likely be compressed into a shorter time frame, and the spillover benefits for efficiency improvements may be absorbed more rapidly. The pioneers have already done much of the dirty work, so a latecomer does not have to reinvent the wheel. By emulating best practices in applying the new technology, Latin America may be able to realize the stream of benefits with a shorter gestation period. Although the use of the Internet in the region lags with respect to other parts of the world, the speed with which the new technology has spread has been remarkable.

How Can Latin America Benefit from the Internet Revolution?

Information technologies such as the Internet and ecommerce appear to generate productivity gains by reducing transaction costs. The rapid dissemination of information, the substitution of digital for paper record keeping, and the networking capabilities of the Internet improve flexibility and responsiveness, encourage new and more efficient intermediaries, increase the use of outsourcing, reduce time to market by linking orders to production, and improve internal coordination.² Productivity gains for firms can be expected through improved procurement and inventory control, and reduced costs for intermediation and sales transactions. Consumers also can benefit through reduced search costs, thus increasing competition and reducing prices.

In fact, the most important attribute of the Internet is, perhaps, the most obvious. Internet facilitates the transmission of information quickly, conveniently and inexpensively. Routine transactions, including making payments, processing and transmitting financial information, and maintaining records can be handled less

Source: Litan and Rivlin (2000).

² See World Bank (2000).

Box 14.2 Siderar in Argentina

In March 1996, Siderar, a steel production firm, undertook an initiative to improve communications with its business partners. The idea was to provide and receive information by electronic means. Initially, electronic mail was employed. Later, more sophisticated operations were used. Through simple e-mail requests to suppliers and order confirmations to clients, Siderar used information technology in auctions, international bidding and other aspects of its daily business operations. Even today, the firm is in the process of setting up a system called "e-procurement" for inventory control and better integration with providers.

By using information technologies, Siderar encourages its 732 suppliers to access specifically designed Web pages to exchange information and coordinate operations. In this way, suppliers are able to check on the status of payments and documents (bills, receipts) as well as day-to-day reports. The advantages are lower administrative costs for both suppliers and Siderar. The use of paper has diminished, and there is more standardization among internal departments and between Siderar and its suppliers. Additional software applications have been developed in SAP, a German control system.

Siderar's systems have advantages as well for clients, who can check on the status of an order or request at any given moment. Is it in the manufacturing stage? Has it been delivered? When is the purchase expected?

Total cost of the system to Siderar has been about \$1.2 million.

Source: Bianco, Peirano and Porta (2000).

expensively with Web-based technology (see Box 14.1). Using information technologies, many firms can also reduce production costs.³

Latin American companies can also use the Internet to achieve the kinds of procurement and inventory savings now enjoyed only by developed country firms. Purchasing off-the-shelf electronic commerce applications is one example. There is potential for savings through reduced processing costs of procurement transactions, lower prices for inputs owing to increased competition, and improved inventory control. Keeping an electronic inventory and transferring information on replenishment needs over the Internet enables producers and retailers to reduce the time at each processing stage for components and raw materials.⁴ (See Box 14.2 for an example in Argentina). Even relatively small reductions in inventory holding time in retail trade can mean substantial increases in profits, since the average cost to retailers of holding inventory for a year is at least 25 percent of the price, and margins may average only 3 to 4 percent (OECD, 1999). Improved inventory control also enables firms to become more integrated with suppliers, which saves time and allows for greater production specialization. Better integration regarding production has led to a boom in specialized manufacturing firms that produce components for better known companies.⁵

Procurement in Latin America is less efficient and more labor-intensive than in the developed countries,

so the technical efficiency gains from transferring procurement systems to the Internet could be relatively large, although the region's lower labor costs could limit those economic gains. Also, the savings in working capital from reduced holding of inventories would be significant in Latin America, where the cost of capital is high and credit is often rationed or unavailable. However, the lack of reliable telecommunications networks may limit these gains.

There could be productivity gains from eliminating marketing and distribution intermediaries or improving their efficiency. By greatly expanding access to information, the Internet has eliminated retailers, wholesalers and even distributors in some sectors. More commonly, existing middlemen have been replaced by new approaches to intermediation made possible by the technology—for example, online auctions and aggregators. Eliminating or transforming middlemen functions could also enable developing country producers to access both domestic and foreign markets at lower cost.

The Internet also can generate significant cost savings in transport. As just one example, the advertising and trading of empty truck space over the Web is reduc-

³ See Litan and Rivlin (2000).

⁴ Goldman Sachs (2000) estimates that 30 percent or more of the total cost of intermediate goods typically comprises "process costs," or the costs of administering transactions and maintaining inventories.

 $^{^5\,}$ See World Bank (2000).

ing costs per ton in the U.S. trucking sector.⁶ According to one estimate, total cost savings thanks to the Internet for the U.S. trucking industry could reach \$15-\$20 billion annually—4 to 5 percent of total industry output.⁷

The Internet also offers the potential for savings in retail transactions. OECD (1999) suggests that greater availability of information to the consumer, along with savings in providing services, could increase the productivity of sales staff in OECD countries by a factor of 10. However, the evidence on the sales of goods over the Internet so far does not show large savings. Some studies have found that goods sold on the Internet are priced the same or higher than in stores.⁸ Others estimate that books and compact discs are 10 percent cheaper on the Internet.⁹

The potential savings in service transactions are more impressive. For example, the total cost (including investment) of bank transfers over the Internet is half that of existing automated systems and one-eighth that of transactions using tellers.¹⁰ Note that one part of these savings reflects efficiency gains, while another reflects the transfer of costs from producers to consumers in the form of time spent searching the Internet. The impact of lower-cost service transactions is likely to be less significant in developing than developed countries because lower wages mean that firms have less incentive to undertake the fixed costs involved in setting up electronic systems. Also, poor distribution systems, inadequate protection against fraudulent credit card purchases, and limited Internet access combine to constrain the potential for this type of commerce in many developing countries.

Easier access to knowledge through the Internet will speed technology diffusion, which is critically important to developing countries because they tend to operate within the technological frontier. Electronic commerce can reduce the costs of communication between geographically distant partners and lower the search and compare costs involved in finding potential business partners and technologies. Also, the Internet provides a radial structure for interpersonal communication networks. Bulletin boards and news servers allow people to exchange information faster and within a wider environment than with networks based on telephone and fax.

Differences in communications and transportation infrastructure are significantly related to differences in the rate of product imitation encouraged by foreign direct investment (World Bank, 2000). Grossman and Helpman (1991) argue that international contacts enable a country to obtain foreign technologies and adapt them to domestic use, an important channel through which the productivity levels of developed countries are passed on to developing ones. Such international "networking" is greatly facilitated by the Internet. By opening markets to a wider range of potential buyers and sellers, the Internet is likely to foster a greater volume and variety of trade. On the other hand, the Internet could erode an important advantage now enjoyed by firms in developed countries; that is, proximity to wealthy customers.¹¹

The Internet's impact on the access of Latin American firms to multinational supply chains is uncertain. More available information about developing country firms may improve their access to multinationals, which often have limited knowledge of potential suppliers. Goldman Sachs (2000) estimates that because of poor research, company purchasing managers tend to award 90 percent of their procurement contracts to about 20 percent of suppliers. On the other hand, suppliers with poor hardware, software and Internet transmission capabilities may be unable to compete with better-connected companies. There is some evidence that the new online auction systems have not resulted in the expansion of supply networks. General Electric, for example, has seen a reduction in the number of its suppliers since starting its online bidding site for procurement.¹²

As some have argued, Latin American firms may find it difficult to access online auctions because of a lack of credibility. Purchasers need to have confidence that suppliers will provide input on time and in accordance with specifications, and product quality may not be known ex ante. More than half of 35 large firms using online auction or exchange sites said that they would not do business through online Web sites with firms they did not know.¹³ Interview results indicate that buyers—typically developed country firms—see the risk

¹² See The Economist (2000).

⁶ See The Economist (2000).

⁷ See The Economist (1999).

⁸ See Goldman Sachs (2000), OECD (1999), and *The Economist* (1999).

⁹ See Oliner and Sichel (2000).

¹⁰ See UNCTAD (2000).

¹¹ See Harris (1998).

¹³ See World Bank (2000a).

Box 14.3 Patterns of Adopting New Technologies: Electricity vs. Information Products

In a widely cited study, David (1990) highlights the striking parallels of information technologies and previous technological breakthroughs. He mentions the steam engine and the combustion engine, but chooses to concentrate on how the dynamo—that is, direct electrical current—came to conquer U.S. industry around the beginning of the 20th century.

The process took almost half a century—longer than one might imagine. It took time to expand the capacity of the electric system and to tailor the technology to its potential applications in industry. And it took time for organizational systems of workplaces to adapt to the opportunities opened up by the new technology. In the case of the dynamo, that involved switching from huge steam engines to a series of smaller electrical machines, in the process making factories more flexible. Finally, the workforce needed time to come to grips with the new technology (learning by doing). In some cases, replacing cheap labor with electrically powered machinery did not produce immediate financial gains.

During the early days of electrification, the productivity gains form the electric dynamo were not particularly large, and in some cases productivity actually dropped. But once the adaptation process gained momentum and higher volumes of electrical power began to push down prices, there was explosive growth.

It should be mentioned that some analysts have pointed out differences between the respective processes of introducing electricity and information technologies. They note, in particular, the much quicker price drop in computer-related equipment, and the fact that, unlike information products, electricity managed to coexist with the technologies it replaced.

Sources: Triplett (1998), Eriksson and Adahl (2000), and Gordon (2000).

in purchasing from developing country firms as especially high. Over time, greater use may be made of certification agencies (e.g., the International Standards Organization and the International Electrotechnical Commission) to independently assess the quality of the products and services of new businesses. However, even in developed countries, relatively few small firms use the certification services these bodies provide. This is because of certification costs and concerns that certification may not fully address buyers' concerns in the markets where small firms compete.¹⁴

An Economy on Steroids?

The three key characteristics of information technologies are low reproduction costs, the high cost of switching and, in particular, network externalities. Taken together, these characteristics explain the S-pattern of diffusion of information technologies: slow at the beginning, then accelerating, and finally, slow again. These features are not unique to information technologies, as Box 14.3. explains in the case of the electric dynamo. Therefore, as Shapiro and Varian (1999) state, the "economy on steroids" in many fundamental respects is not a new economy.

Low reproduction costs. Information is costly to produce but cheap to reproduce. Books that cost hun-

dreds of thousands of dollars to produce can be printed and bound for a dollar or two, and \$100 million movies can be copied on videotape for a few cents. In economic terms, then, it can be said that producing information goods involves high fixed costs but low marginal costs; that is, the cost of producing the first copy may be substantial, but the cost of producing or reproducing additional copies is negligible. This cost structure leads to substantial economies of scale. The more someone produces information-related products, the lower the average cost of production. Moreover, the dominant component of the fixed costs is sunk costs, while the marginal costs of additional copies of the product do not tend to increase, as with other commodities.

High switching costs. Sometimes new technologies are linked with what are called "lock-in" effects. Once the new technology is chosen, the costs of switching become extremely difficult. In fact, lock-in effects are not absolute, since new technologies do displace old ones. But their existence can affect a firm's ability to compete, as well as its strategy and options. The extreme historical example of a lock-in problem is the layout of a computer keyboard, the so-called *QWERTY* arrangement. Why is this slower arrangement still in

¹⁴ See World Bank (2000a).

use, even when others, such as the Dvorak system, appear to be more efficient?¹⁵ The problem is that it is difficult for any one user to change from this system because the return to each person depends on what everybody else is doing. One simply cannot ask the question "QWERTY or Dvorak?" in a vacuum.

Network externalities. A third feature of many information-related products is that they tend to exhibit network externalities. Communications technologies such as telephones, electronic mail, Internet access, fax machines and modems are prime examples. Technologies subject to strong network effects have long lead times followed by explosive growth. This pattern is a result of positive feedback: as the installed base of users grows, more and more users find adoption worthwhile. The key challenge is to obtain a critical mass so that the market can build itself. The fax machine is an example. The basic technology was patented in 1843, and AT&T introduced it in the United States in 1925. However, faxes remained a niche product until the mid-1980s. During a five-year period, the demand for and supply of machines exploded. Before 1982, almost no one had a fax machine; after 1987, most businesses had one or more. The Internet shows the same pattern. The first e-mail message was sent in 1969, but up until the mid-1980s e-mail was used only by technical specialists. When Internet traffic did finally start growing, it did so in a big way, doubling every year from 1989 to 1995. After the Internet was privatized in April 1995, it started growing even faster.¹⁶

Largely as a result of network externalities, but reinforced by low reproduction costs and high switching costs, the use and impact of new technologies follows an S-shaped path. This kind of expansion resembles the way an infectious epidemic spreads among a population. In the first stage, there is a slow rate of contagion and a small, relatively stable number of infected individuals. Once a critical number of people are infected, the rate of subsequent infection accelerates rapidly. In the third stage, there are so many victims that the number of cases tends to stabilize. Similarly, new technologies require an incubation period before they can build a user base. There often is little growth or output for some time. The spark might involve any combination of factors, including additional training of the workforce, reorganization of the production process or company structure, or replacement of obsolete machinery. After this period, which can be very long, productivity and growth can skyrocket. Not only is the direct impact of the technology swift and widespread, but there are often indirect spillovers into other industries as well. In the final stage, the technology is exploited to capacity, so growth again slows.¹⁷

How Large Can Productivity Gains Be?

Economic growth has three basic sources. The first is increased labor input, which involves more hours worked, more workers, or better quality workers. The second is increased capital input, that is, more physical machinery. These first two sources both involve increased inputs of the two basic factors of production. The third source of growth comes from improving the efficiency in using these inputs. Economists refer to this as "total factor productivity" or TFP. Higher TFP growth is the holy grail of modern growth economics. Any economy can grow by increasing its labor inputs, but the labor has to be available. Similarly, any economy can grow by increasing its use of physical capital. But investing in capital carries a cost and requires people to cut back on current consumption. If an economy can achieve higher TFP growth, however, real incomes can increase over time without the necessity of increased use of such inputs.

Total factor productivity increases when existing capital and labor are combined to produce more output, that is, when productive efficiency increases. Factory redesign, organizational efficiency and better production methods all contribute to this. The use of the Internet (in addition to the purchase of the equipment, which enters as physical capital) is part of this, too. Thus, as much as information technologies might strengthen intellectual capacity, the ultimate test of their benefit is their potential impact on productivity, either by creating new products or by making existing ones more efficiently. After all, faster productivity growth is the key to higher living standards.

Recent developments in developed countries have fueled the conventional wisdom that information technologies do in fact affect productivity and thus, eco-

¹⁵ See Shapiro and Varian (1999).

 ¹⁶ However, having the superior technology does not guarantee success.
 Agreeing upon standards is also important. See Shapiro and Varian (1999).
 ¹⁷ See Chong and Zanforlin (1999) and Coyle (1999).

nomic growth. This idea has been reinforced by the experience of the United States, which, at least until recently, enjoyed the most prolonged period of expansion in its history. Not only did productivity performance reach exceptionally high levels, but the rate of unemployment dropped below what was previously thought to be the natural rate of unemployment. All of this occurred amidst few signs of inflationary pressure.

However, skeptics point out that it is difficult to know the baseline or benchmark against which to measure the impact of information technologies. How can one be certain how productive firms would have been in the absence of information technologies? Triplett (1998) compares the intensity of investment in information technologies in various U.S. industries with their growth rates of total factor productivity, which measures the increase in the ratio of output to the sum of capital and labor inputs. They find essentially no correlation. Indeed, certain industries where information technologies were especially strong in relation to total output—such as education and banking—had either low or negative growth in total factor productivity. However, these researchers acknowledge possible measurement problems.¹⁸

Oliner and Sichel (2000) show that the contribution to productivity growth from the use of information technologies, including computer hardware and software and communications equipment, surged in the second half of the 1990s. In addition, technological advances in the production of computers appear to have contributed significantly to more rapid productivity growth. These researchers estimate that the use of information technologies and the production of computers account for about two-thirds of the one percentage point increase in productivity growth between the first and second halves of the last decade. In summary, they claim, information technology is the story behind those gains.

By using new data and a new methodology, Nordhaus (2001) estimates that productivity growth in the new economy sectors has made a significant contribution to economy-wide productivity growth. Labor productivity growth in recent years in the business sector excluding the new economy sectors was 2.2 percent annually, as compared to 3.2 percent including the new economy. Of the 1.8 percent point increase in productivity growth in recent years relative to the earlier period, 0.6 percentage points was due to the new economy sectors.¹⁹

While there has been a delay between investment

in information technologies and productivity growth (the S-shaped curve), a latecomer enjoys the advantage of being able to simply emulate existing best practices or applications of technology, and thus reap the benefits over a shorter gestation period. In fact, it has been shown that spending on information technologies in developing economies has been growing more than twice as fast as in the developed ones over the past decade, though admittedly from a low base.²⁰

Where Does Latin America Stand?

Latin America is a latecomer to the information technology revolution. Despite rapid growth in Internet access in the last few years, it is estimated that only 0.5 percent of Latin Americans had access to the Internet in 1999, compared with 30 percent of U.S. residents. Electronic commerce is also in its infancy in Latin America, representing \$459 million of the region's GDP of \$2 trillion in 1999.²¹

The number of Internet hosts and the use of personal computers are two effective indicators of how well new technology is being assimilated.²² Both these indicators show an enormous gap between Latin America and the developed countries. Whereas the number of Internet hosts is 811 per 10,000 people for developed countries, the corresponding figure for Latin America is 23. Similarly, the number of personal computers per 1,000 people in developed countries is 353, compared to 44 in Latin America.

However, unlike what the conventional wisdom would lead us to believe, the numbers for the region are

¹⁸ See Litan and Rivlin (2000).

¹⁹ A more skeptical view by Gordon (2000) argues that recent aggregate U.S. economic performance, though impressive, does not qualify as an industrial revolution. He posits that (i) investment in information technology involves redistribution of wealth rather than its creation; (ii) much of what Websites offer represents a reduction in the cost of providing an existing activity rather than the invention of a new one; (iii) the Internet has resulted in much duplication; and (iv) trading or purchasing from the office has detracted from productive work.

²⁰ See *The Economist* (2000) and Goldman Sachs (2000).

²¹ See World Bank (2000a).

²² Internet hosts are defined as any computer system with an Internet Protocol address connected to the network. The data do not provide a full count of users because surveys do not capture all computer systems connected to the Internet (e.g., computers behind firewalls) and thus provide an indicator of the minimum size of the Internet.







in the same neighborhood as those for East Asia (20) and Eastern Europe (18) in terms of Internet hosts. Numbers of personal computers are also similar: 44 in Latin America, 43 in East Asia, and 50 in Eastern Eu-

the Middle East (6) and Africa (3). A closer look at the numbers shows that there is wide disparity among the Latin American countries themselves. Uruguay is currently the most wired economy of the region, with 77 Internet hosts per 10,000 people and 100 personal computers per 1,000. Next on the list are Argentina, Chile, Mexico and Trinidad and Tobago,

rope (see Figure 14.2). The regions at the bottom are

where the average number of Internet hosts is roughly 34 per 10,000 and the average number of personal computers is around 54 per 1,000. Interestingly, Belize has the highest number of personal computers (106 per 1,000), but counts with only 12 Internet hosts per 10,000. At the other extreme, poor countries such as Honduras and Bolivia have at most one Internet host per 10,000 and around 11 personal computers per 1,000 (see Figures 14.3 and 14.4).

The most common use of the Internet in Latin American countries is browsing for information. More than 50 percent of people surveyed by Latinobarómetro in Brazil, Peru, Uruguay and Colombia who have Internet access surf the web primarily for information, and around 15 percent use it for sending e-mails. In Ecuador and Mexico, people browse the Internet mostly as part of their office tasks (see Figure 14.5). The Internet has also changed the time people spend at their job, watching television or reading a newspaper. In fact, more than 15 percent of those surveyed in Mexico, Chile, Brazil, Paraguay, Argentina, Venezuela and Honduras report changes in the time they spend at their office because they now have access to the Internet. And in Uruguay and Peru, around 15 percent of people say they have changed the time they spend watching television because they now have the alternative of browsing the Web (see Figure 14.6).

Given the low penetration in the region of new in-





formation technologies, their benefits to Latin America may well lie ahead.²³ Since the effect on productivity is potentially large—as the experience of the United States shows—promoting the use of computers and the Internet in Latin America would appear to be a simple and effective way of fostering growth in the region. Unfortunately, this would be a flawed conclusion. The ability of countries to productively assimilate the new technologies depends not just on the availability of computers or the number of Internet hosts, but on the presence of an environment conducive to innovation. The Holy Grail of productivity may not be in computers, but in some more fundamental factors that make computers such an attractive tool.

 $^{^{23}}$ In contrast, some have argued that most of the benefits of the Internet in the United States have already happened (see Gordon, 2000).

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CHAPTER

15

The Ability to Innovate and Use New Technologies

On one level, the spectacular growth of the Internet in recent years demonstrates its potential to increase productivity, which is the basis of economic growth. But even beyond that, the Internet and the new information technology in general demonstrate the importance of a more subtle but equally important growth factor: innovation and the ability to adapt. When all is said and done, the Internet is simply the latest expression of the ingenuity of human beings and the ongoing effort to improve social welfare and the ability of people and businesses to employ new technologies in the search for markets and profits.

How, then, can Latin America become more innovative? How can the region be more entrepreneurial, and how can it more readily adapt technologies?

The countries that are the most innovative and most able to successfully adapt technologies to domestic needs are also the ones that have higher income levels. Countries that are not very innovative, or that cannot adapt technologies efficiently, have lower GDPs. This relationship is clearly captured by the index of economic creativity developed by *The Global Competitiveness Report* (see Figure 15.1).¹ The index is based on a mix of indicators that reflect the ability of countries to renovate their technologies and firms (see Box 15.1). Most Latin American countries—Chile, Brazil and Mexico being the exceptions—rank low in terms of economic creativity.

Figure 15.2 shows that while the world's leading economies have high levels of innovation, the performance of Latin America is poor, with all countries displaying negative scores below the world average. Costa Rica and Chile are the Latin American leaders in terms of innovation, while Bolivia, El Salvador and Ecuador are the poorest performers. Unlike Latin America, not



Source: Warner (2000) and IDB calculations.

all the countries of East Asia register negative scores: Singapore and Taiwan have remarkable positions.

While innovation is the major force behind economic creativity in industrial countries, it is the transfer of technology that plays a more important role in the developing world and in Latin America in particular. Overall scores for Latin America are negative both for innovation *and* for technological transfer, reflecting the region's difficulties in renovating technologies, either

¹ As mentioned in Chapter 1, *The Global Competitiveness Report* for 2001 introduced a new methodology to construct its technology index, one of the components of the creativity index used here. In this chapter, we employ their previous index as the concept of creativity because it helps us to understand several of the key issues in Latin America related to the ability to innovate. The measure may be criticized, however, on the grounds of subjectiveness and endogeneity (Bertrand and Mullainathan, 2001).

Box 15.1 An Index of Creativity

The Global Competitiveness Report for 2000 contains an index of economic creativity that captures the ability of countries to continuously renovate and improve their productive activities. This process requires renovating technologies as well as firms themselves.

The ability of a country to renovate technologies is measured through a technology index based on survey questions that capture a country's capability to innovate and adopt technology. Since countries can obtain technology either by producing or importing it, an overall technology index is measured by whichever of these components is largest. The idea is that the technology index rewards countries for either innovation or technology transfer. What is important is that the country participate in the newest technologies and innovations, not whether the country itself is the innovative pioneer. To raise GDP through technology-related activities, a country needs to achieve valueadded at some stage of the process, but not necessarily at the inventive stage. The ability to renovate firms is captured through a start-up index that is an average of whether financing is available, and the degree of difficulty in starting a new business. The former is measured by averaging responses to two questions: whether venture capital is available for risktaking entrepreneurs, and whether it is easy to get a loan with a good business plan but with little collateral.

The final economic creativity index is an average of the technology and start-up indices. In a range that goes from -2 to +2, the average index of economic creativity for the developed countries is 0.92, whereas for developing economies it is -0.19. The gap occurs in all the categories of economic creativity, although it is more significant in the case of innovation (0.89 for developed countries vs. -0.57 for developing countries). The economic creativity index for East Asia is 0.32, whereas for Latin America it is -0.75. Although the economies of both regions have performed poorly in terms of innovation, the advantage clearly goes to East Asia.

Source: Warner (2000). Innovation index (Based on eight survey questions) **Technology** index (Equals the innovation index Technology transfer index or the technology transfer (Based on two survey questions) index, whichever is greater) **Economic creativity** index Ease of activating new business Venture capital financing Start-up index Possibility of obtaining a loan with little collateral

by developing them or by assimilating those developed by others. Compare this with East Asia, where the innovation index is negative, but less so, and where the technology transfer score is positive. This confirms the idea that in East Asia, adaptations of existing technologies have played a large role in the region's economic creativity process. In a world with international trade of goods and services, foreign direct investment, and international exchange of information and dissemination of knowledge, the role of economic creativity in a nation's productivity depends on both domestic and foreign research and development.²

Economic creativity also depends on the ability of firms to renovate themselves, which is captured by the start-up index in Figure 15.2.³ In this respect, Latin

² See Coe and Helpman (1995).

³ See Box 15.1.



America fares even worse. This important source for improving productivity is severely constrained in many Latin American countries by lack of credit, shallowness of capital markets, and a gamut of hurdles to start businesses.

Economic Creativity, Innovativeness and Information Technology

Although the measures of innovation and creativity in The Global Competitiveness Report are important, they are partly based on subjective surveys that are open to criticism for lack of comparability across countries and bias problems. Is there an objective measure of creativity and innovation in an economy? Given the fact that the new economy involves very recent technologies, its depth in a given country-that is, its economic creativity and innovative potential—can be measured in part by the number of Internet hosts or personal computers. In fact, the correlation between information technology and economic creativity is high, although it is higher for developed than for developing nations (0.73 vs. 0.54 for Internet hosts and 0.80 vs. 0.53 for personal computers). However, the lower correlation for developing countries is driven by the African countries, since for both Latin America and East Asia the correlation is higher (0.81 and 0.88, respectively, in the case of the Internet) (see Figure 15.3). In general, the



Internet is highly correlated with innovation, start-up of new business, and even technological transfer. In other words, Internet is a useful proxy of economic creativity in the developing world in general, and in Latin America in particular.

In general, the higher the country on the economic creativity ladder, the more effective it will be in achieving technological development, as measured by the extent to which the Internet has penetrated the economy. At this point, an obvious constraint comes to mind: infrastructure (not a component of the creativity index). Does the use of the Internet reflect more the availability of telephone lines than the ability of people and businesses to adopt and use new technologies? Since almost all Internet users depend on telephone lines for connection, there is indeed a close relationship between the two variables (see Figure 15.4). Lack of telecommunications services is a serious problem in Latin America, especially in rural areas, so the digital divide is likely to persist in the future. However, lack of infrastructure is not insurmountable, as a number of imaginative solutions in Latin America have shown (see Box 15.2).

Although infrastructure may be important, it is far from being the whole story. In fact, the relationship between innovation and information technology as measured by Internet depth, to cite one example, holds tightly even when isolating for differences in telephone infrastructure among countries (see Figure 15.5).

It is noteworthy that in Figure 15.5, the vertical axis measures the relationship between Internet hosts





and telephone lines, while the horizontal axis measures innovation as ranked by *The Global Competitiveness Report.* Clearly, the ability to assimilate new technologies is not just a matter of infrastructure.

Determinants of Innovativeness

What are the factors beyond infrastructure that can improve a country's ability to innovate and assimilate new technologies? As Edwards (2001) points out, before Latin American policymakers allow themselves to be seduced by the notion that information technology is the silver bullet for development, governments must take into account key factors that, if not addressed, will ensure that the money invested in new technologies will be wasted. The empirical exploration in Appendix Table 15.1 of the determinants of innovation makes clear that those key factors are education, access to credit, effective institutions, and economic openness.

Education and Training

Part III of this report showed that education is crucial to achieving productivity, since more educated workers are better able to devise more efficient ways to work. In other words, education enables workers to become innovative and to better absorb and adapt technologies. A skilled labor force plays a crucial role in exploiting the potential offered by the explosion of knowledge.



Source: World Economic Forum (2000) and World Bank (2000).

Education is the basis for creating, acquiring, adapting, disseminating, sharing and using knowledge. Even though Latin America's labor force is not as unskilled as the conventional wisdom has it, the region still has a long way to go to bring its workers up to par.

The reality check comes from East Asia, a region with a highly educated population that, not surprisingly, has had the most success in adapting technologies from industrial countries, and later becoming an innovative powerhouse in its own right. In Latin America, it is becoming increasingly necessary to have a broader education that goes beyond just primary school and on to secondary and higher education. As was pointed out in Part III, in the absence of an adequate system of basic education, even the most well designed training systems have little chance of improving the skills of most workers. In Latin America, training systems tend to reinforce, rather than correct, basic education gaps, when in fact their role should be to help firms and workers assimilate technological developments. Toward that end, most training systems in the region need revamping if they are to become a functional contributor to the process of innovation.

Credit and Finance

As shown in Parts I and II of this report, business growth in Latin America is severely limited by lack of credit. The major problem firms face is the difficulty in accessing financial markets. This problem is exacerbated in

Box 15.2 Infrastructure and Telecom Centers in Latin America

Governments throughout the region have been promoting the establishment of telecom centers in low-income urban and rural areas. Provided that it would be difficult and expensive in the short run to attain universal domestic service in all countries of the region, governments are now focusing on providing widespread public access through the establishment of these centers, a goal that is attainable in a relatively small period of time.

A typical telecom center is a location where the public has access to the Internet and services like e-mail and chat rooms. Such facilities already exist in Brazil, Chile, Honduras, Panama and Peru, among other countries in the region. The first telecom center opened to the public in Peru in 1995, and some 700 centers were launched in the five years that followed. Most of these cabins are located in areas with adequate infrastructure to support the Internet connection. On average, the charge is 75 cents per hour, down from \$1.40 in February 1999. This drop was the result of an increase in the number of people using the cabins. "El Encuentro," a private telecom center in an urban area in Chile, offers Internet access at S1 per hour and provides training on software packages such as spreadsheets and word processing programs for \$16 a month. Information technology schools in Brazil's *favelas* offer spreadsheet courses at a monthly charge of \$10. Most of these centers receive public as well as private funds.

The main obstacle to expanding the telecom centers in rural areas has been the infrastructure itself, which poses higher and sometimes unaffordable costs to governments in the region. To make the most of available infrastructure, Honduras has established rural centers that offer a broader range of services such as e-mail, end-user support and training and equipment rental. It is too early to assess the impact of telecom centers, but for the moment they would appear to be the most viable way to expand Internet access in areas of Latin America that lack infrastructure.

Source: Proenza, Bastidas-Buch and Montero (2001).

the case of information technology businesses, since their set-up costs are high, and because the firms interested in getting involved in information technologies are often microenterprises with little or no capital. This combination proves a formidable obstacle. In Latin America, innovation and the development of start-up companies is hindered by underdeveloped financial markets and an overall lack of creative financial instruments, and poor access to credit and its high cost.

Institutions and the Rule of Law

A functional bureaucracy, adequate property rights, control of corruption, and respect for the rule of law have a strong impact on economic performance. Simply put, institutions are crucial to increasing competitiveness, productivity and economic growth. An effective institutional setting proves particularly important in terms of information technology. The fast pace and rapidly changing environment associated with these technologies point to the need for an adequate institutional setting that can keep pace. A Website with a state-of-the-art and ultra-fast modem connection could well become obsolete in six months. A weak rule of law or an unnecessarily complex regulatory system are strong disincentives to innovation because, by their nature, they slow down the process of adaptation and change. Yet such scenarios are all too common in many Latin American countries, where registering a new business requires negotiating through a maze of red tape (see Box 15.3).

Clearly, there is a need for an institutional regime pertaining to information disclosure, transparency, accountability and the rule of law, as well as the structure and functioning of government, including issues of governance and the reduction of corruption. In some Latin American countries, particularly Brazil, Mexico and Argentina, the protection of intellectual property rights is becoming increasingly important. This is being driven by the mounting costs of research and development for new products or processes, and the shortening of the product life cycle. The incentive to develop knowledge is weakened if that knowledge is not protected.⁴

Economic Openness

Openness is another potentially significant factor in innovation and technological absorption. Imports of machinery and equipment, for example, are an important

⁴ See World Bank (2000).

Box 15.3 Obstacles to Starting a Business

A worldwide study of 75 countries finds that some Latin American nations are among those that require the most procedures to start a business (see figure below). In Colombia, 17 steps are required, among the highest number in the world. Under the assumption that everything else goes right, it takes 55 days there on average and around \$250 to start up a firm.

What is the purpose of all these steps? Theoretically, they guarantee that labor and tax rules are enforced, that consumer rights are protected, and that the environment is preserved. However, in practice, these requirements facilitate the opposite effect: they allow for additional rents to politicians and public officials, and they hinder innovation and competition.

This is not just the case in Colombia. Evidence across the world shows the same results. Countries with excessive regulations and procedures are among those with the highest levels of corruption. The myriad steps do not provide effective protection to consumers, do not control pollution, and in fact encourage tax evasion and larger underground economies.

Countries where the rule of law applies and corruption is minimal, such as Canada, Australia or New Zealand, do not hinder business start-ups. In Canada, starting a business involves undertaking two procedures for registry purposes. Operations can begin a few days after the company is registered. In turn, because firms can register easily and learn their obligations beforehand, rules are better enforced. Countries that make setting up a business difficult end up paying a high cost in terms of innovation and creativity. They impede the development of new entrepreneurship and give an implicit advantage to existing firms.



part of the process of channeling knowledge and transferring technology. Open economies have access to the latest technologies that can spur subsequent domestic innovation. Openness also allows the free flow of ideas among nations, which is particularly crucial in a knowledge-based economy that looks to take full advantage of new information technologies.

Pending Issues: Any Additional Government Role?

The analysis above shows that the diffusion of information technologies and the Internet requires investment in skills and infrastructure, a consistent and respected rule of law, the protection of property rights, financial depth, and economic openness. The development and adoption of new technologies, however, also presents its share of new challenges, questions and problems for governments. To the extent that the information technology revolution is relevant to Latin American development, what are some of the key pending issues?

For one, policies should support the creation and broad diffusion of new technologies and encourage competition in the information technology sector. A key issue is whether governments should subsidize the new economy. While it is true that some developed country governments have done so in a variety of ways, there is by no means a clear-cut answer for Latin America.⁵ Edwards (2001) argues that subsidizing information technology carries the danger of creating costly and ineffective institutional conglomerates similar to the inefficient industrial complexes during Latin America's celebrated experiment with import substitution.

However, it is also true that most telecommunications technologies yield network externalities. That is, the private benefit for an individual to connect to the network is lower than the social one, since all agents who already are connected increase their benefit once the individual enters. If these externalities are big enough, a new technology that could improve social welfare might never be introduced. Thus, there may be a case for gov-

⁵ For instance, recent U.S. budgets included relatively large funding for high-performance computing and communications. Similarly, the U.S. Congress has also passed legislation establishing programs that enable public schools and libraries to obtain subsidized Internet services (see Rivera Batiz, 2000).

Box 15.4 New Technologies and the Digital Divide

There is intense debate as to whether governments, international lending institutions and aid organizations should spend their limited development budgets on information technology. A number of development specialists and even some technology executives, such as Bill Gates, have questioned the wisdom of wiring the Third World at the expense of immunizing, educating and helping to feed the 1.2 billion people around the world who earn less than \$1 a day. However, other development experts argue that devoting more money to setting up Internet connections in poor countries will, in the long run, provide people with a degree of self-sufficiency.

Efforts to wire the world have been energized by the production of increasingly low-cost computers, solar panels and satellite dishes. And efforts are underway to develop new types of technology that may be better suited to remote communities and Internet neophytes. Scientists in India, for instance, are testing a \$200 hand-held computer with wireless Internet access and a picture-based operating system that even illiterate farmers can use. MIT researchers have assembled mobile Internet community centers inside metal shipping containers that have been transported to several villages in Costa Rica and the Dominican Republic. One example of how the new information technology can bridge the digital divide is the rural village of Rovieng, Cambodia, where the Internet is transforming the economy. Several young women have revived the village's traditional silk weaving industry. The scarves are sold through the village's Website to customers around the world, but the profits from the new economy experiment are being plowed into the creation of something decidedly more old-fashioned: a pig farm. The farm has generated new employment and hopes for spin-off industries and profits that will go into a fund to pay for the villagers' medical care.

Of course, problems remain. The language barrier, for example, affects how the computers are used. Almost nobody in the village speaks or reads English, and there is very little on the Internet that is written in Khmer, the local language. In addition, although the price of computer hardware has fallen, the cost of satellite connections—the only way people in places such as Rovieng can tap into the Internet—remains prohibitively expensive. Rovieng was able to get around the obstacle by convincing a satellite company to donate a 64,000-bit-per-second link to the village. The connection is valued at about \$18,000 a year.

Source: Chandrasekaran (2001).

ernments to provide subsidies so as to equalize the private benefit with the social benefit. This is a dangerous proposition, however, since the value of network externalities is difficult to determine, and subsidies are an easy avenue for corruption and for creating rather than correcting distortions.

There is a potentially safer way for governments to support the diffusion of new information technologies such as the Internet. The state is an important player in the economy, so the private benefit to adopt a new information technology is close to the social one. And the state is big enough to take advantage of network externalities, even though it is the only agent that adopts it. In addition, if the technology has important network externalities, once the government is in, the net benefit for private agents to enter into the network would be much larger, and therefore the technology would diffuse.⁶

Another important issue is the so-called "digital divide" problem, by which there is the risk that the rich will benefit proportionally more from the development of the new information technologies than the poor, thus exacerbating income inequality in the longer run (see Box 15.4).

This problem may be compounded by another factor. Since development costs are so high and variable costs are almost negligible, property right infractions abound, as a widespread underground economy is able to reproduce originals. Since both the producers and the users of these illegal copies are likely to be middleor low-income groups, income distribution may suffer in the short run when property rights are enforced. This may prevent policymakers from taking decisions that in the long run will benefit the poor through better income and employment opportunities in the formal economy.

Another pending issue is whether governments

⁶ It is important to remember that industries with large economies of scale tend to become monopolies, in which case, government intervention may be warranted. Information technologies can use many of the current networks, like telecommunications, TV cables and electric wires, so regulatory authorities must therefor have a global view of all these industries and prevent the concentration of these networks among a few players.

should apply a laissez-faire approach and let the market dictate whatever technology it wants, or whether governments should be proactive and settle, for example, on a lower-tech version of a given product. In principle, the latter appears to make some sense, especially when the inequalities within certain countries are taken into account, and given the fact that issues such as maintenance may be more expensive with more sophisticated technologies.

Finally, there is the issue of taxation of electronic commerce. There is a legitimate concern that the development of the Internet may shrink the tax base and hence reduce fiscal revenue. Taxation is inherently and inextricably linked with geographical jurisdiction. In order to assess the tax due, it is essential to determine where a certain transaction took place, or where value was added to a certain product.⁷ To give a simple example, if a Peruvian citizen purchases the CD of an American pop singer from a local store, it is immediately clear that the transaction took place under Peruvian jurisdiction, hence that the applicable 18 percent value-added tax should be levied. However, if the Peruvian citizen downloads the music content of the CD directly from the pop singer's Website, it cannot be readily determined whether the transaction took place under the jurisdiction of the seller (located in the United States) or the consumer (located in Peru).

Conclusions

Governments should not pursue expensive policies to promote widespread use of computers as a means to accelerate growth. However, a hands-off approach is not necessarily the best strategy to take advantage of the possibilities offered by the new technologies, either. First and foremost, efforts should aim to improve the environment for innovation through better education, deeper and sounder financial sectors, and stronger institutions that facilitate investment. Second, obstacles to the extension of computer technologies should be removed, among them telecommunications infrastructure bottlenecks and monopolies. Governments should take the lead in adopting the Internet and be receptive to new solutions that facilitate the use of the information technologies by middle- and low-income groups. Finally, governments need be alert to the challenges presented by information technologies, such as the effects on tax collection, the digital divide, and the extent to which governments should be proactive.

⁷ See OECD (1999).

Appendix 15.1

Data Sources and Definitions

- Gross Domestic Product (GDP): Data for 1997 from World Development Indicators, World Bank (2000b).
- *Internet hosts:* Data for 1997 from the database of the International Telecommunications Union (2000).
- Main telephone lines (per 1,000 population): Data for 1997 from the database of the International Telecommunications Union (2000).
- *Personal computers (PCs):* Data for 1997 from the database of the International Telecommunications Union (2000).

- *Private credit:* Data for 1997 from *World Development Indicators,* World Bank (2000b).
- Rule of law: The index used comes from World Development Indicators, World Bank (2000b).

Secondary schooling: Barro and Lee (1993).

- *Trade:* Calculated as the sum of a country's exports and imports in 1997. Data on exports and imports from *World Development Indicators,* World Bank (2000b).
- *Total assets/GDP:* Assets of the top 25 firms by country, including those of the real sector only. Data from WorldScope Database (2000).

	Dependent v	ariable: Internet hosts	/Main telephone lines	(log)
Independent variables	1	2	3	4
Constant	-5.17	-5.36	-7.47	-7.19
	(-1.70)*	(-1.81)*	(-2.30)**	(-2.23)**
Secondary school (%)	0.02	0.02	0.03	0.02
	(3.47)***	(2.92)**	(4.00)***	(3.23)***
Private credit/GDP	0.13	0.27	0.28	0.33
	(0.32)	(0.66)	(0.68)	(0.82)
Trade/GDP	0.13	0.06	0.33	0.24
	(0.38)	(0.17)	(0.95)	(0.69)
Rule of law index	0.51	0.18	0.51	0.27
	(2.09)**	(0.62)	(2.15)***	(0.91)
GDP (Log)	0.01	-0.07	0.07	0.01
	(0.06)	(-0.50)	(0.52)	(0.05)
Total assets/GDP	3.42	2.78	4.50	3.93
	(0.23)	(0.19)	(0.30)	(0.27)
Main telephone lines (per 1,000 pop.)		0.47 (1.89)*	1	0.34 (1.29)
Latin American dummy			0.87 (1.99)**	0.69 (1.52)
R ²	0.63	0.66	0.66	0.67
No. of observations	52	52	51	51

Appendix Table 15.1 Determinants of Internet Hosts: OLS Regression Results

Notes: t-statistics in parentheses. The dependent variable is Internet hosts divided by telephone lines for 1992-98. For the sake of completeness, specifications (2) and (4) also control for telephone lines, As expected, such coefficients are not robustly significant. Notice that a Latin America dummy was included in the specifications (3) and (4), which replicate (1) and (2) respectively.

*** Significant at 1%.

** Significant at 5%.

* Significant at 10%.

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Innovation Systems in Latin America

The two building blocks required to understand the process of innovation are the company itself as a creator and administrator of knowledge, and the national innovation system as the provider of the environment and the resources necessary for this creation of knowledge.

Businesses are the focal points where people with different types of professional and technical knowledge interact and combine to achieve collective results. The capacity of businesses for learning and innovation is closely related to how knowledge is constituted, generated and used, so any analysis must incorporate conceptual categories that examine how businesses carry out this process. Knowledge-based theories of firms use the distinction between explicit and tacit knowledge proposed by the philosopher Michael Polanyi.¹

Explicit knowledge is that which can be encoded and transmitted through verbal or written communication. It can be codified and stored in blueprints, written rules, technical procedures, equations and formulae. This type of knowledge is the subject of scientific and technical treatises.

Tacit knowledge, by contrast, is the practical knowhow derived from hands-on or on-the-job experience. The skills that workers learn by doing constitute the individual component of tacit knowledge. The massive and complex weft of shared beliefs and implicit understandings of a firm's workers and managers regarding how tasks should be done constitutes its collective component.

While explicit and encoded technological knowledge can be traded between firms, tacit knowledge is accessed only by hiring people who possess it, or by merging with other organizations that have incorporated it into their practical culture. Tacit knowledge is the non-codified technological knowledge that differentiates firms. This has led analysts to conclude that tacit knowledge represents the principal source of sustainable competitive advantage in today's rapidly changing economy.²

The second building block of the knowledge-andlearning economy is the national innovation system, which is the set of interrelated agents, institutions and practices that constitute, perform and participate in processes of technological innovation. A country's innovation system can be delimited by looking at it as centered in the production system. The underlying claim is that what matters are the actual practices of innovation carried out by businesses. This means that while analysis of the role of formal institutions in innovation is a critical first step toward understanding a given country's innovation system, the ultimate focus must be on the innovation itself, where it is carried out, and its impact on production processes at the business level.

At first glance, it would appear that differences between innovation systems in developing and developed countries are purely quantitative. In developing countries, the number of people involved in innovation is smaller, there are fewer institutions, and they are less developed. Investment in research and development as a percentage of GDP is lower, as is the number of patents, and many firms do not have research and development (R&D) departments.

What must be understood, however, is that these quantitative differences reflect a deeper divide. Innovation systems in developing countries are, in effect, "handicapped" systems—that is, they are qualitatively

¹ For theoretical explanations of the concepts of tacit and explicit knowledge, see Lam (1998) and Melo (2001a).

² See Winter (1987), Hall (1993), Grant (1996) and Lam (1998).

	Europ	ean patents	U.S	. patents
	1995 (%)	1995 (base: 1990 =100)	1995 (%)	1995 (base: 1990 =100)
Western Europe	47.4	91	19.9	78
Central and Eastern Europe	0.4	101	0.1	43
Commonwealth of Independent States	0.4	113	0.1	59
North America	33.4	125	51.5	108
Latin America	0.2	204	0.2	122
Arab States	0.0	101	0.0	135
Sub-Saharan Africa	0.2	96	0.1	78
East Asia	16.6	87	27.3	108
China	0.1	152	0.2	118
India and Central Asia	0.0	103	0.0	160
Southeast Asia	0.0	165	0.0	126
Oceania	1.3	163	0.6	84
World total	100.0	na	100.0	na

Table 16.1 Innovation Output Measured in Patents

Source: Barré (1998, p. 26).

different as a result of cumulative lags with respect to the developed countries. This does not mean that these systems are irreparably disabled in the sense that some human beings unfortunately are, but rather that they are at a clear disadvantage that must be acknowledged and addressed. This chapter will more explicitly describe the implications of Latin America's figuratively "handicapped" innovation systems, beginning with the question of whether the region is catching up or falling behind the world's innovative leaders.

How is Latin America doing in the technological race? The short answer supported by empirical evidence is that the region is progressing in absolute terms but falling behind in relative terms. According to *The Global Competitiveness Report* indicators described in Chapter 15, the average value of Latin America's innovation index clearly lags behind most other regions in the world. Other indicators of innovative output point in the same direction. Table 16.1 shows the relative share of 11 groups of countries and China in world innovative output, as measured by patents in both the European Patent Office (EPO) and the U.S. Patent and Trademarks Office (USPTO). Latin America's aggregate share in both patent offices was 0.2 percent in 1995.

A comparison with the shares for two economies that can be considered to have successfully caught up— South Korea with a 0.65 percent share, and Ireland with 0.14 percent—shows even more clearly that Latin America's innovative output is not catching up with that of the world leaders.³

It is still true, however, that the region is progressing in *absolute* terms. For instance, the number of Latin American patents in the EPO grew by 104 percent between 1990 and 1995, and the number in the USPTO rose by 22 percent. Still, the region's innovative output can be considered relatively meager, and a look at national efforts in this area shows why. Table 16.2 shows the expenditure on science and technology as a percentage of GDP for 16 Latin American nations and for Canada, Spain and the United States. With the exception of a few countries, Latin America's efforts fall short of what is needed.

Human Resources

Human resource development in the Latin American countries imposes serious constraints on their innovation systems. Table 16.3 shows the number of researchers per 1,000 people in the labor force for 15 Latin

 $^{^3\,}$ The shares for Ireland and South Korea, which are not shown in the table, are for 1996 and refer to IPO patent applications only. They are from OECD (1999).

Country		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Argentina	STA	0.33	0.34	0.36	0.43	0.44	0.49	0.50	0.50	0.51	0.54
J	R&D	-	-	-	-	-	-	0.42	0.42	0.42	0.47
Bolivia	STA	-	-	-	-	-	-	-	0.58	0.54	0.55
1	R&D	}		0.37	0.39	0.39	0.37	0.33	0.32	0.29	0.29
Brazil	STA	1.23	1.20	1.04	1.20	1.35	1.26	1.29	-	-	-
	R&D	0.58	0.59	0.48	0.61	0.74	0.87	0.91	-	-	-
Chile	R&D	0.51	0.53	0.58	0.65	0.66	0.65	0.66	0.65	0.62	0.63
Colombia	STA	-	-	-	-	0.62	0.67	0.70	0.65	-	-
	R&D	-	-	-	-	0.37	0.39	0.41	0.41	-	-
Costa Rica	R&D	0.73	1.05	1.23	1.42	1.23	1.25	1.13	-	-	-
Cuba	STA	1.13	1.11	1.65	1.56	1.47	1.43	1.26	1.33	1.49	1.69
	R&D	0.72	0.65	1.13	0.93	0.82	0.77	0.61	0.70	0.87	0.83
Ecuador	STA	-	-	- 1	-	-	-	0.18	0.23	0.22	-
	R&D	-	-	-	-	-	0.08	0.09	0.08	0.08	- 1
El Salvador	STA	-	-	-	-	0.30	0.30	0.30	0.30	0.84	-
	R&D	-	-	-	-	-	-	-	-	0.08	-
Mexico	STA	0.28	0.33	0.32	0.37	0.41	0.35	0.35	0.42	0.47	0.41
	R&D	-	-	-	0.22	0.29	0.31	0.31	0.34	-	-
Nicaragua	STA	-	-	-	-	-	-	-	0.14	-	-
	R&D	-	-	-	-	-	-	-	0.13	j -	-
Panama	STA	0.63	0.67	0.63	0.71	0.72	0.76	0.85	0.92	0.87	-
	R&D	0.38	0.38	0.34	0.36	0.37	0.38	0.38	0.37	0.33	-
Peru	STA	-	-	-	0.18	0.42	0.68	0.74	0.67	0.75	-
	R&D	-	-	-	-	-	-	-	0.06	-	-
Trinidad											
& Tobago	STA	-	-	-	-	-	-	0.33	0.36	-	-
	R&D	-	-	-	-	-	-	0.13	0.14	-	-
Uruguay	R&D	0.25	0.15	0.19	0.07	0.14	0.28	0.28	0.42	0.23	0.26
Venezuela	STA	0.37	0.39	0.49	0.47	0.39	0.48	0.29	0.33	-	-
Canada	R&D	1.45	1.51	1.56	1.60	1.65	1.62	1.57	1.59	1.61	1.50
Spain	R&D	0.85	0.87	0.91	0.91	0.85	0.85	0.87	0.86	0.89	0.90
United States	R&D	1 2.62	1 2.69	2.61	2.49	2.39	2.48	2.52	2.55	2.59	2.67

Table 16.2	Expenditure (on Science	and Technology	as	а	Percent	of	GDP
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Notes: STA=scientific and technological activities. R&D=research and technology.

Source: Adapted from Red Iberoamericana de Indicadores de Ciencia y Tecnología (2000).

American countries, and for Canada, Spain and the United States. Although the stocks of human resources in science and technology in Argentina, Chile, and Cuba are relatively strong, the general picture for the region is of a gap that does not seem to be closing. However, the human resource development system is not the only culprit, as it only explains the supply side of the problem. There is also a demand side: firms have systematically de-emphasized knowledge investment and technological innovation as major tools for profit making. Generally speaking, universities in the region produce more researchers than the amount demanded by the productive system.

Table 16.4 shows the average number of qualified professionals employed by Colombian firms according to size and to whether they are international-caliber, national-caliber, or potential innovators. The figures are striking in that they show the low level of qualified human resources employed in most categories of Colombian firms. With such a low level of human capital utilization, the ability to innovate is bound to be seriously impaired.

Informal Innovation

Sutz (1998) reviewed the results of surveys in six Latin American countries and found a great deal of what is called "informality" in innovative processes.⁴ This re-

⁴ The six countries were Argentina, Chile, Colombia, Mexico, Uruguay, and Venezuela. More survey information and results can be found in CIESU (1987), CONACYT (1998), Durán et al. (1998), INDEC (1998), OCEI-CONICYT (1998), and Sutz (1998).

Country		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Argentina	HC	-	-	-	1.99	2.45	2.57	2.62	2.69	2.75	-
-	FTE	-	-	-	1.47	1.77	1.90	1.95	1.85	1.84	-
Bolivia	HC	- 1	-	-	-	-	-	-	0.38	0.39	0.38
	FTE	-	-	-	-	-	-	-	-	0.21	0.21
Brazil	FTE	-	-	l -	-	-	0.67	- 1	-	-	-
Chile	HC	1.20	1.24	1.25	1.18	1.21	1.26	1.30	1.32	1.37	1.35
Colombia	HC	-	-	-	-	-	- 1	0.45	0.46	0.47	-
Costa Rica	HC	-	-	- 1	-	1.22	-	1.52	-	-	- (
Cuba	HC	1.23	1.32	1.32	1.27	1.21	1.13	1.13	1.13	1.21	1.20
Ecuador	HC	-	-	-	-	-	-	0.32	0.32	0.31	-
	FTE	-	-	-	-	-	0.15	0.23	0.21	0.22	-
El Salvador	HC	-	-	-	-	0.10	0.10	0.09	0.09	0.20	0.20
	FTE	-	-	- 1	-	0.04	0.04	0.04	0.04	0.08	0.08
Mexico	HC	-	-	-	0.55	0.68	0.74	-	-	-	-
	FTE	-	-	- 1	0.42	0.50	0.55	-	-	-	-
Nicaragua	HC	-	-	-	- 1	-	-	-	0.29	-	-
-	FTE	-	-	- \		-	-	-	0.22	-	-
Panama	HC	-	0.38	0.38	0.63	0.65	0.67	0.84	0.78	0.78	-
	FTE	-	0.10	0.19	0.29	0.30	0.31	0.31	0.31	0.43	-
Trinidad											
& Tobago	HC	-	-	-	-	-	-	-	0.66	-	-
Uruguay	HC	- 1	-	-	-	-	-	-	-	-	1.80
	FTE	-	-	-	-	-	-	-	-	-	0.59
Venezuela	HC	-	-	-	-	-	-	-	-	0.45	-
Canada	FTE	4.63	4.74	5.02	5.25	5.46	5.58	-	- (-	-
Spain	HC	4.34	4.78	5.02	5.15	-	6.31	-	6.36	-	-
· }	FTE	2.46	2.64	2.70	2.79	3.05	2.99	3.20	3.30	3.69	-
United States	HC	-	-	-	14.52	-	13.67	-	13.75	-	-
	FTE				7.47	-	7.31	7.77	8.17	-	-

Table 16.3Researchers in the Labor Force (per 1,000 population)

Notes: HC=head count. FTE=full-time equivalent.

Source: Adapted from Red Iberoamericana de Indicadores de Ciencia y Tecnología (2000).

fers to innovations by companies that do not have a formal internal structure in charge of research and development. While 63.6 percent of firms in the sample said they had introduced innovations, only 15.7 percent had a formal R&D department. Another sign of informality is that management in many firms did not know how much the company was spending on research and development. In Uruguay, more than 60 percent of firms did not know how much they were spending on R&D, and in Mexico the figure was 71.4 percent. In Venezuela, only 8 percent of firms provided data about their research and development expenses.

Weak Linkages and Knowledge Flows

Linkages and hence knowledge flows between Latin American businesses and research institutions (includ-

ing universities) are weak. When asked about the source of their innovative ideas, 13.4 percent of Colombian businesses surveyed attributed them to universities and 7.4 percent to public sector research institutes. However, 45 percent of firms with 50-100 employees, and which pertained to the category of international-caliber innovators, credited universities as a source of innovative ideas, while 43 percent credited the public research institutes.

When the firms resorted to outsourcing of innovation, universities and public research institutions were the least employed counterparts. In Mexico, only 6 percent of firms had established cooperation agreements with universities and only 4.9 percent did so with public research institutes. Moreover, many firms declared that those agreements were irrelevant. In the Venezuelan survey, 43 percent of firms said they had signed cooperation agreements, but only 3.5 percent of them

Firm size	Type of firm								
(by number of employees)	International	National	Potential innovators	Do not innovate					
20-49	1.1	0.8	0.3	0.3					
50-99	4.4	1.6	3.0	1.0					
100-199	8.6	3.5	3.1	2.3					
200+	42.5	14.9	2.6	3.4					
Total	17.5	4.5	1.6	0.8					

Source: Sutz (1998).

were with universities and 4.5 percent with public research institutes. In Chile, 31.8 percent of firms acknowledged having benefited from innovations from universities and 16.2 percent from public research institutes. Some 25 percent of firms actually signed contracts with universities, and 14 percent signed them with public research institutes. In Uruguay, 27.2 percent of firms had cooperation agreements with public institutions (including both universities and public research institutes). Ten percent of those were with the country's main public university.

Firm-to-firm flows vary from country to country. In Colombia, 60 percent of firms reported having carried out some type of joint innovation with client firms. In Chile, that figure was 48 percent. In Uruguay, only 10.5 percent of firms had sought technological advice from other businesses, and in Venezuela that figure was only 10 percent. Regardless of whether firm-to-firm flows were high or low, it is important to point out that external interactions were not assigned a crucial role by the firms themselves. Most firms reported that the principal source of new ideas was their own personnel.

In summary, all the evidence points to limited and inadequate cooperation among businesses themselves, and between business communities and universities and research institutions. These are the core institutions of any system of innovation, yet in Latin America it is clear they are not working together as they should.

Finally, unlike most developed countries, where the dominant component of nationwide innovation efforts is the business sector, the dominant component in Latin America is the public sector. During the 1990s, over 60 percent of the region's research and development expenditures were by government, as compared to less than 30 percent by businesses. That trend is changing,

however. The share of the business sector in total research and development expenditure has been increasing, while the government share has been declining.

Formal Organizations

Besides businesses themselves, the other building block for innovation is a nation's principal formal organizations, such as industrial and technological research institutes, universities, and policymaking bodies.

Research institutes face a difficult challenge in all countries of the world, as they try to balance the longrun imperative of keeping abreast with the frontiers of research with their institutional duty to satisfy shortrun and concrete demands from their business-sector clientele.⁵ According to Machado (1993), industrial technology institutions in the region have been unable to maintain that equilibrium. Most do not have the necessary knowledge of technological advances in their fields; nor do they seek out domestic or foreign partners that could help them in that respect. Many were found to be unaware of technological information already in the public domain, and had no experience in reverse engineering and copying, which are in great demand by small and medium-size firms.

Research programs are often determined on the basis of the researchers' personal agendas and not as a result of a study of industry needs. There is little consultation with the business sector. Of eight research institutes studied by Machado, none had ever conducted a customer satisfaction survey. There are few examples of

⁵ See Alcorta and Peres (1995).

successful technology transfer from institutes to industry. In short, then, the problem is not only that the linkages between firms and research institutes are weak. It is that the linkages are weak in part because, due to their internal deficiencies, the research institutes often do not have much to offer to businesses.

The quality of universities in the region varies widely, but the number of high-quality universities is limited.⁶ The average university does not put relations with the business community high on its agenda. While many universities do not have much to offer to businesses, it is also true that private sector demand for knowledge is weak both qualitatively and quantitatively.⁷ Business strategies are often unconcerned about generating knowledge. This prompts them to emphasize routine consulting work in their relations with university faculty members. The region's entrenched tradition of relying on technology imports—generally but clearly not always the best technical and economic option-has led broad segments of the business community to simply discount local universities as potential technological partners. To the universities' credit, many studies report that it is the academic community that usually takes the initiative in searching for partnerships with firms. A number of universities have actively built organizational arrangements to foster university-industry relations.⁸ Nonetheless, it is also true that the region's university researchers still have strong incentives to conduct their research around agendas set by their respective scientific or technical discipline in the developed countries. In most cases, it is unlikely that these agendas will be relevant to the problems faced by firms in the region.

Policymaking Bodies

In most Latin American countries, the organizational component of the innovation system is formally structured along the following lines: (i) a central government agency in charge of defining science and technology policy; (ii) a set of executing agencies; (iii) institutions (including both public and private universities) in charge of basic and applied research; (iv) institutions responsible for defining technical norms, standards, quality control and certification; (v) institutions in charge of technical and vocational education as well as short-term training of the active labor force; and (vi) financial institutions and funding agencies.

The top tier of the organizational pyramid typically

includes a central government agency empowered with policymaking authority and a technical advisory body. In three countries (Brazil, Costa Rica and Venezuela), the policy agency is at the ministry level: the Ministry of Science and Technology. In other countries, the highest authority is the Ministry of Planning or the President's Office assisted by a Science and Technology Secretariat or a National Research Council. In several countries, the advisory bodies have representation only from the ministries related to science and technology. In other countries, other sectors are represented as well, including public and private universities, the scientific community, trade organizations from the business sector, and regional science and technology entities.

Legal Frameworks, Agencies and Policies in Transition

With the advent of the structural reform process in Latin America in the late 1980s and early 1990s, agencies entered a period of transition that is still in progress. The two central features of this transition have been a policy shift toward greater emphasis on supporting technological modernization by the business sector, and major institutional and legal transformations of the formal organizational component of innovation systems.

With the reorientation of development strategies away from the import-substitution model and towards market-based development, the general direction of public policies has changed substantially. In particular, a new approach to industrial policies has emerged that focuses on finding the ways and means to improve competitiveness. The overriding concern of both entrepreneurs and policymakers has become access to external markets and ways to successfully compete in them, productivity growth, and efficient technological modernization. This new policy thrust has been felt in the area of innovation policies, where new policies are emerging as well. The central issue of innovation policy is increasingly understood to be how to help the productive sector enhance its competitiveness, and at the same time, how to respond to the long-run challenges posed by the knowledge-based economy in terms of basic scientific research.

⁷ See Sutz and Arocena (2000).

⁶ See Meyer-Stamer (1995).

⁸ See Sutz and Arocena (2000).

Policies to Promote Technological Modernization

In Latin America's leading countries in terms of innovation, there is a definite preoccupation with better linking science and technology with the imperative with improve competitiveness. As a result, almost every major industrial policy statement in the post-reform period has given high priority to technological modernization as an area where government intervention is critical to enhancing the ability of the domestic private sector to compete.

The main areas of action for technology policies in the region are:

• Promoting research and development by the private firms themselves;

• Strengthening cooperation between public research institutions and private firms; and

• Creating or strengthening the informational infrastructure necessary for successful research and development by businesses.

There is considerable variation in the ways countries go about defining mid-term objectives for their technology policies. Mexico's policy defines seven areas where government efforts must be concentrated: (1) fostering technological transfer as a key factor in strengthening productive chains; (2) promoting quality norms and systems in the microenterprise and small and mediumsize business sectors; (3) strengthening the basic technological capabilities of those same businesses; (4) providing basic information to businesses on such issues as voluntary standardization and regarding available technology advice and consultancy services; (5) encouraging technology transfer from the more advanced countries; (6) protecting industrial intellectual property; and (7) stepping up efforts to create a culture of technological innovation in the business sector.

Brazilian policy, by contrast, focuses on specific and selected sectors grouped into two categories (see Ministério de Ciência e Tecnologia, 1996). The first includes sectors where the country has already developed some technological capabilities, but where there is still the need to further strengthen them. This includes information technology and automation, aerospace technology (particularly satellites), nuclear technology, military technology, and agriculture. The second category consists of sectors where technological development is either absent or in an incipient stage. This includes superconductivity, special materials, optical electronics, biotechnology, application of biotechnology to agriculture, energy conservation and alternative sources of energy.

The promotion of technological research and innovation in the first category requires mobilizing a whole battery of policy instruments to encourage the firms themselves (albeit with the support of government and private non-profit institutions) to undertake technological innovation. For the second category, this effort revolves around the creation and future expansion of world-quality research centers devoted to basic and applied research. The rationale for tackling this research is based on the idea that, while it may not respond to short-term market demands, the research has significant medium- to long-term potential for both productive application by businesses and the consequent benefits for society at large.

Policy Instruments

The array of instruments used by policymakers to support scientific and technological development in leading countries of the region include: (i) grant for research projects; (ii) credit programs to strengthen the technological capabilities of industries and firms; (iii) fiscal incentives for technological innovation; (iv) programs geared to the needs of targeted industries; and (v) horizontal programs to address needs that emerge in special areas of the private sector's technological performance.

Grants are typically nonreimbursable and given to qualified projects selected by means of competitive procedures. A distinction is made between scientific research projects carried out by research institutes and university researchers, and projects aimed at technological development at the industry and company levels.

One frequently stated objective in technology policies is to foster partnerships between businesses and academic institutions for research and innovation aimed at solving technological problems faced by the former. In Brazil, there are two institutional mechanisms through which these partnerships are promoted. One is called "Technological Platforms," which are fora where the stakeholders get together to identify and address the technological obstacles faced by a particular productive sector or a specific region. The expected outcome of these meetings is the formation of partnerships between research institutes, universities and representatives of the particular productive sector (or region) to formulate cooperative research projects. These projects are eligible for funding from government agencies.

Credit Programs

Government agencies that support technological modernization usually operate through trust funds, fiduciary funds, or specialized financial agencies. They provide loans to firms, consortia of firms, or consortia of firms and research institutions to carry out coordinated research and technological development that is expected to result in the invention of new products, significant improvements in existing products, better production processes, stronger infrastructure for innovation, or improved product quality. To this basic core of innovation activities eligible for credit, some financial agencies add the purchase of technological and scientific services; acquisition of scientific and technical documentation and information; consulting services; adaptation of imported products, processes or technologies to local conditions; purchase in domestic or foreign markets of product, process or service technologies; strengthening of teams devoted to technology development or adaptation; and creation, implementation and expansion of technological research centers.

Inspired by an innovation research program sponsored by the U.S. Small Business Administration, the funding agencies typically provide nonreimbursable loans to technological innovation projects of microenterprises and small enterprises.

Brazil and Mexico have a number of special credit programs to encourage technological innovation by businesses. In Brazil, a first set of credit lines is part of the Ministry of Science and Technology's Program to Support Scientific and Technological Development, funded by the World Bank. This includes two particularly interesting sub-programs: Support for Technological Sector Entities (TSEs), and Technology Management and Competitiveness.

The TSEs are non-profit organizations that provide one or more of the following services for firms from particular productive sectors: (i) product research and development; (ii) technical services; (iii) metrology, normalization and certification services; (iv) quality management; (v) training; and (vi) organization of technological information banks. The Technology Management and Competitiveness Program supports pilot projects carried out by partnerships of firms and non-profit technical support entities. The projects must include (i) diagnosis of the current technological situation of the particular industry; (ii) training of senior management in new technology management concepts and instruments; and (iii) internal implementation at the firm level of technology management structures and mechanisms that will enable them to apply the concepts learned at the training stage.

In addition to these programs, FINEP, the Brazilian federal innovation financing agency, also offers an integral support credit line that finances all aspects of a technological innovation business plan, from the project formulation stage through the construction of civil works; the purchase and installation of machinery, equipment and technical instruments; the licensing or purchase of technology; and training, technical assistance, and initial working capital. FINEP also offers a preinvestment credit line to finance engineering consulting services, as well as credit in support of technological, environmental and product quality management.

Fiscal Incentives

Beyond the leading countries of the region, a number of other Latin American countries use fiscal incentives as a policy instrument for technology innovation. The incentives typically include (i) reduction in the corporate income tax; (ii) reduction in value-added taxes; (iii) accelerated depreciation of capital goods and equipment acquired in the context of an innovation project; and (iv) fiscal credits for expenses and additional investments in R&D. In addition, some countries grant some special incentives. Colombia allows a deduction of 125 percent of the costs of innovation projects, and gives exemptions from value-added taxes on imports of equipment and instruments for such projects by research centers, technological development entities and universities. Brazil grants an exemption from the tax on industrialized products to firms that produce information technology products, provided that the firm spends more than 5 percent of its gross sales on R&D. It also allows the deduction as operational expenses of payments of royalties and other technical assistance payments made by advanced technology firms.

Other Programs

Several countries in the region have special programs to promote technological innovation in specific sectors deemed to be strategic. Perhaps the best example is incentives given by the Brazilian government to firms in the information technology sector. Besides the above-mentioned exemption from the industrialized products tax, the government purchases information technology goods based not merely on price considerations but on the price-quality ratio of products offered in competitive bids by information technology firms. In addition, a program to support software production provides loans to companies involved in software development and buyers' credit for their commercial customers.

Finally, there is an array of programs and institutional efforts across the region in areas of product quality and design; participation in or organization of technical fairs and other events where technological innovations are disseminated; organization of pools of technological consultants; promotion and defense of industrial property; and the formal organization and completion of technology-foresight exercises with implications for policy formulation and design.

Policy Issues

The systemic issues that affect innovation in Latin America are not all directly amenable to policy intervention. Bearing this limitation in mind, the policy discussion centers around the role of government in a proactive strategy to catch up with the world's technological leaders. The assumption is that implementation of such a strategy will allow the Latin American countries to gradually transform their national innovation systems into more mature frameworks that can better assist domestic businesses in creating and applying technological knowledge to the production of higher-quality and lower-cost products

The essence of catch-up strategies is the generalized and intensive build-up of problem-solving capabilities throughout a national innovation system. The end result is that firms will be able to improve their productivity initially by imitating and learning from the leaders and adapting products, processes and organizational technologies already developed elsewhere to local conditions; and subsequently by making steady improvements in quality, cost reduction, and incremental change.

While the imitation of already established technologies prevails in the initial phase, the emphasis in a second phase based on more developed innovative capabilities shifts to higher value-added production, continuous improvement, and the generation of new products. At this point, there may be a number of particular firms or sectors that are considered to be internationally competitive, and hence to have "caught up" with the leaders. There may even be firms and sectors that are on the leading edge. To the extent that that is the case, the catch-up strategy may then no longer apply, and these sectors and strategies may even shift to more aggressive strategies to forge ahead of the competition.

Where there are national innovation systems whose backbone is a myriad of competing private firms that use decentralized decisionmaking and respond to market signals, the government has a multiple role. First, it must assume a leadership role. Second, it has a rulesetting function in the exercise of which it must create a general policy environment conducive to private investment in technological innovation. Third, it must perform a planning function. Fourth, it has a fundamental role to play in human resource development. Fifth, it must be responsible for promotion functions. Sixth, it cannot escape undertaking productive functions within an otherwise predominantly private innovation system. And, seventh, it has to discharge a regulatory function.⁹

The importance of government leadership is based on the notion that the task of catching up with the advanced countries in terms of innovation is an enormous endeavor. The most reasonable way of conceiving it is as a national project whose completion requires mobilization of a vast amount of societal energies. It stands to reason that state institutions and the political leadership elected to guide them play a role in guiding this overall effort.

A prime example of such a leadership role is that of the United States. The government of today's innovative country par excellence has consistently led the national innovation effort. Government-supported basic research initiates and supports technological advances, and the government has encouraged large-scale univer-

⁹ Here we draw on the taxonomy of government functions devised by Celso de Macedo (2000).

sity research. It has channeled the innovation efforts of industrial firms via procurement and development contracts (Freeman, undated). Among the innovation systems of the developed countries, the United States is unique in that the federal government has financed an exceptionally large proportion of total R&D carried out by the business sector.

The remaining six functions are specifications of the leading role of government, and some of them overlap. The planning function calls attention to government's power and responsibility to lead the way in defining, through participatory decision processes, clear strategic objectives. An appropriate instrument for this is the formulation of multi-annual plans that establish measurable mid-term objectives, the policy measures and policy actions to reach them, and the required budgetary expenditures. The planning function also includes the selection of strategic research areas where efforts must be concentrated to accelerate the catch-up process.

The government plays a key role in human resource development, both in terms of devising long-term strategies for human capital formation and ensuring high levels of investment in education systems. The promotion function requires the use of financial instruments, fiscal instruments and the government's coordination role to stimulate innovation and technological upgrading by the business sector. The productive function is required because a certain number of the institutions generating innovation are in the public sector. This subset includes public universities and research institutes, as well as state enterprises in countries where these have not been privatized. These public entities are major players in the innovation system, and the government's responsibility is to manage them in such a way as to maximize their contribution.

The regulation function is related to the government's responsibility to set overall rules for all the agents in the system. The most relevant rules are in four areas: (i) industrial and intellectual property rights; (ii) market competition; (iii) technical standards, metrology, and quality standards and accreditation; and (iv) safety, health and environmental protection.

Quite naturally, a host of political economy and policy issues emerge in connection with all the enumerated functions. Prominent among them are issues having to do with the institutional prerequisites for efficient implementation of technology policies, and policies aimed at providing public goods. Paraphrasing Lipsey (1999), one could argue that the ideas supporting the view that government intervention is necessary to promote technological innovation are both powerful and dangerous. They are powerful because they shed light on a key ingredient of economic development and they open new and promising avenues for public policy. But they are dangerous as well because, by allowing for the possibility of selective intervention or context-specific policies, they could end up being applied in the wrong institutional contexts, opening a Pandora's box of rent-seeking behavior and related abuses.

Technology policy is a complex matter. Effective policy design and implementation require a considerable degree of institutional development, good governance, and substantial administrative capabilities. Here, the spirit of Lipsey's advice on context-specific policies is wholly opposite, even when applied to the broader issue of subsidies and similar interventions to promote technological innovation: "Such policies should be avoided unless a country's political constitution, political practice, and administrative competence are all such as to reduce to acceptable levels the risk that the policies will be subverted for purposes other than those for which they were intended" (Lipsey, 1999, p. 26).

Policies Aimed at Providing Public Goods

There are a number of aspects to policies aimed at providing public goods that are relevant to the innovative practices of businesses. The discussion here will be limited to policies that support the diffusion of technologies and the promotion of innovation clusters.

The rationale for emphasizing technology diffusion is straightforward. For countries whose main task is catching up, learning from the leaders through imitation and adaptation is the most effective form of internal innovation. Based on lessons learned from international experience, technology diffusion programs should (i) be customer-focused and demand-driven; (ii) comprehensively cover different types of technologies, firms and sectors, and include the transfer of both off-the-shelf and existing technologies as well as more highly sophisticated technologies if there is a demand for them; (iii) provide different kinds of expertise and services, including training and networking; (iv) develop strong linkages with all technology-related service providers and promote networks among providers and users; (v) go beyond technical problem-solving and address

the managerial and organizational modifications required for firms to adapt to technical change; and (vi) have sufficient resources, linkages and leverage points to work with large numbers of firms over time.

An innovation cluster is an agglomeration in a given geographical location of firms that belong to the same or related lines of business. There are many types of clusters, and a number of different cluster typologies can be found in the literature. For the purposes of this chapter, all typologies recognize the existence of innovative or innovation clusters.

Innovation clusters center around knowledge-intensive activities and have the capacity to undertake technology innovations, design new products and processes, and bring them quickly to the markets (UNCTAD, 1998). The flows of knowledge are particularly frequent and intense among firms belonging to innovation clusters.

Innovation clusters are mainly found in industrialized countries. There are, however, a number of such clusters in the developing world. On the basis of the findings of Bortagaray and Tiffin (2000), at least 31 clusters can be identified in Latin America that meet the requirements of the UNCTAD definition. It is noteworthy that some of these clusters are in high technology industries such as microelectronics (Campinas), telecommunications (Campinas, Curitiba), computer science and informatics (Campinas, São Leopoldo, Monterrey) software (Curitiba, Espírito Santo, Porto Real, Porto, Rio de Janeiro, San José), automation engineering (Espírito Santo), biotechnology (Belo Horizonte, Havana), electronics (Santa Rita de Sapucaí, Cuernavaca, Guadalajara), and aeronautics (São José dos Campos).

The geographical distribution of these innovation clusters indicates that Brazil is the leading country with 22, followed by Mexico with six, Argentina with two, and Cuba, Costa Rica and Uruguay with one each.

The factors underlying successful innovation clusters in the developed world are a frontier research topic. In the case of Latin America, much work is a fortiori still needed to shed light on the requirements for success. This means that policy and best-practice lessons are still far from settled.

Policy experience with innovation clusters in Latin America is limited but does suggest certain recommendations. According to Quandt (1999), the first attempt was Brazil's creation of 13 "technological innovation nuclei" in selected universities and research centers in 1982. This was followed by establishment of the Program for the Implementation of Science Parks in 1984. Since 1993, many public and private entities have become involved in promoting incubators and science parks. In 1999, there were 15 regions classified as emerging high technology centers, seven science parks, and about 60 incubators housing nearly 500 firms.

Mexico started to create business incubators in 1990 and by 1999 there were 15 in operation. Most are supported by the National Council for Science and Technology (CONACYT) and the Association of Incubators and Technological Parks. Some of the efforts are led by universities, others by research and development centers. Two are led by the private sector.

In Argentina, the Polo Tecnológico Constituyentes, organized around the main public institutes, aims to develop enterprise incubation processes. But according to Bortagaray and Tiffin (2000), the emphasis is more on supply-driven technology transfer out of the large government laboratories than on demand-driven cluster formation.

Consensus among the practitioners involved with innovation clusters suggests several recommendations.

First, policymakers should let the private sector take the lead in developing these centers. Government support should be provided on the basis of a prior and irreversible commitment by the private sector to contribute substantial resources. Policymakers should make sure that the critical mass of enterprises and skills can be marshaled by private entrepreneurs before committing public resources to the support of a particular innovation cluster initiative.

Second, government support should address critical issues of seed financing and venture capital. In addition, tax incentives and credit lines from the development banks for working and fixed capital for the firms belonging to the clusters are appropriate forms of government support. Third, the role of subnational and local governments is decisive. And finally, the principle of decreasing government support as a particular cluster matures must be strictly observed.

Conclusions

In today's global economy, where knowledge-driven innovation has become a decisive factor in the competitiveness of both nations and businesses, Latin America's poor performance in the area of innovation is particularly troubling. This chapter has addressed the issues involved in upgrading the region's technological capabilities by introducing a basic analytical framework to help understand the practices and institutions involved in technological modernization in Latin America. Some of the features of the national innovation systems in the region are not encouraging: their innovation output is low, linkages between the different actors and institutions weak, and knowledge flows limited. Taking into account that these characteristics are not always amenable to direct policy intervention, the policy discussion centered around the role of government in a proactive strategy to catch up with the world's technological leaders. The assumption is that implementation of such a strategy will enable the Latin American countries to gradually transform their national innovation systems into more mature frameworks that can better support efforts by domestic business communities to create and apply technological knowledge to the production of higher-quality and lower-cost products.

Part V References

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Summary

Until the macroeconomic crises of the 1980s, most Latin American countries relied on a wide array of industrial and investment policies as the main tools to expand their industrial bases and develop new sectors. For the most part, these policies were based on the premise that domestic firms had to be given preference in the local markets, and that government intervention could be tailored to the needs of individual sectors. Common features of such policies included selective import tariff and non-tariff protection, a gamut of financial and fiscal subsidies, direct government ownership of a variety of enterprises, and all types of restrictions on foreign direct investment.

By the mid-1990s, most of these policies had been dismantled or fallen into disuse, and since then a new vintage of industrial policies has emerged. The new policies do not aim to circumvent market outcomes and create an artificial environment for the development of domestic firms. Instead, they address salient market failures either by providing public goods, or through interventions that increase the supply of goods with positive externalities, which tend to be under-provided by the market. These new industrial policies reckon that competitive advantages are to a large extent created, and that building a more competitive economy demands an integral approach inasmuch as competitiveness is not merely the result of individual actions by businesses.

Recent policies take advantage of the coordinating role of government through policies to promote exports, output growth and investment, and higher productivity and greater competitiveness. An example is clusters and networks. On the basis of their power to coordinate, governments now act as external catalysts to facilitate the consolidation of clusters and networks around an existing base of leading private firms. Chapter 17 provides a detailed description of current industrial policies in Latin America. Not surprisingly, given today's more competitive world economy, export promotion is a major aim of the new policies. In the more policy-proactive countries of the region, a large variety of financial instruments have been devised to ensure that all the stages of the export business can be financed through expedient channels, most often at rates that strictly reflect market conditions. Exports in most countries are also granted fiscal incentives such as tax refunds and drawbacks, temporary admission of imports, and export processing zones. While a few subsidies to exports still remain, the dominant trend is towards their elimination.

Policies to promote investment also include a range of financial and fiscal incentives. Fifteen countries of the region have public sector financial corporations or development banks that provide medium- to long-term loans and other financial services. In some cases, temporary participation in equity of new firms in selected sectors is permitted. Although the late 1980s and early 1990s saw widespread repeal of tax incentives and subsidies, national governments in five countries still offer tax incentives for investments in less developed regions, and 18 countries grant fiscal incentives to various productive sectors.

Surprisingly, the sectors most commonly favored by these incentives are not new or high technology sectors, but tourism and primary sectors such as oil, mining and forestry. This suggests that the landscape of industrial policies is still varied, mixing new interventions that focus on addressing market failures and coordinating disperse economic agents with old tendencies to grant benefits to specific sectors on a case-by-case basis. The process of adopting the new industrial policies is very much a work in progress, so it would be premature to pass judgment on its effectiveness.

Much more sweeping have been changes in the treatment of foreign direct investment (FDI) throughout Latin America. Since the early 1990s, when the region adopted non-discriminatory policies in treatment of FDI, dismantled restrictions on the repatriation of profits and capital, and opened infrastructure sectors to private participation, most Latin American countries have seen significantly increased flows of FDI. While the net effect for these countries has been a subject of heated debate, the benefits would appear to outweigh any negative effects. FDI generates knowledge spillovers that benefit firms and sectors, improves the quality and diversity of inputs, and acts as a catalyst for expanding export sectors. Although FDI may displace domestic firms or increase the cost of certain inputs, such positive effects tend to predominate, provided the host country has a sufficiently high level of human capital.

Chapter 18 addresses the main question of what countries can do to make themselves more attractive to foreign investors. To evaluate the impact of the different FDI policy options, the chapter isolates the influence of factors that are not amenable to policy action. This is done by applying a "gravity model" that takes into account the size of the recipient economy, its proximity to the source country, and other factors that facilitate bilateral investment, such as a common language or past colonial links. The most important ways that government can influence the FDI environment are through policy actions that affect taxes on foreign corporations and ensure the quality of several types of public institutions. Relying on tax policies to influence FDI, however, could result in destructive competition between potential recipient countries and end up throwing all the benefits of FDI over to foreign corporations. Countries should instead focus on improving the institutional and policy fundamentals that make them attractive to foreign investors. This involves reducing excessive regulation, enforcing property rights, and controlling corruption. These broad policies not only have a much greater impact on FDI than do specific policy measures such as special tax treatment, but they also have significant positive effects on competitiveness.

CHAPTER

17

Industrial Policy at the Turn of the Century

The focus of Latin America's industrial production was reshaped in the late 1980s and early 1990s by implicit policy decisions that led to the adoption of marketoriented reforms and reduced state intervention in national economies. The reform process prompted the region's policymakers to abandon explicit industrial policies that had been a central feature of import substitution, particularly tariff protection and subsidies.

Typical of radical changes that overshoot the mark, the policy objective was to scrap explicit industrial policies altogether, with the underlying idea that market forces would spontaneously lead to an optimal reallocation of resources. But by the mid-1990s, there was a noticeable change in the policy atmosphere, a growing feeling among both public and private sector decisionmakers that the reforms were not delivering the promised results. As a result, the difficulties of the industrial restructuring process and the unintended and undesirable outcomes of the reforms created conditions favorable to the emergence of a new type of explicit industrial policy congruent with the market-oriented development strategy most countries in the region had adopted.

The turning point in adopting the new industrial policies occurred almost simultaneously in several countries during the period from 1994-96.¹ In most leading countries, the policy shift took the form of adopting explicit, medium- to long-term plans, programs or strategies for the industrial sector. The policy shift generally came out of broad public debate on the effects of the structural reforms and the need to improve the competitiveness of domestic industry in a new context of a more open national economy.

Emerging Policies

In order to understand the nature of the emerging industrial policies, it is as important to characterize them negatively (i.e., for what they are *not* and for what they do not propose) as it is positively (i.e., for what they are). The spirit behind the emerging policies is by no means to return to the import-substitution model. Nor is the aim to interfere with the market mechanism through the systematic and generalized use of arbitrary subsidies. In contrast with many policymakers of the import-substitution era, proponents of emerging policies do not overlook the importance of macroeconomic stability and sound macroeconomic policies. Rather, such stability is explicitly and even forcefully prescribed as a prerequisite for investment growth and industrial modernization. A positive characterization of the new industrial policies is that they aim to improve the competitiveness of domestic producers in the global economy. Instead of being designed to circumvent market outcomes, they seek to redress market failures both by providing public goods and using government intervention to stimulate the supply of goods with positive externalities.

In Brazil, Colombia and Mexico, a clear picture of these new trends can be gleaned from several policy statements. Colombian authorities defined the strategy for the productive sectors established in 1994 as an "ambitious competitiveness strategy for internationalization that ought to be the outcome of a concerted effort by the public and private sectors to outline joint

¹ See Melo (2001a) for a more detailed description of the policy changes analyzed in this chapter.

technological, productive, trade and infrastructure strategies that will facilitate more efficient use of productive resources and generate sustainable comparative advantages" (Departamento Nacional de Planeación de Colombia, 1994).

Competitiveness should be conceived as a nation's ability to face the challenges of the global economy while at the same time improving the welfare of its people. Four general criteria are part and parcel of this concept:

(i) Competitive advantages in the modern world are to a large extent created by, and emerge from, factors that are themselves the result of the development process. They can therefore be shaped by economic agents and are not simply the result of the availability of natural resources or unskilled labor;

(ii) Creating a more competitive economy must be approached in an integral manner, since competitiveness is not merely the result of individual actions by businesses, but of the sectoral and global settings that account for the environment in which those actions occur;

(iii) Promoting competition and overcoming the constraints to free factor mobility must be achieved through proactive sector policies aimed at surmounting the obstacles to higher productivity. Consequently, sector policies and actions must enable the different productive sectors to better integrate into the new development model. This must be done through "strategic plans directed toward removing institutional or regulatory restraints; redefining the scope of credit or export promotion policies in terms of sector-level objectives; designing industrial reconversion strategies; inducing processes of technological transfer and innovation; and generating a greater integration of production chains so as to increase productivity;"

(iv) Implementation of this vision requires a special effort to combine public and private actions on the basis of dialogue and negotiation.

Several issues raised by the Colombian policy statement are echoed in the policy statements of Mexico's 1995-2000 Industrial and External Trade Policy Program (PICE) and Brazil's Multi-Annual Plan for 1996-99. Taken together, these industrial policy pronouncements support several conclusions.

First, a significant segment of Latin American policymakers are making an effort to redefine the role and content of industrial policies in an era of greater global commercial and financial integration. Second, while this effort builds on the experiences and lessons of other countries, it is in many ways unprecedented and involves experimentation, charting of unfamiliar territory, and in some cases breaking new ground altogether. To that extent, it can be said that the new policies are still taking shape and forming an identity of their own.

Third, it is a remarkable feature of these emerging policy efforts that they strive to address core issues revolving around the central question of how to make countries more competitive. These issues include productivity, efficiency and product quality. The obvious background assumption is that trade liberalization was necessary and that it is here to stay. But it is also assumed that it is both desirable and possible to change the prevailing global distribution of comparative advantages so as to increase Latin America's manufacturing exports (and even high-technology goods and services), while decreasing its dependence on primary sector exports. The final assumption is that government indeed has a role to play in this pursuit.

Export Promotion Policies

Current industrial policies in Latin America give a prominent role to the development and diversification of exports. The region has three main types of export promotion policies: (i) policies that affect the availability or cost of credit; (ii) fiscal incentives; and (iii) policies that provide non-financial services to exporters. This section looks at the first two categories.

Credit for Exporters

Fourteen Latin American countries have institutional schemes to provide credit to their exporters (see Table 17.1). Five countries have specialized export credit agencies, another six provide special credit lines for exporters through their main public sector development banks, and the remaining three provide credit to exporters through credit lines open to all producers, regardless of the destination of their products.

There is a rough correlation between the size of the economy and institutional provision of credit. Most of the smaller economies (particularly in the Caribbean) do not provide nationally based, institutional credit facilities to their exporters. The Caribbean countries, for

	Credit export agency	Export credit lines in develop- ment bank	Loans for working capital	Loans for discrete capital goods	Financing for entire invest- ment projects	Buyers' credit	Financing for marketing activities	Outright grants	Financing for capital subscrip- tions	Loans to meet ISO norms ¹	Export credit insur- ance
Argentina	Yes		x		x	x	x		x	x	x
Bahamas	No	No						Х			
Barbados	No	No					X	Х			
Belize	No	No						Х			
Bolivia	No	No									
Brazil	No	Yes	Х	X		Х	1				х
Chile	No	Yes	X X	X		X2	X				
Colombia	Yes		l x	X		Х	Х		X		х
Costa Rica	No	No	X	X			1		{		
Dominican											
Republic	No	No									
Ecuador	No ³	No	X	X			1			1	х
El Salvador	No	Yes	X	X	x		X				
Guatemala	No	No	X	X							
Guvana	No	No					1	х			
Haiti	No	No									
Honduras	Yes		x	Х							
Jamaica	No	No									
Mexico	Yes	Yes	x	X	х	Х	X4			X⁵	X
Nicaragua	No	No	х	Х							
Panama	No	No									
Paraguay	No	No	1						1	1	
Peru	No	Yes	Х			Х					
Suriname	No	No									
Trinidad	1						Ì			1	
& Tobago	No	No									
Uruquay	No	Yes	Х								X
Venezuela	Yes		x		1	х	1		1	ļ	х

¹ These are loans to support the implementation of international quality (ISO) norms in export production.

² Only for the foreign buyer of Chilean durable goods and engineering services.

³ In Ecuador, there is neither a specialized export credit agency nor special export credit lines from the public sector development bank, the *Corporación Financiera Nacional* (CFN). However, the CFN has a strategic goal of assigning at least 50 percent of its disbursements to "productive investment in international trade." ⁴ The Mexican external trade bank, Bancomext, gives partial grants (up to 50 percent of costs) to finance market research, image-promotion campaigns, and promotion of Mexican trade fairs.

⁵ Bancomext gives partial grants (up to 50 percent of costs) to finance the acquisition of quality certification.

example, rely instead on outright grants from the Caribbean Export Development Agency.

Some features of these credit schemes reflect the market orientation and the move toward open economies that have accompanied the emerging industrial policies in the region. First, in most countries the governmental agencies in charge of financing exports are second-tier financial institutions. Second, in practically all cases, the pricing of the loans follows market principles, that is, lending rates reflect the market cost of money. Interest rates are normally freely negotiated between the first-tier (generally private) financial institution and the individual exporter. Third, in most cases the available credit lines are open only to non-traditional exporters.

The two basic types of loans extended by export credit agencies have been to finance working capital and fixed investment costs. All 14 countries surveyed finance exporters' working capital, while 10 of them provide both types of loans. Loans to foreign buyers of domestic exports are less common, provided by only seven countries. Export credit facilities in some countries go beyond these two types of financing and have been particularly innovative in developing new financial products and services. For example, some countries have specific credit facilities for exporters of capital goods. Others provide credit to finance entire investment projects. Unlike the more traditional credit lines, which at best allow for financing the purchase of discrete sets of capital goods, these credit lines include financing for plant construction or renovation, for other related civil works, and even for land purchases.

There have also been innovations in terms of financial assistance for the commercialization of exports, including measures to open markets, defined here as actions by an export firm to gain access to a particular foreign market. Chile's Corporation to Promote Productivity (CORFO), for instance, has a credit line for nontraditional domestic exporters to finance construction in foreign countries of commercialization infrastructure such as branch offices, stores and warehouses. Some of the region's most innovative agencies provide financing to attend trade fairs; for marketing missions and business trips by domestic exporters; for research and development of new products that target consumers in foreign markets; and for technical assistance and training to implement international quality (ISO) norms.

Learning from their counterparts in the developed countries, credit agencies in seven countries in the region have developed export credit insurance schemes that protect exporters against both the commercial and political risks of a foreign buyer defaulting on payments.

In a few countries, notably in the Caribbean, financial promotion of exports is carried out through outright grants to exporters. The Caribbean Export Development Agency provides grants on a cost-sharing basis to enhance the competitiveness of export firms. The grants are restricted to enterprises operating in the manufacturing and services sectors. Firms in the agricultural sector are not eligible unless the export-related activities in which they are engaged bring with them considerable value added.

Fiscal Incentives for Exports

Fiscal incentives for the region's exports suggest that the emerging industrial policies in Latin America are consistent with external and domestic economic liberalization and with a reliance on market forces. Although a few subsidies remain, the main feature of these fiscal incentives is that they do *not* involve subsidies, and that the prevailing trend is to eliminate them altogether. Table 17.2 shows that the principal fiscal devices used to promote exports are refunds of domestic tax payments (that is, taxes other than import duties), drawback schemes, temporary admission schemes, export processing zones, and incentives to establish and operate trading companies.

The typical tax refund provides a total or partial refund of indirect taxes and contributions paid in the several stages of production and domestic commercialization of exported goods. The aim is to avoid double taxation. The refunds are typically related to value-added taxes and other excise taxes, but also include exemptions on payroll taxes and similar contributions. In a number of countries, the tax refund instrument is a freely negotiable market instrument called the Tax Refund Certificate (TRC). TRCs can be used for payment of any tax, including corporate income taxes and import duties.² Mexico's innovative tax refund scheme for large exporters-known by its Spanish acronym ALTEX-allows firms for which exports constitute at least 40 percent of total sales to use simplified and expeditious export and import formalities and, most importantly, to quickly recover the ad valorem tax on domestic inputs. The Mexican government in fact has legally committed itself to refund tax payments to eligible firms in five working days.

Drawback schemes are the standard instrument used to enable exporting firms to compensate for the antiexport bias of import tariffs. They allow exporters to recover duties paid on imported inputs used in export production. Table 17.2 shows that 16 countries in the region have some type of drawback scheme, with Mexico once again the most advanced. Mexico has gone beyond the traditional reimbursement mechanism to an exemption scheme. Instead of duties being refunded ex-post, an outright exemption means exporters do not have to pay the duties in the first place, which in turn reduces their need for working capital.

Temporary admission schemes make it possible for exporting firms to temporarily introduce inputs, raw materials, intermediate goods, capital goods and spare parts into export production with total or partial exemption from taxes and import duties. Table 17.2 shows that 12 countries in the region use this type of scheme.

² In some cases, the TRC mechanism includes a subsidy component and will therefore have to be modified to meet with WTO rules. In the case of nonagricultural exports, it may have to be phased out altogether.

ole 17.2 Fisca	l Incentive	es for Expo	orts						
	Tax refund schemes	Drawback schemes	Simplified drawback scheme	Temporary admission schemes	Export processing zones	Exemption from import duties	Exemption from domestic taxes	Promotion of specific sectors	Trading companie
Argentina	x	x		x	x				x
Bahamas						X	Х	j X	
Barbados	ļ			J		X	X 1	ļ	X2
Belize					X	X	X3		
Bolivia	X	X		X	X				
Brazil	X	x	}	х	X			}	
Chile	X	l x	X						
Colombia	X	x		X	X				X X
Costa Rica4		l x		x	X			1	{
Dominican									
Republic		x	X	l x	x]	ļ
Ecuador		l x		x	x				
El Salvador	x	х		X	X			1	
Guatemala	x	l x	1	x	x			}	
Guvana									
Haiti						l x	х		
Honduras		[X	X	X5		1
Jamaica					x	X	X6	x	X7
Mexico	x	x		x	x				x
Nicaragua		x			x	X8			
Panama	x				x				1
Paraguay	x	l x		1	x				
Peru	x x	x	1		x		X 9		1
Suriname)					
Trinidad & Tobago			1		x	1	x	x	
Uruquav	x	x		l x	Î				
Venezuela	l x	x		x x	x		ł	1	

¹ Exemption from both import duties and domestic taxes on corporate profits is not limited to export production. All manufacturers benefit from a 10-year tax holiday. However, for exporters in the manufacturing sector, the tax holiday is prolonged for an indefinite number of years into the future, as companies benefit from a very low (2.5 percent) tax rate on corporate profits after the initial 10-year tax holiday is over.

² The particular type of trading company promoted in Barbados is the "foreign sales corporation, defined as a foreign corporation established in an approved jurisdiction outside of the United States by a U.S. export-oriented corporation."

³ Tax holidays are given to all investors (both foreign and domestic). However, while the typical tax holiday period is five years, the Fiscal Incentives Act of 1990 allows for extensions of up to 20 additional years if production is strictly for export and is highly labor-intensive.

⁴ The Costa Rican Active Transformation Regime combines (and in some particular aspects even goes beyond) the attributes of tax refund schemes, drawback schemes, and temporary admission schemes.

⁵ A 10-year tax holiday on profits from exports is granted under certain conditions.

⁶ In Jamaica, the exemption from the income tax is partial. The amount of the rebate depends on export performance.

⁷ In the form of foreign sales corporations.

* Some items used in export production (notably machinery and raw materials) are duty-free.

⁹ Export of services is exempt from the general sales tax.

In some cases, however, the temporary admission schemes have a built-in subsidy component that will have to be eliminated to comply with WTO rules.

Export firms that locate their manufacturing plants within export processing zones (EPZs) benefit from an in-bond, common physical space. They receive a range of fiscal incentives in exchange for a commitment to produce or transform goods for the external market. Twenty Latin American countries offer the EPZ option to both foreign investors and domestic exporters, making this instrument the most widely used fiscal incentive vehicle (see Table 17.2).

Finally, current legislation in five countries provides incentives to establish and expand businesses that specialize in exports. The incentives typically include exemptions from value-added taxes and from the tax withholding requirements on certain payments to which many ordinary transactions are subjected.

Financial and Fiscal Incentives for Production and Investment

Current industrial policies in Latin America are not restricted to promoting exports. A number of fiscal and financial incentives for production and investment are horizontal policies that affect all producers across the board, regardless of the sector to which they belong or the region of the country where they are located. The four types of incentives are horizontal credit and financial services, horizontal fiscal incentives, credit and fiscal incentives for producers in particular sectors, and credit and fiscal incentives for producers located in particular regions of the country (see Table 17.3).

Fifteen countries in the region have public sector financial corporations or development banks that provide producers with medium- to long-term loans and related financial services. Most of these entities operate as second-tier institutions and charge market-determined interest rates. In most countries, credit is usually provided through either medium-term loans to finance working capital or long-term loans to finance investment projects (including the discrete purchase of fixed assets).

As in the case of export credits, in a number of countries these public sector institutions have gone beyond basic modalities and introduced an array of innovations. Several leading institutions now provide loans to restructure liabilities, pay for consultancy services, finance environmental studies, prevent emission or recycling of toxic substances, improve commercial practices, lease capital goods, finance civil projects and infrastructure, support real estate development, hold medium- and long-term U.S. dollar auctions, and provide guarantees. Another innovative approach has been equity investment in private firms. In the typical case, the stated policy is to take equity positions only as a minority shareholder and on a temporary and selective basis in profitable companies or projects.

Development finance policies are also being used to support particular sectors or regions within a country. Development banks in six countries have credit lines that benefit particular sectors, and in four countries there are credit lines that promote production and investment in particular regions (see Table 17.3).

Latin America's structural reforms of the late 1980s and early 1990s saw widespread repeal of tax incentives. The emerging industrial policies assign no significant role to tax incentives, and there has been virtually no attempt in the region to resurrect such efforts, with the exception of some Caribbean countries (see Table 17.3). Although there are horizontal tax incentive schemes in five non-Caribbean countries, their scope is limited, and the only tax incentive mechanism found in most countries is associated with free trade zones. Moreover, foreign firms are often exempted from the tax on profit remittances if profits are reinvested, investment tax credits are sometimes permitted, governments grant tax stability, and domestic and foreign companies are allowed to invest part of the tax bill in government-approved projects.

Sector- and region-specific incentives, however, are more common. National governments in five countries have established tax incentives for less developed regions, and in 18 countries there are fiscal incentives to benefit certain productive sectors. These incentives can include exemptions from federal income taxes, import duties on capital goods, and VAT and excise taxes. In most cases, the favored sectors are tourism and primary sectors such as oil, mining and forestry. The most frequent sector-specific tax incentives are exemptions from taxes on profits (often used for the mining sector), lower rates on corporate income taxes and VAT and custom duties, and accelerated depreciation. Often substantial fiscal incentives in eight countries (including most Caribbean countries) target tourism and hotel construction. In seven countries, prospecting and exploration costs for mining are exempted, and in five countries there are significant fiscal incentives for forestry activities. Oil and other hydrocarbons receive various types of tax exemptions in four countries.

Incentives for Productivity Growth and Competitiveness

A third subset of prevailing industrial policies in Latin America aims to qualitatively change production functions and improve the competitiveness of businesses. These policies strengthen and foster the integration of production chains, and promote private sector investment in human capital. Policies to promote technological modernization and innovation are an important part of these efforts (see Chapter 16).
Table 17.3 Financia	It and Fiscal	Incentives fo	or Productio	n and Investmer	ť					
	Loans for working capital	Loans for fixed assets and/or investment projects ¹	Equity investment	Loans for specific sectors ²	Credit programs for particular regions	Horizontal tax incentives	Tax incentives for specific sectors	Tax incentives for particular regions	Subsidies for specific sectors	Subsidies for particular regions
Argentina	×	X(ip)		×	×		Mining, forestry		X ³	
Bahamas						X4	Hotels, financial services, spirits and heer			
Barbados						X5	Financial centres			
201020						<	rinanciac services, insurance, information			
							technology			
Belize						×	Mining			
Bolivia							Mining			1
Brazil	×	X(ip)	×	Oil, natural gas, shipping, power sector, tele-	Xe			í×		
				communications, software, motion bicture industry						
Chile	×	×	×		×	X ⁸	Forestry, oil, nuclear materials	×	×	×
Colombia	×	X(ip)	×	Motion picture industry	¥9			X ¹⁰		
Costa Rica	×						Forestry, tounism			
Dominican Republic							Tourism, agribusiness			
Ecuador	×	X(ip)	×				Mining, tourism			
El Salvador	×	X(ip)		Mining, services sector						
Guatemala										
Guyana							Agribusiness			
Haiti						X ¹²				
Honduras	×	×		Transport sector, shrimp industry						
Jamaica							Motion picture industry, tourism, bauxite, aluminum, factory construction			
Mexico	×	X(ip)		Motion picture		X ¹³	Forestry, motion		X ¹⁴	
				Industry			picture industry, air and maritime			
							transportation, publishing industry			

		Loans for fixed assets			Credit			Tax		-
	Loans for working capital	and/or investment projects ¹	Equity investment	Loans for specific sectors ²	programs for particular regions	Horizontal tax incentives	Tax incentives for specific sectors	incentives for particular regions	Subsidies for specific sectors	Subsidies for particular regions
Nicaragua	×	×	i				Tourism			
Panama	×	×					Tourism, forestry			
Paraguay	×	×				X ¹⁵		X ¹⁶		
Peru	×	×					Tourism, mining, oil	X17		
Suriname				E E		X ¹⁸				
Trinidad & Tobago			ł			X ¹⁹	Hotels, construction			
Uruguay	×	X(ip)				X ²⁰	Hydrocarbons, printing chinning			
							forestry, military			
							industry, airlines,			
			_				newspapers,			
							broadcasters,			
							theaters, motion			
-						1011	picture mansuy			
Venezuela	×	X(ip)				X	Hydrocarbons and other primary sectors ²²			
¹ The notation X(ip) means	that there are credi	t lines for entire inv	estment projects a	nd, a fortioni, for discret	te capital goods. T	he plain X indicat	es that only loans for dis	crete sets of fixed a	ssets are available	
 Other than agriculture. There have been subsidit Income is tax-free and im 	es financed from the aports to be used in	national budget for investment projects	agricultural and to are duty-free.	urism projects in the pr	ovinces of Catamar	ca, La Rioja, San I	uis and San Juan.			
 The tax incentive is for fit The BNDES (through BND) Tredit facilities for the North 	oreign investors. Uff ESPAR) contributes v theast the Amazon	shore companies are with equity capital to the South and the	: taxed at a rate sig o two Regional Fun Center-West region	jnificantly below the rat ds for Emerging Enterpr s	e for local compani ises (in the states o	ies. of Santa Catarina	and Minas Gerais), which	in turn, lend to en	nerging firms. It a	lso has special
⁷ There are federal tax inve ⁸ There are two main horizr	istment incentives for	or the Northeast and	Amazon regions.	estment of profits). 1) ,	Accelerated depreci	ation is granted f	or new fixed assets acruit	ed domestically and	l for imported fixe	H accets.
2) personal income tax and	additional tax apply	y only when profits	are distributed.		ucceleted deplect		יוובא וואנת מספבה מכלתו	כת מחוובזרורמוול מווי		a acces,
⁹ Colombia's Instituto de Fi ¹⁰ There are two special tax	omento Industrial (I c regimes that favor	FI) has a credit line particular regions re	for firms located in cently affected by	 border zones and anot natural disasters, the Pá 	her for that part of iez Law and the Qui	the coffee-produc imbaya Law. The f	cing affected by the earth irst is applicable to the z	iquake of January 19 ones affected by thi	999. e flooding of the P	áez River in 1995,
and the second to the com ¹¹ The services industries in	ee-producing zone ai icluded with credit li	rrected by the earth ines of their own are	quake or January, 1 tourism, transport	999. ation, software and oth	er services.					
¹² Haiti has a comprehensiv ¹³ Through the Sector Prom	/e tax holiday schem Intion Program (PRO	e. SFC) firms in 22 ind	ustries in the man	ifacturing sector can im	nort goods at a pre	ferential rate to F	e used in the respective	manufacturing secto	or to produce final	ands either for
the external or domestic m	arket.				por good at a pro					
¹⁵ The tourism industry is s ¹⁵ Paraguay has a five-vear	ubsidized through si tax holidav for new	ale by the National I investments.	ourism Fund of dev	eloped land at favorabl	e prices.					
¹⁶ The duration of the tax h	oliday mentioned in	footnote 15 is long	er (10 years) if the	company making the ir	rvestment locates i	n the Department	s of Guairá, Caazapá, Ñee	mbecú, Concepción,	. or in the Eastern	Region.
¹⁷ Manufacturing enterprise ¹⁸ According to the U.S. Sta	ss operating in the b ate Department, the	order provinces and Surinamese governm	in the Amazon reg ient has the legal _l	on are exempt from the oower to grant tax holid	income tax, the VA ays on a case-by-ca	VT, and excise taxe ase basis.	S.			
¹⁹ Trinidad and Tobago grar ²⁰ A tax exemption is availa	its comprehensive ta able on profits reinve	ix holidays of up to ested in manufacturi	10 years. ng firms. farming a	nd hotel facilities. In a	addition. there is pa	artial relief from t	he capital tax by comput	ing the fiscal value	of industrial equip	ment at 50
percent.	_							ĥ		
²¹ New investments in man ²² New investments in hydr	ufacturing, agricultu ocarbons production	re, fishing, fish farm enjoy a tax rebate o	iing, livestock and of 8 percent. The p	tourism receive a tax re urchase of capital equip	bate of 20 percent. oment and services	The capital gains for new investme	tax is 1 percent. nt in oil, mining, agricult	ure and fisheries is	exempt from the v	/holesale tax.
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Fostering the Integration of Production Chains

In terms of strengthening production chains, the coordination role of public policy is more important than its role in allocating material incentives. While financial and tax incentives continue to be important instruments available to policymakers, it is government's role as a social entity with the legitimacy and ability to summon all sectors of society that enables it to exercise leadership and guidance.

Two leading countries in this area are Mexico and Colombia, both of which have explicitly defined the specific production chains to be strengthened, the actions to be taken, and the policy instruments to be employed.

Mexico's industrial policy for 1995-2000 targeted the productive chains of eight sectors, including hightechnology industries, the automotive industry, light manufacturing, the petrochemical industry, mining, agribusiness, forestry, and public sector providers. Direct financial and fiscal incentives do not play the leading role. The thrust of the policy is that the national government must put the coordinating capacity of the public sector at the service of private sector efforts.

The Colombian strategy makes a distinction between existing production chains that require further strengthening and development, and the promotion of new production chains to make the country a player in markets where it has been absent.³ Existing production chains are further broken down into those that are significant non-traditional exporters and are now threatened by external competition, and those that generate significant linkages and are important to the country's domestic trade.

Fostering Private Sector Investment in Human Capital

The increasingly deliberate effort to design proactive government policies to develop human capital is reflected in broad initiatives in strategic sectors that are important to modernize economies and increase their competitiveness. For the sake of illustration, this section looks at Mexican policies on human resource development, and at a special Brazilian program to train highly qualified personnel for strategic activities.

Mexico's incentive system to encourage firms to train or retrain their workers includes (i) scholarships

from the Ministry of Labor for in-house training of prospective workers for periods ranging up to three months, provided that the beneficiary firm commits itself to hiring at least 70 percent of the trainees; (ii) training services provided by the Ministry of Education to all employees, including those who are at the managerial level; (iii) demand-driven courses for the training of workers in the technical norms of specific industries; and (iv) business training in management, finance, accounting and investment, organized by NAFIN, the governmental development finance corporation, and provided to owners and managers of microenterprises and small and medium-size businesses.

At the other end of the spectrum, Brazil's program trains highly qualified professionals involved in technological research, productive development processes and technology management. The program provides financial support for training in advanced technologies such as biotechnology, basic industrial technology such as technology management, technological innovation and dissemination, infrastructure-related technologies, and environmental technologies.

These policy initiatives complement traditional systems of labor training funded with payroll taxes (see Chapter 10). As a response to the lack of incentives that usually characterize those systems, these labor training initiatives are either demand driven or provide direct incentives for firms to train their workers.

Policies to Promote Development of Small and Medium-Size Businesses

Governments all over Latin America recognize the contribution of small and medium-size enterprises (SMEs) to economic growth, social cohesion, employment, and regional and local development. Trade liberalization and domestic deregulation are pressing firms of all sizes to improve their competitive position. However, unlike large firms, SMEs have a more limited internal resource base and hence are at a disadvantage when it comes to devising effective responses to the new challenges.⁴ By the same token, the opening of the economies and increased international economic integration bring new

³ See Ministerio de Desarrollo Económico de Colombia (2000).

⁴ See Inter-American Development Bank (1995).

opportunities for SMEs to enter foreign markets and take advantage of new technologies. This section addresses the policy issues involved in helping SMEs face these new challenges and opportunities.

Helping SMEs become more competitive demands government policies that reform the overall policy, institutional and regulatory framework in order to create a level playing field, and that provide support services to SMEs that compensate them for their unfavorable position.

Creating a level playing field requires careful examination at the country level of the institutional, regulatory and policy obstacles that are either biased against or constrain the development and growth of SMEs. The laws and regulations that need to be examined include those related to the establishment and incorporation of businesses, taxes, tariffs, commercial law, and government procurement of goods and services.

In terms of providing support services, principles of best practices require moving from supply- to demand-driven schemes, and from an emphasis on protection and paternalism to competition, cost-recovery and sustainability. Subsidized access to services should not be ruled out, but should be limited in scope, transparent in application, and targeted to identified needs (IDB, 1995). Support services are generally provided in the form of financial services, access to technology, and other business development services such as training, infrastructure, information, and nonfinancial support for export activities.

An emerging policy trend in both developed and developing countries is the emphasis on support schemes that target not the individual SME, but instead various types of collective arrangements of SMEs. Such efforts often include a variety of policies, some of which overlap and are not necessarily limited to SMEs. Examples are policies that support the integration of production chains, clusters, and networks of enterprises. Issues that are playing an increasingly prominent role in practical policymaking and in the analytical literature include the synergies created by interaction between enterprises and groups of enterprises and their surrounding social and economic environment, agglomeration economies, technological learning through interaction, collective efficiency, and network economies. In this regard, Casalet (1997) notes that policy actions aimed at groups of enterprises are more likely to have an effect than actions directed at individual firms.

Collective Service Provision: Clusters and Networks⁵

A cluster is an agglomeration of firms, in the same line or related lines of business in a given geographical location.⁶ In principle, a cluster can contain any number or combination of firms of all sizes, although some combinations are more frequent than others. Promoting clusters of enterprises is an effective way for governments to create conditions for the private sector to enhance productivity, innovation and competitiveness. Local concentration of industries makes it possible for the participating firms to benefit from economies of scale, economies of agglomeration, and supply-side externalities that would not otherwise be available were the firms to work in isolation. More importantly, clusters are optimal arrangements for the production and internal diffusion of tacit knowledge—the kind of knowledge that gives a competitive edge to those who possess it.7 In the case of small firms, clusters enable them to combine the advantages of working on a small scale with the various benefits of sharing on a large scale.

A network is a group of firms using combined resources to cooperate on joint projects.⁸ Networks facilitate accelerated learning by the participating firms. In the case of small firms, networks are conducive to peer-based learning, the medium of choice for many such enterprises. Networks also can facilitate the sharing of overhead costs and the exploitation of specific scale economies available through collective action. Networks need not be geographically concentrated. Once trust among participants is established, operational dialogue can be carried out through electronic means, to mention just one possibility. However, networks frequently are key components of clusters, particularly in the case of firms that belong to a production chain.

On the basis of their convoking power, governments can act as external catalysts to facilitate the emergence of clusters and networks. In doing so, they address market failures stemming from the under-provision of public goods and the lack of coordination.⁹ The idea of

⁵ See Inter-American Development Bank (1995) and Melo (2001b).

⁶ See Enright and Ffowcs-Williams (2000).

⁷ On the concept of tacit knowledge, see Melo (2001b). On its importance as a source of sustainable competitive advantage, see Winter (1987), Hall (1993), Grant (1996) and Lam (1998).

⁸ The discussion on networks draws on Enright and Ffowcs-Williams (2000).

⁹ See Enright and Ffowcs-Williams (2000, p. 13).

promoting clusters as a policy endeavor is by no means new in the region. Cluster initiatives have been undertaken in Argentina, Brazil, Chile, Colombia, Costa Rica, Guatemala, Honduras, Jamaica, Nicaragua, Paraguay, Uruguay and Venezuela.¹⁰

The golden rule for a cluster policy is that any cluster worth supporting must be present and operational before any significant amount of public financial resources can be committed to further developing it. Viable clusters are created on the basis of economic forces that compel firms to agglomerate in a given location. Firms acting in a decentralized manner in a market setting are in a privileged position to assess the potential benefits (and hence viability) of a cluster strategy, and are therefore the true creators of clusters. It is extremely difficult for governments to create the linkages between companies, between industries, and between firms and supporting institutions, much less the general economic conditions, upon which cluster formation (and eventual success) critically depends. Cluster initiatives must therefore be led by the private sector, and it is the firms themselves that must bear the bulk of the risk. The government should only play a catalytic role in cluster building, that is, the focus of public policy must be on building the institutional and support systems for the cluster. This includes supporting capacity building by industry associations, labor groups, financial institutions, research centers, universities and schools, technical extension services, and the relevant government agencies. Within the framework of this catalytic role, local and subnational governments can and should play a decisive part in cluster promotion.

A second policy principle is that the focus of cluster promotion policies must be on helping small and medium-size enterprises. This does not imply, however, that only SME clusters should be promoted. It is perfectly appropriate for public policy to support clusters in which large enterprises participate alongside SMEs and even play a leading role, as is most likely the case. The point is that whatever incentives or subsidies are granted beyond the provision of public goods must focus on the participating SMEs.

In terms of networks, the main task for policymakers is to facilitate the networking process and create an institutional setting that favors market-induced formation of networks. Networking can be facilitated, for example, if there are teams of consultants—preferably independent rather than salaried—acting as brokers in promoting networks.¹¹

Conclusions

This chapter has shown that the past decade has been a period of transition from the explicit industrial policies of the import-substitution era to a new type of industrial policy that responds to the challenges posed by a more integrated world economy. By taking advantage of the government's coordinating role, these new policies aim to improve competitiveness by easing access to key resources, developing new capabilities, and exploiting economies of agglomeration. However, this transition period is still in progress, and consequently it is too early to make a definitive judgment as to the effectiveness of industrial policies that are in fact still emerging.

¹⁰ For experiences in cluster promotion, see Aragón (1997), Bortagaray and Tiffin (2000), Ceglie and Dini (1999), and Farinelli and Kluzer (undated).

¹¹ See UNCTAD Secretariat (1998) and Enright and Ffowcs-Williams (2000).

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CHAPTER

18

Foreign Direct Investment Policies

One of the most notable features of economic globalization has been the increased importance of foreign direct investment around the world. Over the past two decades, the international flow of FDI has increased by a factor of almost 10 (see Figure 18.1). To put this trend in perspective, it might be noted that, by comparison, international trade flows only doubled over almost the same period.

However, the increase in FDI has not been consistent over this time span. There were periods of stagnation—the first half of the 1980s and 1990s—followed by periods of explosive growth. During the second half of those same decades, the annual rate of growth of FDI was close to 25 percent.

Latin America did not take advantage of the first FDI boom of the late 1980s, primarily because of macroeconomic instability and restrictions on some sectors of FDI and on the repatriation of profits and capital. FDI inflows into the region remained fairly stable from 1980 through 1993, increasing at an annual rate of less than 2 percent. The FDI boom into Latin America began around 1993, when most of the restrictions mentioned above had been lifted, and infrastructure sectors were opened to private participation. Between 1993 and 1999, flows into the region grew at almost 30 percent per year. As a result of the latest boom, Latin America has regained the share in FDI flows it had lost during the late 1980s, and is currently receiving around 10 percent of all FDI flows.

Furthermore, while FDI flows to the developing world have increased spectacularly, other forms of capital flows have remained fairly stagnant. Thus, in recent years FDI has represented by far the most important source of private external financing for Latin America. In 1999, FDI represented nearly 97 percent of total net private capital flows into the region.



Source: IMF (2000)

The question, then, is whether FDI has a positive effect on host countries, and if so, what can governments do to attract it? In principle, there are several mechanisms through which FDI can generate positive spillovers for an entire economy. If the foreign firm is technologically more advanced than most domestic companies, interaction by nationals with its technicians and engineers could bring about positive knowledge spillovers. Such a knowledge transfer also occurs if the foreign firm directly trains local workers, who may then be hired by domestic firms.

There is also the potential for development of new inputs or improvement in the quality of existing ones. This may well occur initially by way of the demand created by the foreign investment, but it could eventually become available for domestic firms as well.¹ Yet another source of externality is that multinationals that export their goods to foreign markets may induce domestic firms to follow suit, thus acting as catalysts for domestic exporters.² Some studies also have found evidence that FDI has a positive effect on growth, provided that human capital in the host country is up to the task. In other words, in order to benefit from the advanced technology introduced by foreign firms, the host country has to have capacity to absorb that technology.³

FDI can also lead, however, to negative spillovers. Domestic firms may be displaced by foreign ones, or they may find that the cost of factors of production increases as a result of the presence of foreign firms.⁴ A recent study of FDI spillovers in Venezuela finds that, while foreign equity participation increases productivity, the presence of foreign firms has a negative impact on the productivity of domestically owned firms in the same sector.⁵ This negative result may be due to the fact that this study focuses on intra-industry spillovers. Another study on Colombia finds that the effects of FDI are positive and quite large once inter-industry spillovers are taken into account.⁶

The answer to the guestion of whether FDI benefits the host countries may depend on the manner in which the investment is attracted into the country. If countries compete aggressively by offering subsidies to potential investors, net benefits generated by FDI projects might be competed away and ultimately accrue only to the foreign investors. Competing by offering subsidies, however, is not the only way for countries to court potential investors. Countries can compete in potentially harmful ways, such as by relaxing labor or environmental standards in such a manner that there are adverse effects on the welfare of the population. A more positive approach is for countries to make themselves more attractive to foreign investors by improving the quality of their institutions, labor force and infrastructure. As this chapter will show, although there are many variables beyond the control of policymakers that influence where FDI flows to, the quality of host country institutions clearly plays a prominent role in determining where that investment ultimately goes.

Foreign Direct Investment in Latin America

How does Latin America compare with other regions in terms of its success in attracting FDI? Which countries in the region have been more successful in this regard? From where do investment flows into the region originate?⁷

Developed countries received 70 percent of total FDI flows over 1997-99, while Latin America received 11 percent—quite a bit more than countries in East Asia, which received around 6 percent.⁸ However, Figure 18.2 shows FDI inflows in proportion to the GDP of the recipient countries or regions, and by that measure, East Asia receives the most inflows-nearly 4 percent of GDP—closely followed by the developed countries. The corresponding value for Latin America is just above 2 percent. When all countries in each region are given similar weights in the average (rather than weighting them by GDP), Latin America is a close second to the developed countries, with East Asia third. The change in the ranking reflects the fact that some of the smaller countries in Latin America tend to have larger shares of FDI flows over GDP, while the contrary is true in the developed countries, as well as in East Asia.

The countries that have received larger flows are Brazil, with 38 percent of the total, followed by Argentina, Mexico and Chile. These four countries have received nearly 80 percent of total inflows. However, as a proportion of GDP, Trinidad and Tobago, which received FDI inflows averaging 9 percent of GDP, received the most inflows by far, followed by Panama, Bolivia and Chile. In Trinidad and Tobago, FDI has been associated primarily with large energy projects, particularly natural gas projects following deregulation of the sector. In Panama, the privatization of services and investments

¹ See Rodríguez-Clare (1996).

² See Aitken, Hanson and Harrison (1997).

³ See Borensztein, De Gregorio and Lee (1998).

⁴ See Agosín and Mayer (2001) for evidence on the crowding out of domestic investment in developing countries.

⁵ See Aitken, Hanson and Harrison (1999).

⁶ See Kugler (2000).

⁷ For a much more complete and detailed analysis of FDI flows into Latin America, see ECLAC (2000). For a similar analysis for FDI trends around the world, see UNCTAD Secretariat (2000).

⁸ See IMF (2000).



Figure 18.3 FDI Inflows to Latin America, 1997-99 (Percent of GDP) Trinidad & Tobago Panama Bolivia Chile Jamaica Bahamas (enezuela Argentina Costa Rica Losta Rica Brazili M. Republici Nicaragua Ecuadori El Salvadori Peru Mexico Belize Honduras araguay Guatemal Uruguay 2 9 10 Source: IMF (2000).

in the administration of pension funds has played a major role. In Bolivia, the energy sector has been at the center of efforts to attract FDI.⁹ Chile and Argentina have increased their ranking thanks to huge individual acquisitions by two Spanish companies, Endesa in Chile, and Repsol in Argentina.¹⁰ In contrast, Brazil, Costa Rica and Mexico, which according to popular perception receive a disproportionate amount of FDI flows, in fact have relatively modest showings. Brazil and Costa Rica are only slightly above the regional average, and Mexico is in fact below it (see Figure 18.3).

While Latin America typically has been a recipient of FDI flows, some countries in the region have recently become more active as sources of FDI. In particular, Chile, Argentina, Brazil, Colombia and Venezuela have increased their share as sources of FDI. FDI outflows from Chile represented 38 percent of total outflows from the region, and almost 2.5 percent of GDP. Argentina is second as a source country, with outflows representing 28 percent of the regional total, although this only corresponds to 0.5 percent of GDP.¹¹

Where do FDI flows to Latin American economies originate? Data on bilateral FDI flows in 1997 from the International Direct Investment Statistics Yearbook published by the OECD show, not surprisingly, that the United States is the principal source of FDI in Latin America.¹² Of note, however, is that Spain is already in second place. Common language and colonial links may be playing an important role here, as discussed below. Chile and Argentina, and to a lesser extent Brazil, have also become major sources of FDI inflows into Latin America.13

What Determines Where FDI Goes?

In examining the location of FDI flows, this section focuses on determinants that are amenable to policy action by host countries, particularly the guality of institutions.

There are, of course, a number of different potential determinants of FDI flows. As discussed earlier, FDI can be attracted by low tax levels on foreign firms, or by the aggressive use of subsidies. However, competing for FDI by lowering taxes or offering subsidies can lead

⁹ See ECLAC (2000) for a discussion of FDI flows into Panama and Trinidad and Tobago (pp. 55-57), and for a detailed account of the strategy to attract FDI in Bolivia (pp. 88-97).

¹⁰ See ECLAC (2000, pp. 139-77) for a detailed account of the aggressive expansion of Spanish firms into Latin America.

¹¹ Data on FDI outflows from Mexico, which also would be expected to be significant, were not available.

¹² See OECD (2000).

 $^{^{13}\,}$ While the OECD data only include investment flows that originate in OECD countries, the value of FDI outflows from individual Latin American countries to Latin America can be inferred by subtracting the outflows of FDI to each of the OECD countries from total outflows in each country (as reported by the IMF).

to what several authors have called a "race to the bottom," where the foreign firms end up appropriating all the benefits associated with their investment.

Alternatively, countries can try to make themselves more attractive by educating their labor force or improving the quality of their infrastructure or institutions. Oman (2000b) has called this type of competition a "beauty contest."

Evaluating the impact of the different policy options on the location of FDI requires having an effective benchmark against which the success or failure of countries in this regard can be measured. For example, a country could be receiving a large amount of FDI not because of its policies, but simply because of its size, or its proximity to an important source country. Or FDI might flow there for historical reasons, such as strong colonial links to a particular source country. The examples in this discussion suggest that focusing on explaining bilateral FDI, rather than aggregate FDI, may allow for a more appropriate benchmark for judging the success or failure of alternative policies. In order to establish such a benchmark, which controls for factors unrelated to actual policies, we use the gravity model. Borrowed from the empirical trade literature, this model has had an enormous degree of success in explaining bilateral trade flows.

In its simplest formulation, the gravity model states that bilateral trade flows depend positively on the size of both economies, measured by their GDPs and negatively on the distance between them. The analogy is to Newton's gravitational attraction between two celestial bodies. Typical variables added to the simplest gravity specification in the trade literature include GDP per capita or population, as well as dummies indicating whether the two countries share a common border, a common language, past colonial links, etc. Although most applications of the gravity model have involved bilateral trade flows, they have recently been used for FDI as well. In fact, these variables also seem to be natural determinants of FDI. For example, the fact that two countries share the same language may encourage FDI flows between them, since this reduces transaction costs (such as foreign executives learning the language of the host country, the need to hire bilingual workers, translation of contracts, etc.).

Empirical exercises by Stein and Daude (2001) and summarized in Appendix Table 18.1—find that all the gravity variables have the expected effects and are statistically significant. According to the results, which are based on bilateral FDI stocks for 1996,14 the coefficient for the host country size is close to one, suggesting that, all else being equal, an increase in the host country's GDP leads to a proportional increase in FDI. Consistent with the gravity idea, while size increases attraction, distance decreases it. The coefficients estimated for distance suggest that a 10 percent increase in distance between the source and the host country reduces bilateral stock of FDI by about 7 percent. Combining both effects, Mexico and Brazil are almost equally attractive as destinations for FDI from Canada. Although Brazil is a larger economy, that effect is offset by the greater distance to Canada. Common language, colonial links and adjacency all have positive effects that are also economically significant.

Isolating the influence of these variables allows for moving on to the main question: What can countries do to attract FDI? The variables amenable to policy action include tax rates on foreign corporations, and the quality of the labor force, infrastructure and, in particular, public institutions.

Taxes on Foreign Corporations

Can countries attract FDI by reducing taxes on foreign corporations? An analysis of data on withholding tax rates on dividends of foreign corporations suggests that higher tax rates on foreign corporations indeed have a negative effect on FDI.¹⁵ Specifically, a one percentage point increase in the tax rate decreases the stock of FDI by about 4 percent.

In the event that tax treaties exist between the host country and some source countries, tax rates on foreign corporations will differ according to the nationality of the foreign owners. In order to account for these differences, bilateral data on tax rates were used taking into account the content of prevailing treaties.

The fact that tax reductions or incentives are effective in attracting FDI does not automatically mean that governments should pursue these policies. As has been discussed, such policies can ultimately have negative

¹⁴ See OECD (2000). The information for 1996 is available with a breakdown of 18 source OECD countries and 58 host countries. Notice that we focus on FDI stocks rather than FDI flows.

¹⁵ Based on Price Waterhouse (1997).

effects if competition for FDI leads to a "race to the bottom."

It would have been interesting to explore as well the effect of subsidies and other financial and fiscal incentives on the location of FDI. Unfortunately, given the fact that incentives are usually negotiated on a caseby-case basis and often lack transparency, the effects of subsidies cannot be systematically studied.

Quality of the Labor Force and Infrastructure

Governments may seek to make their countries more attractive to foreign investors by improving the business environment. One dimension of this environment often emphasized in business surveys is the quality of the labor force. For example, together with Costa Rica's proximity to the United States, the country's highly educated labor force was a key determinant in the decision by Intel to locate there.¹⁶

Anecdotal evidence aside, however, it is important to examine data that might establish whether governments can attract more FDI by improving the quality of the labor force. The Barro-Lee (2000) database contains several indicators of human capital stock, of which we use the percentage of the population older than 25 years of age with some post-secondary education. The conjecture is that foreign firms may locate based on the availability of skilled workers, but the results regarding the effects of this variable are not conclusive. While the education of the labor force seems to have positive effects on FDI, these effects are not particularly robust and in fact disappear when certain institutional variables are included, or when alternative measures of human capital are used. In cases when this variable is significant, the results suggest that a one percentage point increase in the population above 25 years of age with some post-secondary education results in about a 3 percent increase in FDI.

Similar inconclusive results were obtained with regard to the quality of infrastructure. In this case, a subjective indicator taken from *The Global Competitiveness Report* was used. It shows high correlations with several indicators of the availability and quality of infrastructure services.¹⁷ But while this variable has significant positive effects on FDI when the institutional variables are excluded, its effect is diminished and is usually not significant once institutions are taken into account.

Quality of Institutions

Countries may become more attractive to foreign investors by improving the quality of the institutional environment in which businesses operate. Excessive regulation, corruption or political instability can discourage foreign investors, while respect for the rule of law, a government that honors its commitments, and a competent civil service may encourage such investment.

Institutions are important for two closely related reasons. They can reduce the cost of doing business, but beyond this "expected" effect, good institutions can substantially increase the predictability of the rules of the game within which firms conduct their business. Foreign investors may be discouraged by unpredictable rules as much as they are by costly ones. Political instability, the credibility of the government and respect for the rule of law all clearly affect that predictability. So does corruption, which would be just like a tax if it were predictable, yet is in fact "much more taxing than a tax" precisely *because* of its unpredictability.¹⁸ As for regulation, when it is excessive, it tends to be ad hoc and unpredictable as well.

The governance indicators developed by Kaufmann, Kraay and Zoido-Lobatón (1999a and 1999b) were used to explore the role of institutional variables as determinants of the location of FDI. These indicators are constructed on the basis of information gathered through a wide variety of cross-country surveys as well as polls of experts, and are available for a large cross-section of countries. Each indicator represents a different dimension of governance: political voice and accountability, political instability, government effectiveness, regulatory burden, rule of law, and graft.¹⁹

Political voice and accountability, as well as political instability and violence, aggregate those aspects related to the way authorities are selected and replaced. The first variable focuses on different indicators related to the political process, civil rights and institutions that facilitate citizen control of government

¹⁶ See Larrain, López-Calva and Rodríguez-Clare (1998).

¹⁷ See Chapter 3.

 $^{^{18}}$ See the study by Wei (1997) on the determinants of the location of FDI.

¹⁹ Larger values indicate better institutions. See Kaufmann, Kraay and Zoido-Lobatón (1999a, 1999b) for a detailed description of each variable, as well as the methodology used in their construction.

actions. An example is the degree of independence of the media. The second variable combines indicators that measure the risk of a destabilized government or the removal of the government from power in a violent or unconstitutional manner. The indicators clustered in government effectiveness and the regulatory burden are related to the ability of the government to formulate and implement policies. The first one aggregates indicators on the quality of the bureaucracy, the competence of civil servants, the quality of public service delivery, and the credibility of the government's commitment to its policies. The second brings together indicators related to the content of policies, such as the existence of policies unfriendly to the market (e.g., price controls and other forms of excessive regulation).

The last two variables, the rule of law and graft, consider aspects related to the respect that both citizens and the government have for the institutions that resolve their conflicts and govern their interactions. The first includes variables that measure perceptions of the effectiveness and predictability of the judiciary, as well as the enforceability of contracts, while the second aggregates different indicators of corruption.

While improvements in governance indicators would be expected to make countries more attractive for foreign investors, not all of these dimensions are likely to have similar effects. A foreign investor may be more worried about excessive regulation, corruption or disregard for the rule of law, and less worried about the independence of the media or the ability of citizens to hold their leaders accountable.

The results regarding the role of institutional quality are striking. Institutions *do* matter, and they matter a great deal. Figure 18.4 plots inflows of FDI as shares of GDP of the recipient countries for 1997-99 against the summary variable of institutions, defined as the average of the six individual indicators. The correlation is 0.49, and is highly significant.

The results of more systematic empirical exercises are presented in Appendix Table 18.1. All the governance indicators, with the exception of political voice and accountability, have positive effects on FDI location and are statistically significant. More importantly, their impact is quite large. The largest impact is the regulatory burden, which captures the quality and market friendliness of government policies. An improvement of one standard deviation in regulatory burden increases



Sources: IMF (2000) and Kauffman, Kraay and Lobatón (1999a).

the stock of FDI by a factor of 4.7. The magnitude of this potential impact is substantial, to say the least. For example, a one standard deviation improvement in this variable would take the quality of government policies in Mexico to the level of Australia.

Similarly, an improvement of one standard deviation in government effectiveness increases FDI by a factor of nearly three. Such an improvement would, for example, increase the index of Russia to that of Argentina, or the index of Morocco to that of Chile. Finally, improvements of one standard deviation for graft, the rule of law, and political instability would increase FDI by 140 percent, 100 percent and 57 percent, respectively. The corresponding impact of an improvement in the summary indicator of governance is an increase in FDI of nearly 130 percent.²⁰

Since the difference between the averages for Latin American and OECD countries with regard to this summary indicator is larger than one standard deviation (in fact, it is equivalent to a 1.34 standard deviation), the results suggest that improving institutions from the Latin American average to that of the OECD countries would result in an increase in FDI by a factor of 2.8.

Three different sources for institutional data, in addition to those of Kaufmann, Kraay and Zoido-Lobatón

²⁰ See Appendix Table 18.1. Since the governance indicators are normalized to have a standard deviation of 1, their impact can be calculated as the exponential of the coefficient minus 1.

were used to check the robustness of these results.²¹ Specifically, we used data on a variety of institutional dimensions from the International Country Risk Guide (ICRG), constructed on the basis of a poll of experts, an index of shareholders' rights developed by La Porta, López de Silanes and Shleifer (1998) and based on analysis of each country's laws and commercial codes, and data from the World Business Environment Survey focusing on major obstacles to the operation and growth of businesses.²² While the results are not always as large quantitatively as those discussed above, the conclusion is exactly the same: institutions matter.

Implications and Policy Options

Discussion of policy options open to countries looking to attract FDI revolves around two strategies. The first is associated with the "beauty contest" approach. It involves improving the quality of national institutions, educating the labor force and developing infrastructure. The second entails aggressive use of fiscal and financial incentives to attract foreign investors. This is obviously a false dichotomy, as countries tend to follow a mixed strategy that combines both types of actions (see Box 18.1 for Costa Rica). Yet, organizing the discussion in terms of these polar strategies is useful for the purposes of presentation. The ultimate objective, of course, is not the maximization of FDI per se, but rather the maximization of society's welfare.

The "Beauty Contest"

One important difference between this strategy and aggressive incentives is that, regardless of how much FDI this approach attracts, the improvements it brings about will benefit society as a whole. In particular, domestic firms will clearly gain from improvements in infrastructure, education and the quality of the institutional environment. Empirical results suggest that, beyond these general benefits, improving the quality of institutions in particular has very significant potential to attract foreign investment. The results also suggest, however, that improving certain institutions matters more than improving others. The most promising policies in terms of attracting foreign investors are to reduce excessive regulation, enforce property rights, improve the quality of the bureaucracy, and reduce corruption. Other dimensions, such as independent news media or the ability of citizens to hold their leaders accountable, are clearly less of a concern to foreign investors.

On the other hand, the results regarding the effects of education and the quality of the infrastructure on the location of FDI are quite weak. This does not mean, however, that countries should not pursue these policies. Regardless of how effective they may or may not be in terms of attracting FDI, these policies may help maximize the societal benefits that can be derived from foreign investment.

Education of the labor force, for example, may have important effects on the benefits host countries derive from FDI through two different but related channels. First, educating the labor force may affect the type of FDI a host country receives.²³ Countries with an uneducated labor force will tend to attract foreign investment in mature industries that may come simply to exploit the availability of cheap labor. There are many reasons to expect the benefits of this type of investment to be smaller than those in more advanced industries, for which the availability of an educated labor force may be an important consideration. Knowledge spillovers are likely to be larger in more advanced industries. These firms tend to have a larger effect on the development of specialized suppliers, whose resulting better-quality products then become available to domestic firms as well. In addition, more advanced industries can generate positive feedback in the sense that when a foreign firm comes because the labor force is educated, it may play a role in fostering further education of the labor force. This has been the case with Intel in Costa Rica, where enrollment in engineering schools has doubled in only two years.

The second benefit is that, for a given type of investment, host countries may be better able to derive benefits from FDI if the labor force is educated. Regardless of the extent of potential knowledge spillovers, the ability to absorb knowledge, and to accumulate human capital through training, will depend on the existing stock of human capital. This effect is at the center of findings by Borensztein, De Gregorio and Lee (1998)

 $^{^{\}rm 21}\,$ See Stein and Daude (2001).

 ²² For a detailed description of the survey, see Lora, Cortes and Herrera (2001). A summary of the results is presented in Chapter 2 of this Report.
 ²³ Unfortunately, not enough quality and disaggregated data on this issue were available to explore this hypothesis.

Box 18.1 What Makes Costa Rica So Attractive to FDI?

Intel's decision to locate in Costa Rica—with an initial investment equivalent to 2.1 percent of the country's GDP has called attention to the Central American nation's recent success in attracting high-tech foreign direct investment. There are several important lessons to learn regarding how a successful policy to attract FDI can be compatible with national development, maximizing the benefits from the presence of multinational enterprises to the host country.

What has made Costa Rica so attractive to foreign investors? Costa Rica does give tax exemptions to foreign or domestic firms through its Export Processing Zones (EPZ). But the government did not promise any special benefits to Intel or other foreign investors. Larrain, López-Calva and Rodriguez-Clare (2000) point out that such an approach involves less of a policy risk and in fact may have given the government more credibility than would have resulted from granting special fiscal benefits that could have resulted in unsustainable fiscal balances and doubts about the fairness of the rules of the game. Rosales, et al. (2000) find that Costa Rica has no comparative advantage in terms of fiscal incentives for FDI relative to its competitors. According to a 1999 survey of foreign investors, Costa Rica's principal strengths are perceived to be political stability, democratic government, good governance, and the guality of the labor force, as well as its relative proximity to the U.S. market. In the case of Intel, these factors seem to have played an important role. The country's institutional strengths seem to have offset the limited size of the local market as well as Mexico's advantage in terms of location (see Larrain, López-Calva and Rodríguez-Clare, 2000).

Does Costa Rica benefit from the presence of multinational enterprises? The direct effect of large amounts of FDI has been a substantial contribution to the short-run growth rate of the Costa Rican economy. Based on Central Bank data, Intel alone contributed 5 points of the 8 percent growth rate in 1999. Another macroeconomic effect has been a significant increase in exports, as well as the diversification in products and markets. From a fiscal point of view, the EPZ exemptions imply a fiscal cost. However, since the EPZ tax holidays are limited to 12 years, these effects will likely disappear over the long run. A major concern about Intel coming to Costa Rica was the possible effect on the price of certain inputs and wages. But the company's presence seems to have had a positive impact on the wages of skilled labor, particularly engineers, while the negative effect on domestic firms is seen as transitory and not very harmful. There has been a coordinated effort by the Ministry of Education, Intel and the Costa Rican Technology Institute to implement new educational programs, so an increase in the supply of skilled labor is expected over the medium term. Obviously, this process will benefit not only Intel but also domestic firms. And the connections between Intel and the Costa Rican Technology Institute, however incipient, may eventually help strengthen research and development links between businesses and national educational institutions. To date there is no evidence of informal knowledge spillovers related to the presence of high-tech enterprises in Costa Rica.

There has also been particular interest in backward linkages to domestic suppliers. According to Monge (2000), acquisitions of domestic inputs by firms in the Cartago EPZ in 1999 represented less than 10 percent of total inputs. These linkages have positive effects, since new inputs may become available, or the quality of existing inputs may improve substantially. Larrain, López-Calva and Rodríguez-Clare (2000) report that companies that compete with Intel in the input markets are already taking advantage of new and improved inputs. They would appear to consider the presence of Intel as highly positive for development of their own businesses. To further strengthen such positive effects of FDI, the government is implementing a program to support the development of suppliers for the high-tech sector. The program complements private initiatives by foreign companies to train input suppliers.

Recent bottlenecks regarding infrastructure, especially in the telecommunications and transportation (airports and ports) sectors have raised concerns among foreign investors and domestic authorities. The presence of high-tech enterprises clearly will prompt the need for more investment in infrastructure, an investment that will of course also benefit domestic firms.

It seems clear that Costa Rica's success in attracting FDI is related to its solid institutional environment, as well as to coordinated efforts to minimize the possible negative effects of such investments and to maximize the positive linkages and opportunities they provide. that FDI has a positive effect on growth, provided that the host country has sufficiently high levels of human capital. The authors conclude that in order to benefit from the advanced technology introduced by foreign firms, the host country must have the capacity to absorb it.

Returning to the positive feedback issue discussed above, it is important to note that it has substantial political economy implications as well. A large foreign investor for which education is an important consideration will demand that the government improve the educational level of the labor force. The investor thus becomes a key constituent in favor of education. An investor that values the quality of infrastructure and the institutional environment will demand that the government develop infrastructure and undertake institutional reform. On the other hand, a foreign investor attracted to a country because of its cheap labor will likely demand that the government ensure the continuous availability of cheap labor, a scenario clearly less appealing as a development strategy.

If there is a downside to the beauty contest strategy, it is that improving the quality of the labor force, infrastructure and institutions is a long-term endeavor, the benefits of which may not be realized until long after the government that pursued this strategy has abandoned power. This long timeline from the perspective of short-term political considerations is precisely what makes the alternative strategy based on aggressive fiscal and financial incentives more appealing.

Competition in Incentives

While empirical results suggest that lower taxes on foreign corporations *do* have an effect on the location of FDI, these effects are much smaller than those associated with institutional quality. However, as in the previous discussion about the impact of an educated labor force, the key is not necessarily how much FDI comes into the host country, but rather the benefits the country derives from those investments.

The manner in which countries compete to attract FDI can affect who benefits from the foreign investment. It is clear that if there is heated competition between countries to provide incentives for FDI, the main beneficiaries of the investments will be the foreign investors themselves, since they will be able to extract most of the benefits that their investment has to offer. This is a key point because, as the discussion below will show, competition for FDI has heated up considerably in recent years. One striking example is in the automobile industry. Table 18.1 shows the escalation in cost of subsidies per worker for 14 FDI projects in the automobile sector in developed and developing countries from 1980-97.²⁴

There are several reasons why the intensity of competition for FDI may have increased in recent years. One is the spectacular increase in the volume of FDI itself, which means that the stakes in the guest to attract FDI are now much higher. Another is the increased number of players in the game. Countries that used to discourage FDI, such as China, have become major players. Meanwhile, in other countries such as the United States and Brazil, subnational governments have become major players. The escalation of subsidies for FDI in the automobile sector shown in Table 18.1 for the most part resulted from competition among subnational governments within the same country, rather than competition among countries. Other factors that have intensified competition for FDI include reductions almost worldwide in trade barriers, and the appearance of new ways of conducting business such as e-commerce, which can provide similar services worldwide from any location.

To the extent that FDI produces positive spillovers, it makes sense for governments to offer incentives to potential investors to lure them to their countries. The problem is not one of efficiency—competing incentives help to direct investments toward locations where the social rates of return are highest. The problem is the distribution of the benefits. To the extent that social rates of return for an investment in different locations do not differ too much, foreign firms will be able to extract most of the benefits associated with the investment.²⁵

Oman (2000a) reports evidence from business surveys and interviews with foreign investors that foreign firms often take a two-stage approach to deciding where to locate their large long-term investments. Competition in providing incentives only becomes relevant during the second stage of the decision process, after the firm has narrowed down the list of potential locations

²⁴ Taken from Oman (2000a).

²⁵ See Fernández-Arias, Hausmann and Stein (2001), who suggest that coordination among host countries to restrict competition would increase the benefits they derive from FDI.

Date of package	Country	Investor	Amount of subsidy (US\$)
1980	United States	Honda	4.000
Early 1980s	United States	Nissan	17,000
1984	United States	Mazda-Ford	14,000
Mid-1980s	United States	GM Saturn	27,000
Mid-1980s	United States	Mitsubishi-Chrysler	35,000
Mid-1980s	United States	Toyota	50,000
Mid-1980s	United States	Fuji-Isuzu	51,000
Early 1990s	United States	Mercedes-Benz	168,000
1992	Portugal	Ford-Volkswagen	265,000
1995	Brazil	Volkswagen	54,000-94,000
1996	Brazil	Renault	133,000
1996	Brazil	Mercedes-Benz	340,000
1997	Germany	Volkswagen	180,000
1997	India	Ford	200,000-420,000

¹ Estimated value of fiscal and financial incentives supplied by national and subnational governments to a particular investment project, divided by the number of jobs the project was expected directly to create.

Source: Taken from Oman (2000a.)

by looking primarily at "fundamentals" such as the quality of the institutional environment, political and macroeconomic stability, market access, availability of skilled workers, and the quality of infrastructure.

Table 18.1 Investment Incentives in the Automobile Industry

Other possible problems associated with incentivebased competition include temporary erosion of the tax base, particularly since the incentives typically are available to both foreign and domestic companies.²⁶ If it is costly for existing firms to qualify for the incentives, fiscal problems may be reduced, but the introduction of new incentives may put those firms at a disadvantage relative to new ones. In addition, since the negotiations are rarely transparent and open to public scrutiny, they could lead to arbitrariness and corruption.

Given the rules of the game, however, it is hard to imagine countries refraining from competition for FDI. In fact, even if foreign firms were to appropriate most of the externalities directly associated with their activities (such as knowledge externalities, training, development of suppliers, etc.), there remain other benefits of FDI that are less directly related to the productive activities of the firm. One is the positive feedback discussed above. Foreign investors can become a major constituent in favor of reform and tip the balance in that direction. Second, attracting a major investment may have a signaling effect, reducing the cost of marketing the location to other potential investors. Third, to the extent that there are economies of agglomeration, landing a large investment may make the location more attractive for other potential investors.²⁷

In general, this discussion suggests that countries need to improve the fundamentals of education, infrastructure, institutions and stability in order to maximize the benefits they derive from the activities of foreign investors. There are no easy shortcuts to attracting FDI.

Or are there?

Export Platforms

Developing infrastructure, educating the labor force, dismantling trade barriers, easing regulation, and improving institutions represent a daunting task that may take prolonged efforts and produce slow results. One possible shortcut—not an alternative, per se, but rather a complement to these sustained efforts—is to establish export platforms such as Export Processing Zones (EPZs). If designed correctly, these platforms can serve as enclaves where the obstacles to business development in the rest of the country can be bypassed—or, in

 $^{^{26}\,}$ See Chapter 17 for a description of investment incentives in Latin American countries.

²⁷ In theory, in an environment of heated competition, a firm could even appropriate these externalities in the course of the negotiations.

other words, islands of good institutions and infrastructure in a country with bad fundamentals. Platforms clearly involve elements of both strategies to attract FDI: they can provide adequate infrastructure and reduce the bureaucratic burden, and at the same time they may offer tax incentives and reduced trade barriers, all factors which can contribute to making the country attractive to foreign investors.²⁸

The evidence on the success of export platforms is mixed. Our analysis found no significant effect of export platforms on FDI or the growth of exports. Nor did EPZs have an effect in countries with weak institutions and infrastructure. The problem is that EPZs come in different shapes and forms, and while some have been enormously successful, others are tainted by corruption or excessive bureaucracy, and some have failed altogether. The data do not allow us to discriminate among different kinds of EPZs, which is probably the reason for the inconclusive results. Radelet (1999) argues emphatically, however, that no country has ever been able to rapidly expand manufacturing exports without an export platform.

Conclusions

Foreign direct investment has increased rapidly across the world in recent years, and Latin America has been no exception. However, different countries have had very different degrees of success in attracting foreign investors. This chapter studied what determines where FDI goes, with a particular emphasis on variables amenable to policy action by government. While competing for FDI by offering tax incentives can sometimes be effective in attracting investors, improving the guality of a country's institutions appears to have a much greater impact. Perhaps more importantly, competing by addressing such fundamental issues as educational and institutional development affects the *type* of FDI that comes into a country and the benefits the country derives from those investments. Countries should focus on the fundamentals that make them attractive to foreign investors: dismantling excessive regulation, enforcing property rights and the rule of law, improving the quality of the bureaucracy, reducing corruption, educating the labor force, and expanding infrastructure. Countries might also consider designing export platforms to complement these more long-term endeavors.

²⁸ See Radelet (1999) for a detailed discussion of export platforms.

Determinants of FDI: Cross-Section Regression Results

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Independent variables	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6	Reg. 7	Reg. 8
GDP (log)	0.917	0.925	0.959	0.921	1.156	0.942	0.967	0.984
	(9.05)***	(8.66)***	(9.55)***	(10.31)***	(14.03)***	(9.16)***	(9.74)***	(9.90)***
Distance (log)	-0.61	-0.587	-0.556	-0.598	-0.619	-0.582	-0.554	-0.511
	(4.21)***	(3.70)***	(3.75)***	(4.65)***	(4.62)***	(4.01)***	(4.01)***	(3.46)***
Common language dummy	1.338	1.334	1.284	1.086	1.113	1.2	1.122	1.205
	(3.28)***	(3.24)***	(3.23)***	(2.94)***	(3.29)***	(3.09)***	(2.84)***	(2.97)***
Colonizer dummy	1.195	1.225	1.276	1.282	1.099	1.277	1.324	1.35
	(2.48)**	(2.52)**	(2.68)**	(3.35)***	(3.00)***	(2.95)***	(3.18)***	(3.05)***
Adjacency dummy	0.903	0.915	0.937	0.966	1.013	1.002	1.015	0.997
	(1.80)*	(1.83)*	(1.88)*	(2.13)**	(2.02)**	(2.04)**	(2.14)**	(2.05)**
Infrastructure index	1.055	0.992	0.55	-0.423	0.023	0.044	-0.089	0.082
	(3.38)***	(2.70)***	(1.32)	(0.94)	(0.06)	(0.08)	(0.17)	(0.14)
Tax rate (%)	-3.541	-3.69	-4.095	-4.682	-3.542	-4.675	-4.362	-4.633
	(-1.48)	(-1.49)	(1.75)*	(2.97)***	(2.08)**	(2.38)**	(2.36)**	(2.22)**
Higher education ¹	0.034	0.031	0.025	0.008	0.001	0.016	0.005	0.008
	(2.86)***	(2.02)**	(2.07)**	(0.65)	(0.08)	(1.03)	(0.34)	(0.52)
Voice and accountability index			0.096 (0.38)					
Political instability index			0.449 (2.11)**					
Government effectiveness index				1.09 (5.20)***				
Regulatory burden index					1.549 (5.46)***			
Rule of law index						0.707 (2.48)**		
Corruption index							0.873 (3.28)***	
Quality of institutions index (average)								0.837 (2.61)**
No. of observations	846	846	846	846	846	846	846	846
R ²	0.69	0.69	0.69	0.72	0.72	0.7	0.71	0.7

Dependent variable: Bilateral FDI stock 1996 (log)

Notes: t-statistics in parentheses.

¹ Percentage of persons older than 25 who have some tertiary education. *** Significant at 1%.

** Significant at 5%.
* Significant at 10%.

Part VI References

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