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# The Mexico Competitiveness Report 2009

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The terms *country* and *nation* as used in this report do not in all cases refer to a territorial entity that is a state as understood by international law and practice. The terms cover well-defined, geographically self-contained economic areas that may not be states but for which statistical data are maintained on a separate and independent basis.

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# Preface

**KLAUS SCHWAB**
Executive Chairman, World Economic Forum

*The Mexico Competitiveness Report 2009* appears at a critical time for Mexico, given the country's national reform agenda and the present global economic outlook. Against the background of one of the most serious economic and financial crises in decades for the United States and the rest of the world, it becomes even more crucial for Mexico's government and private sector to engage in defining and implementing a competitiveness agenda, and related policies, able to ensure sustained economic growth and the well-being of every Mexican in the long term.

In the last decade or so, Mexico has made impressive progress toward achieving macroeconomic stability and liberalizing and opening its economy, leaving behind a recent past of recurring financial crises linked to changes in the administrations, oil price volatility, and fiscal excesses, among other factors, and establishing a solid foundation for sustainable long-term economic growth. However, a number of flaws continue to afflict the country, including overly rigid labor markets and poor educational systems, coupled with still inequitable income distribution, social tensions, rampant crime, low levels of citizens' trust in politicians, and a sense of reform fatigue. Mexico's institutions face a tough reform path to bring social justice and legal security to their citizens. Failure to move ahead in the short term poses risks to the growth of per capita incomes, the stable evolution of its institutions, and ultimately the prosperity of a country that faces a demographic opportunity, with a large share of its population being young. At the same time, the current major US and global economic downturn and Mexico's close association with the US business cycle represent daunting challenges facing the country in the short to medium term.

*The Mexico Competitiveness Report 2009* builds on the methodology and findings of the World Economic Forum's *Global Competitiveness Report 2008–2009* and aims at deepening the understanding of Mexico's main competitiveness challenges ahead. The *Report* intends to offer a unique platform for discussion and a useful tool for policymakers, business strategists, and other stakeholders in identifying the main impediments to growth and in designing best policies and practices to foster a competitive economy. Building on the latest thinking in competitiveness research, this *Report* offers a broad overview of the country's main competitive strengths and weaknesses, highlighting the areas requiring immediate attention. Finally, insightful essays on specific issues of competitiveness written by leading academics are featured in Part 2 of this *Report.*

The publication of this *Report* will provide support for roundtable discussions of Mexico's competitiveness, which should no doubt take into account the need for economic rigor and efficiency while improving social equity. We hope that these discussions will generate specific insights, concrete options, and priorities for action.

We would like to express our gratitude to the distinguished experts and scholars who have contributed excellent papers to the *Report,* casting light on different aspects crucial to boosting Mexico's competitiveness. We especially wish to thank the editors of the *Report*, Ricardo Hausmann at the Center for International Development, Harvard University, and Irene Mia and Emilio Lozoya Austin at the World Economic Forum for their leadership and commitment. Appreciation also goes to the other members of the Global Competitiveness Network: Jennifer Blanke, Ciara Browne, Agustina Ciocia, Margareta Drzeniek Hanouz, Thierry Geiger, Pearl Samandari, and Eva Trujillo as well as to Arturo Franco Hernandez from the Agenda team, Latin America. Last but not least, we would like to thank ProMexico, our partner in this *Report*, for its invaluable support in this important venture, and to convey our sincere gratitude to our network of 142 Partner Institutes around the world and to all the business executives who participated in our Executive Opinion Survey, without whose valuable input the creation of this *Report* would not have been possible.

# Executive Summary

**RICARDO HAUSMANN**, Harvard University
**EMILIO LOZOYA AUSTIN**, World Economic Forum
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The past 20 years have been a period of important reforms in Mexico. Since the late 1980s, the country has undergone an impressive process of liberalization, opening of the economy, and macroeconomic stabilization. Extreme vulnerability to external shocks, double-digit inflation, and current account and fiscal deficits seem to have been overcome. However, a number of weaknesses continue to drag the country's productivity and hence its potential for sustained economic growth and the well-being of its citizens. In spite of a very benign external environment in the period 2003–07, Mexico's growth rates have been disappointing, and the challenges facing the country have become even greater in the context of the current major economic and financial crisis — one of the most serious in decades — affecting the United States and the rest of the world.

*The Mexico Competitiveness Report 2009* aims at providing Mexico's policymakers, business leaders, and all relevant stakeholders with a unique tool that identifies the country's main competitiveness flaws and strengths, together with an in-depth analysis of areas that are key to the country's potential for long-term growth. In doing so, the *Report* aims to support the country's reform process and contribute to the definition of a national competitiveness agenda of the priority issues that need to be tackled for Mexico to boost its competitiveness in the face of the present daunting economic outlook.

The *Report* is organized into three thematic parts. Part 1 assesses the current state of Mexico's competitiveness and its potential for sustained growth using the broad methodological framework offered by the Global Competitiveness Index (GCI) 2008–2009. Part 2 features contributions from a number of experts providing additional insights and diagnostics related to particular aspects of the competitiveness challenges faced by the country. Part 3 includes detailed profiles for Mexico and 10 selected countries and offers a comprehensive competitiveness snapshot for each of these countries.

## Part 1: An assessment of Mexico's competitiveness

Chapter 1.1, "Assessing the Foundations of Mexico's Competitiveness: Findings from the Global Competitiveness Index" by Irene Mia and Emilio Lozoya Austin (both at the World Economic Forum), aims to cast some light on the impediments to Mexico's growth and sustained competitiveness. Their assessment is based on the findings of the most recent GCI, featured in *The Global Competitiveness Report 2008–2009*. To properly benchmark Mexico's progress and challenges, comparisons are made with selected relevant national and regional comparators. The GCI provides a state-of-the-art methodological framework to assess *the set of institutions, policies, and factors that determine the level of productivity of a country* and identifies a large number of macro- and microeconomic drivers of growth around 12 pillars of competitiveness. These pillars play all a crucial role as drivers of national competitiveness, but they differ in importance according to any given country's stage of development. Different pillars affect different countries in different ways. The elements driving productivity, and therefore competitiveness, change as countries move along the development path. Accordingly, the GCI classifies countries into three specific stages of development: *factor-driven, efficiency-driven,* and *innovation-driven*. Mexico is currently placed in the efficiency driven stage, together with regional neighbors Argentina, Brazil, Costa Rica, and Peru and other relevant countries such as South Africa and Thailand.

Mexico ranked 60th among 134 countries in the most recent GCI computation (55th in the constant 2005–06 sample). Table 1 summarizes Mexico's results in the 12 competitiveness pillars composing the GCI. The country's performance captured by each of the 12 pillars reveals a series of flaws and challenges; these need to be addressed if the country is to fulfill its competitive potential. Rankings in labor market efficiency (110th), institutions (97th), and higher education and training (74th) seem particularly alarming, given Mexico's stage of development. Mexico's poor showing in the innovation pillar (90th) does not appear as worrisome as the results previously mentioned. The country could continue to grow in the short to medium term without generating much endogenous knowledge, but it needs to be able to count on a pool of qualified and skilled labor to respond to the current competitiveness challenges. On the positive side, Mexico has improved importantly over the past years in macroeconomic stability and business sophistication, showing convincing ranks of 48th and 58th, respectively. Moreover, the country's competitiveness continues to be boosted by the large size of its market (11th).

**Table 1** Mexico's competitiveness at glance according to the GCI 2008–2009

| Pillars of competitiveness | Mexico's rank (out of 134 economies) |
|---|---|
| Labor market efficiency | 110 |
| Institutions | 97 |
| Innovation | 90 |
| Higher education and training | 74 |
| Goods market efficiency | 73 |
| Technological readiness | 71 |
| Infrastructure | 68 |
| Financial market sophistication | 66 |
| Health and primary education | 65 |
| Business sophistication | 58 |
| Macroeconomic stability | 48 |
| Market size | 11 |

Source: World Economic Forum 2008

In line with these results, the authors conclude that significant progress has been realized for the country to break free from endemic macroeconomic instability and move toward opening, liberalizing, and improving the efficiency of its economy, as well as diversifying its base. However, important weaknesses remain in key areas. Among the efficiency-enhancers, overly rigid labor markets and imperfect competition conditions in the goods and services markets hamper economic efficiency. These hindrances need to be addressed by further liberalization and structural reforms. The poor quality of the higher education system, reflected in the poor performance of Mexican students on international tests, is a major cause of concern.

As for other countries whose competitiveness is hinged on efficient production systems and markets, Mexico needs a qualified, constantly learning and adaptable workforce. In addition, Mexico also suffers from an insufficient pool of graduates in math, science, and engineering. This lack reduces the capacity of Mexican firms to advance further in the value chain. National innovation and the capacity to absorb and adapt foreign technology are also damaged and limited by the insufficiency noted above.

The country also continues to display serious shortcomings in some of the basic requirements of competitiveness. The perceived quality of its institutions is worrisome. The list of grievances is by no means short: poor public governance, corruption, low levels of citizen trust in politicians, widespread red-tape and government inefficiencies, an onerous tax system with a small tax base, and an inefficient legal framework. Epidemic levels of crime and violence impose considerable costs on businesses, not to mention ordinary Mexicans. This is well understood by policymakers, but further action is urgently required. At the same time, Mexico is a country of great potential, with a unique geographical position, a young population, and a rapidly expanding market. The authors believe that this potential must and can be fulfilled by a joint effort of all political parties, the business sector, and civil society to address the deficiencies highlighted above.

## Part 2: Focus on selected factors of competitiveness

This part of the *Report* features a number of insightful contributions written by eminent academics and competitiveness experts, who examine key areas of Mexico's competitiveness landscape in more depth. As highlighted by the GCI, the factors driving productivity, and therefore competitiveness, change as countries move along the development path. For an efficiency-driven country such as Mexico, notwithstanding a greater concentration of challenges at the efficiency enhancers' level, one can find important opportunities for boosting competitiveness in the areas of basic requirements and innovation and sophistication factors.

Referring to the GCI's categorization of the factor-driven, efficiency-driven, and innovation-driven stages of development, the contributions included in Part 2 provide a set of diagnostics and action items in areas loosely linked to each of those stages and related competitiveness drivers and enablers, as follows:

### Factor-driven stage

In their thoughtful paper "Growth Diagnostic: Mexico," Ricardo Hausmann and Bailey Klinger (both at the Center for International Development, Harvard University) embark on a comprehensive review of the factors that explain Mexico's recent economic performance. Economic growth in Mexico seems not to have been constrained by access to finance, macroeconomic uncertainty, political uncertainty, high or variable taxes, labor market rigidities, or coordination failures in self-discovery. Rigidities in the non-tradable sector causing stickiness, or other business climate rigidities or microeconomic risks are not identified as clear impediments either.

The one constraint identified by the authors as binding is the supply of education, but the fact that returns

to education have continued to fall despite the resumption of growth after 2002 casts doubt on this conclusion. Therefore, Hausmann and Klinger conclude that there is not enough evidence to identify a unique constraint to growth that is harming the economy across a wide cross-section of activities, and they call for a policy of public-private dialogue to identify those constraints unique to each sector or activity. Such a policy, they believe, will help overcome the puzzlingly slow growth observed in Mexico and identify sector-specific policies and actions to foster competitiveness.

In "Possible Impacts of Global Climate Change Policy on Mexico and Other Developing Countries in Coming Years," Jeffrey Frankel from Harvard University addresses the challenges and opportunities brought about by the ongoing efforts to address the problem of global climate change for Mexico and other middle-income countries. Economic spillovers rising from contrasting effects on commodity and food prices, along with challenges for energy-intensive industries stemming from Kyoto Protocol obligations, are among the trends described in this chapter.

### Efficiency-driven and innovation-driven stages

Trade of products and services and human capital movements between countries have enormous effects on an economy's productivity and efficiency, especially for *efficiency-driven* countries such as Mexico. In his paper "Mexico's Impact on the US Labor Market: A Reason to Renegotiate NAFTA?" Robert Z. Lawrence (at the John F. Kennedy School of Government, Harvard University) analyzes how Mexico's transformation into a much more open economy — which has become increasingly dependent on its trade with the United States, thanks to the North American Free Trade Agreement (NAFTA) — is of critical importance to both economies. He argues that immigration and trade have actually been far less damaging than many suggest and reviews the outlook of the NAFTA agreement in view of the current circumstances and the new US administration.

In "Small and Medium Firm Lending in Mexico: Lessons and Current Issues," Rodrigo Canales (Yale School of Management) and Ramana Nanda (Harvard Business School) unseal some of the challenges faced by this large sector of the economy as it struggles to become more productive, notably in its access to credit. Mexico is often cited as one of the world's most entrepreneurial countries in terms of the percentage of its population that has started or is in the process of starting a business venture. Yet Mexico does not seem to be very friendly to entrepreneurs, as confirmed by the fact that a large portion of new businesses is created in the informal sector. The authors identify the main obstacle to this area as the country's insufficient access to credit for small entrepreneurs. The chapter is devoted to assessing recent programs adopted in Mexico to foster SME competitiveness (including programs to increase capital availability) and draws some important conclusions for policymakers in their efforts to improve the micro-components of national competitiveness.

Quality higher education and the presence of an appropriate qualified labor pool are important efficiency enhancers and an essential precondition for countries to generate endogenous innovation and produce new and unique goods and services. As mentioned, countries' competitiveness increasingly depends on such capacity as they move up in the development path to the third and most advanced innovation-driven stage of development. Fostering innovation in a knowledge-based economic setting requires investment in the quality of the skills of the labor force. The question of how to build the capabilities both to initiate a resurgence of growth and to facilitate Mexico's transition into a broader set of growth-enhancing industries and activities is addressed in "Producing Superstars for the Economic *Mundial*: The Mexican Predicament with Quality of Education," by Lant Pritchett and Martina Viarengo (both at the John F. Kennedy School of Government, Harvard University). The authors adopt an interesting approach, exploring the consequence of Mexico's poor performance in internationally comparable examinations such as the Organisation for Economic Co-operation and Development's Programme for International Student Assessment (PISA) on the *absolute* number of very highly skilled workers. They conclude that Mexico produces only between 3,500 and 6,000 students per year above the high international benchmark, much less than the United States, Korea, or even India. The consequences of the dearth of globally competitive human capital are then explored, with an emphasis on the rise of superstar phenomena in labor markets. The chapter concludes with some possible educational policies for focusing on the upper end of performance — policies that are at odds with much of the "quality" focus of typical educational policies, which normally concentrate on the lower, not the upper, end of performance.

## Part 3: Country Profiles

Part 3 presents detailed competitiveness profiles for Mexico and the economies used as comparators in the analysis performed in Part 1 of this *Report*, together with a section on how to read the country profiles and interpret the information they provide.

# Part 1

## An Assessment of Mexico's Competitiveness

CHAPTER 1.1

# Assessing the Foundations of Mexico's Competitiveness: Findings from the Global Competitiveness Index

**IRENE MIA and EMILIO LOZOYA AUSTIN,**
World Economic Forum

Mexico has come a long way since the "lost decade" of the 1980s and the ensuing instability associated with recurring financial crises. The country has emerged as the second largest economy in Latin America,[1] after Brazil, and as the region's top destination for foreign direct investment (FDI) in 2006.[2]

Since the 1995 "Tequila" crisis that rocked the country's financial and exchange markets, Mexico has made significant progress toward establishing a solid macroeconomic foundation for sustained growth. It adopted an effective stabilization program that included the restructuring of its external debt, a prudent monetary policy, and a flexible exchange rate. These were coupled with the privatization of important companies. One result has been single-digit inflation (4% in 2007). Public debt and the current account deficit both stand at manageable levels — 22.7% and 0.6% of gross domestic product (GDP). The government budget is balanced.

Also, Mexico has started to leverage its unique geographic position between two oceans and between North and South America. With an already large internal market of nearly 10 million people,[3] it has entered into an extensive network of trade agreements that provide preferential access to markets that include North America, Japan, and Europe. The North American Free Trade Agreement (NAFTA), which established a free trade area between Mexico, the United States, and Canada, helped triple intra-regional trade during the first decade after it took effect in 1994.[4] NAFTA has significantly contributed to the diversification of Mexico's productive and export structure, especially thanks to the *maquiladora* system of assembly factories and increased FDI. The United States accounted for 82.1% and 49.6% of Mexican exports and imports, respectively, and Mexico's exports consisted mainly of manufactured products (80.7% of total) in 2007 according to the Economist Intelligence Unit (EIU).

Notwithstanding these achievements and positive developments, Mexico does not display the same dynamism in terms of growth rates as other leading emerging markets such as India and China. Annual GDP growth rates in Mexico averaged 2.8% from 2002 to 2006, unimpressive compared to 10.1% and 7.8% for China and India, respectively, for the same period.[5] Mexico's economy continues to appear particularly vulnerable to external downturns, given its close association with the US business cycle and the heavy dependence on oil revenues to fund the public sector. The marked slowdown of the US economy sparked by the sub-prime mortgage crisis is already having an important impact on Mexico's growth, and the resilience of the country's economy in the months to come remains to be seen.

The authors would like to thank Eva Trujillo Herrera for her excellent research assistance for this paper.

*The Mexico Competitiveness Report 2009* will try to cast some light on the impediments to Mexico's growth and sustained competitiveness. It aims to provide a neutral platform for dialogue among policymakers, business people, and other relevant stakeholders and help them identify effective policies and strategies that will improve the country's competitiveness and lead to lasting prosperity for all Mexicans. In that spirit, this paper will assess the current state of Mexico's competitiveness and its potential for sustained growth using the broad methodological framework offered by the Global Competitiveness Index (GCI), developed for the World Economic Forum by Professor Xavier Sala-i-Martin of Columbia University. Besides identifying the drivers of competitiveness, the GCI offers a unique tool that can help prioritize policies and actions according to a country's specific stage of development. Through the lens of the GCI, this chapter will take a comprehensive snapshot of Mexico's competitive landscape and suggest areas that should be given priority in the design of a national competitiveness strategy. This, in turn, will set the context for the insightful contributions featured in the second part of the *Report*, in which distinguished scholars will conduct deep-dive analyses of selected areas key for fostering Mexico's competitiveness in the years to come, and provide related policy guidelines.



The chapter will start by briefly outlining the methodological framework of the GCI. It will then assess Mexico's performance in the different pillars of competitiveness, with a special focus on those factors considered crucial for the country given its stage of development.

## Introducing the Global Competitiveness Index

The World Economic Forum has been studying national competitiveness for almost three decades. During that period it worked with leading academics, always taking into account relevant new ideas, literature, and evidence. Developed in cooperation with Professor Xavier Sala-i-Martin, an eminent growth economist from Columbia University, the GCI was introduced in 2004. The Index provides a state-of-the-art methodological framework to assess *the set of institutions, policies, and factors that determine the level of productivity of a country* and identifies a large number of macro- and microeconomic drivers of growth.[6]

The GCI builds on the awareness that competitiveness is an extremely complex phenomenon that cannot be explained by one or two causes; rather, competitiveness and sustained growth are determined by the interrelationships among several and diverse factors. Figure 1 shows the 12 pillars of competitiveness identified by the GCI and listed below:

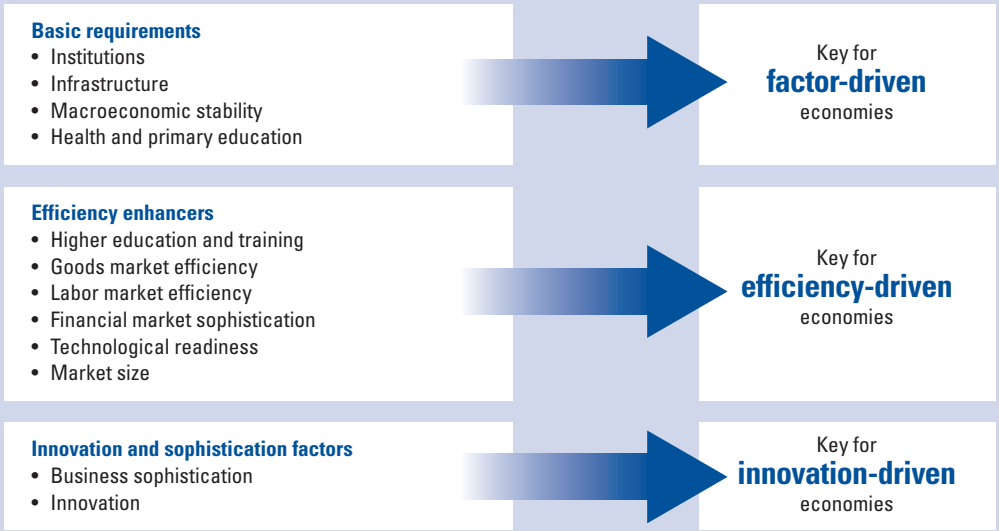
- **Institutions:** fairness of public institutions, government efficiency, security and the costs of insecurity to businesses, and corporate governance;
- **Infrastructure:** quality and development of general and specific infrastructure;
- **Macroeconomic stability:** quality of the macroeconomic environment;
- **Health and primary education:** health of the population and the quality of and access to basic education;
- **Higher education and training:** quality of and access to secondary and higher education and the effectiveness of on-the-job training;
- **Goods market efficiency:** the extent of domestic and foreign competition in a given market and the quality of demand conditions;
- **Labor market efficiency:** flexibility of the labor market and whether it ensures the efficient use of talent;
- **Financial market sophistication:** sophistication, efficiency, soundness and trustworthiness of financial markets;
- **Technological readiness:** penetration of information and communication technologies (ICT) and the extent to which countries leverage technology and knowledge from abroad (notably through FDI), by adopting and adapting it in their production systems;
- **Market size:** the size of the domestic and foreign markets;
- **Business sophistication:** at the firm level, the degree of sophistication of operations and company strategies and the presence and development of clusters;
- **Innovation:** potential to generate endogenous innovation.

The 12 pillars (analyzed in more detail in the following section) play a crucial role for all countries as drivers of competitiveness, but their importance differs according to each country's stage of development. Different pillars affect different countries in different ways. The elements driving productivity, and therefore competitiveness, change as countries move along the development path. Accordingly, the GCI classifies countries into three specific stages of development: *factor-driven, efficiency-driven* and *innovation-driven*.[7]

In the *factor-driven* stage, countries compete on the basis of their factor endowments, primarily unskilled labor and natural resources, and their economies are centered on commodities and/or basic manufactured products. At this stage of development, competitiveness rests mainly on efficient and transparent public and private institutions (pillar 1), well-developed infrastructure (pillar 2), good macroeconomic fundamentals (pillar 3), and a healthy and literate labor force (pillar 4).

As countries move up the development path to the *efficiency-driven* stage, productivity can be improved not only by fostering the efficiency of the factor markets but also by improving the efficiency of production processes and practices at the firm level. Key factors include: higher education and training (pillar 5), efficient markets for goods and services (pillar 6), flexible and well-functioning labor markets (pillar 7), sophisticated financial markets (pillar 8), a large domestic and/or foreign market that allows for economies of scale (pillar 9) and the ability to leverage existing technologies, notably ICT, in the production system (pillar 10).

**Figure 1** The 12 pillars of competitiveness




In the third and most advanced — *innovation-driven* — stage of development, countries cannot continue to grow if they simply rely on efficient markets and production processes; they must start to compete by producing new, unique value-added goods. At this point, the capacity to generate endogenous technology (pillar 12) and to use sophisticated production processes (pillar 11) becomes critical.

Table 1 lists the 134 economies covered by the latest GCI included in *The Global Competitiveness Report 2008–2009* by stage of development.[8] The countries falling between two of the three stages are defined as "in transition." Mexico is currently placed in the *efficiency-driven* stage, together with regional neighbors Argentina, Brazil, Costa Rica, and Peru and other relevant countries such as South Africa and Thailand.

The GCI integrates the concept of development stages in two ways:

1. by organizing the 12 pillars into three subindexes, according to their importance for each of the stages of development referenced above: pillars 1 through 4 are considered basic requirements of competitiveness, key for countries in the *factor-driven* stage but also fundamental preconditions for any competitive economy; pillars 5 through 10 represent efficiency enhancers, crucial for economies in an *efficiency-driven* stage; pillars 11 and 12 are defined as innovation and sophistication factors and are considered particularly relevant for countries in the *innovation-driven* stage (see Figure 1).
2. by assigning a different relative weight to each subindex in the overall GCI computation according to the specific development stage of a country. Table 2 provides full details of the weighting of the subindexes based on stages of development.[9] In the case of Mexico, for instance, the overall GCI score is the result of a weighted average of the three subindexes, as follows: 40% for basic requirements, 50% for efficiency enhancers, and 10% for innovation and sophistication factors.

The GCI builds on a combination of hard and survey data in order to capture, in the most comprehensive way possible, all determinants of competitiveness. Hard data mean quantitative factors, such as inflation rates, personal computer penetration and life expectancy that are collected by international organizations, including the International Monetary Fund (IMF), the World Bank and various United Nations agencies. Survey data capture fundamentals that tend to be qualitative in nature and for which hard data are often not available for a large number of countries. They include crucial factors such as the protection of property rights, independence of the judiciary, and the quality of the educational system. These data come from the Executive Opinion Survey, conducted by the Forum annually in over 130 economies that accounted for approximately 98% of global GDP in 2008.[10] For a detailed description of the more than 110 variables included in the GCI, see Annex 1: Structure of the Global Competitiveness Index 2008–2009 at the end of this chapter.

## An appraisal of Mexico's competitiveness landscape through the lens of the Global Competitiveness Index

This section draws on the findings of the most recent GCI, featured in *The Global Competitiveness Report 2008–2009*. To provide benchmarks relevant to Mexico's progress and challenges, comparisons will be made with selected neighboring and/or relevant countries and regions;[11] the GCI figures for Mexico for the

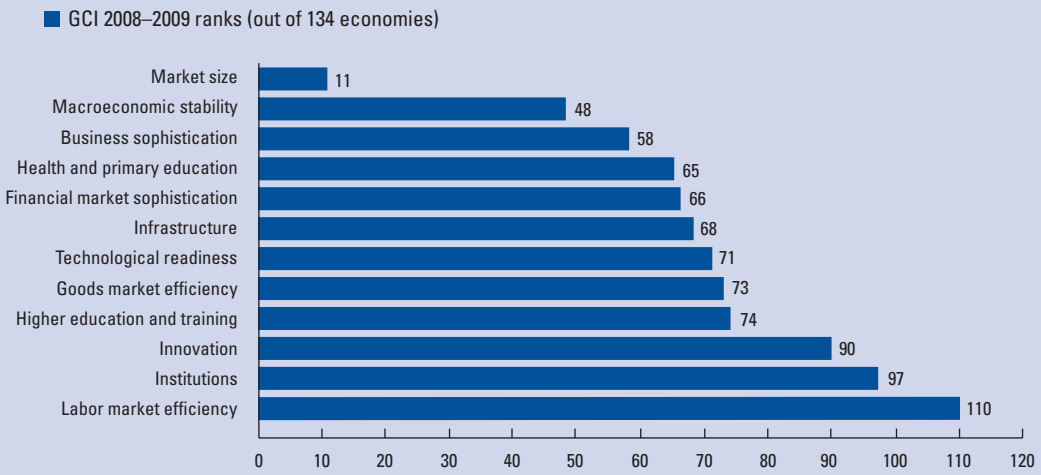
**Table 1** List of economies by stage of development

| Stage 1 | Transition from 1 to 2 | Stage 2 | Transition from 2 to 3 | Stage 3 |
|---|---|---|---|---|
| Bangladesh | Armenia | Albania | Bahrain | Australia |
| Benin | Azerbaijan | Algeria | Barbados | Austria |
| Bolivia | Botswana | Argentina | Chile | Belgium |
| Burkina Faso | Brunei Darussalam | Bosnia and Herzegovina | Croatia | Canada |
| Burundi | China | Brazil | Estonia | Cyprus |
| Cambodia | El Salvador | Bulgaria | Hungary | Czech Republic |
| Cameroon | Georgia | Colombia | Latvia | Denmark |
| Chad | Guatemala | Costa Rica | Lithuania | Finland |
| Côte d'Ivoire | Iran | Dominican Republic | Poland | France |
| Egypt | Jordan | Ecuador | Qatar | Germany |
| Ethiopia | Kazakhstan | Jamaica | Russian Federation | Greece |
| Gambia, The | Kuwait | Macedonia, FYR | Slovak Republic | Hong Kong SAR |
| Ghana | Libya | Malaysia | Taiwan, China | Iceland |
| Guyana | Morocco | Mauritius | Trinidad and Tobago | Ireland |
| Honduras | Oman | Mexico | Turkey | Israel |
| India | Saudi Arabia | Montenegro | | Italy |
| Indonesia | Venezuela | Namibia | | Japan |
| Kenya | | Panama | | Korea, Rep. |
| Kyrgyz Republic | | Peru | | Luxembourg |
| Lesotho | | Romania | | Malta |
| Madagascar | | Serbia | | Netherlands |
| Malawi | | South Africa | | New Zealand |
| Mali | | Suriname | | Norway |
| Mauritania | | Thailand | | Portugal |
| Moldova | | Tunisia | | Puerto Rico |
| Mongolia | | Ukraine | | Singapore |
| Mozambique | | Uruguay | | Slovenia |
| Nepal | | | | Spain |
| Nicaragua | | | | Sweden |
| Nigeria | | | | Switzerland |
| Pakistan | | | | United Arab Emirates |
| Paraguay | | | | United Kingdom |
| Philippines | | | | United States |
| Senegal | | | | |
| Sri Lanka | | | | |
| Syria | | | | |
| Tajikistan | | | | |
| Tanzania | | | | |
| Timor-Leste | | | | |
| Uganda | | | | |
| Vietnam | | | | |
| Zambia | | | | |
| Zimbabwe | | | | |

**Table 2** Weights of the three subindexes per stage of development

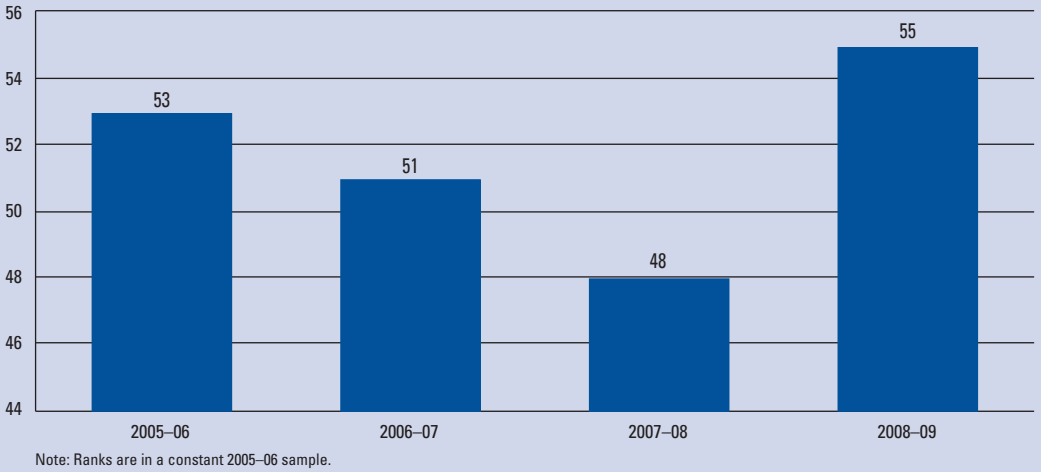
| Pillar group | Factor-driven stage (%) | Efficiency-driven stage (%) | Innovation-driven stage (%) |
|---|---|---|---|
| Basic requirements | 60 | 40 | 20 |
| Efficiency enhancers | 35 | 50 | 50 |
| Innovation and sophistication factors | 5 | 10 | 40 |

**Figure 2** Mexico competitiveness performance at a glance




Source: World Economic Forum 2008

**Figure 3** Mexico's evolution in the GCI ranking, 2005–08




Note: Ranks are in a constant 2005–06 sample.

last four years will also be included. This analysis will provide a useful starting point from which to identify areas of focus and corrective policies and actions.

Figure 2 provides a snapshot of Mexico's competitiveness by pillar in the GCI for 2008–2009. Figure 3 highlights the evolution of the country's performance for 2005–08 in comparison only to economies included in the 2005–06 sample.[12]

Tables 3 through 6 show rankings and scores for Mexico and selected countries/regions in the overall GCI 2008–2009 as well as for each subindex and pillar.

Mexico ranked 60th among 134 countries in the most recent GCI computation (55th in the constant 2005–06 sample, as shown in Figure 3). It placed among the most competitive economies in Latin America[13] and better than three of the ten countries in the comparative sample, namely Hungary (62nd), Turkey (63rd), and Brazil (64th). As Figure 3 shows, Mexico's competitiveness had been following an encouraging upward trend up to 2007. The fall in ranks observed from 2007 to 2008 can be mainly traced back to a worsening business perception in different dimensions assessed by the GCI. This can probably be linked to the US financial crisis and the rising levels of crime and violence observed in the country in the last year or so.

Mexico's performance in each of the 12 pillars (Figure 2) reveals a series of important flaws. These problems must be tackled if the country is to fulfill its competitive potential. Rankings in labor market efficiency (110th), institutions (97th), higher education and training (74th), and goods market efficiency (73rd) would seem particularly alarming given Mexico's stage of development. Indeed, as explained above, countries in the *efficiency-driven* stage derive their competitiveness from the efficiency enhancers and, to a slightly lesser extent, the basic requirements. Accordingly, Mexico's poor 90th place in innovation is not as worrisome as its 74th place in higher education and training; the country can con-

**Table 3** GCI 2008–2009 and its subindexes for Mexico and selected countries/regions

| | | | Basic requirements | | Efficiency enhancers | | Innovation factors | |
|---|---|---|---|---|---|---|---|---|
| Country/Region | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| Brazil | 64 | 4.23 | 96 | 3.98 | 51 | 4.28 | 42 | 4.04 |
| Chile | 28 | 4.72 | 36 | 5.15 | 30 | 4.58 | 44 | 4.00 |
| China | 30 | 4.70 | 42 | 5.01 | 40 | 4.41 | 32 | 4.18 |
| Hungary | 62 | 4.22 | 64 | 4.43 | 48 | 4.31 | 55 | 3.75 |
| India | 50 | 4.33 | 80 | 4.23 | 33 | 4.49 | 27 | 4.29 |
| Indonesia | 55 | 4.25 | 76 | 4.25 | 49 | 4.29 | 45 | 3.98 |
| Korea, Rep. | 13 | 5.28 | 16 | 5.71 | 15 | 5.15 | 10 | 5.20 |
| Russian Federation | 51 | 4.31 | 56 | 4.54 | 50 | 4.29 | 73 | 3.56 |
| South Africa | 45 | 4.41 | 69 | 4.41 | 35 | 4.46 | 36 | 4.13 |
| Turkey | 63 | 4.15 | 72 | 4.34 | 59 | 4.10 | 63 | 3.70 |
| **Mexico** | **60** | **4.23** | **60** | **4.47** | **55** | **4.16** | **70** | **3.60** |
| Latin America & the Caribbean average | | 3.92 | | 4.22 | | 3.77 | | 3.43 |
| OECD average | | 4.98 | | 5.40 | | 4.94 | | 4.72 |

Source: World Economic Forum 2008

**Table 4** Basic requirements for Mexico and selected countries/regions

| | Institutions | | Infrastructure | | Macroeconomic stability | | Health and primary education | | Basic requirements | |
|---|---|---|---|---|---|---|---|---|---|---|
| Country/Region | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| Brazil | 91 | 3.56 | 78 | 3.15 | 122 | 3.89 | 79 | 5.31 | 96 | 3.98 |
| Chile | 37 | 4.73 | 30 | 4.59 | 14 | 5.90 | 73 | 5.37 | 36 | 5.15 |
| China | 56 | 4.18 | 47 | 4.22 | 11 | 5.95 | 50 | 5.71 | 42 | 5.01 |
| Hungary | 64 | 3.94 | 57 | 3.85 | 115 | 4.20 | 49 | 5.74 | 64 | 4.43 |
| India | 53 | 4.23 | 72 | 3.38 | 109 | 4.32 | 100 | 4.99 | 80 | 4.23 |
| Indonesia | 68 | 3.89 | 86 | 2.95 | 72 | 4.91 | 87 | 5.26 | 76 | 4.25 |
| Korea, Rep. | 28 | 4.95 | 15 | 5.63 | 4 | 6.15 | 26 | 6.10 | 16 | 5.71 |
| Russian Federation | 110 | 3.29 | 59 | 3.75 | 29 | 5.55 | 59 | 5.59 | 56 | 4.54 |
| South Africa | 46 | 4.55 | 48 | 4.21 | 63 | 5.06 | 122 | 3.84 | 69 | 4.41 |
| Turkey | 80 | 3.72 | 66 | 3.54 | 79 | 4.79 | 78 | 5.33 | 72 | 4.34 |
| **Mexico** | **97** | **3.49** | **68** | **3.51** | **48** | **5.32** | **65** | **5.55** | **60** | **4.47** |
| Latin America & the Caribbean average | | 3.57 | | 3.22 | | 4.68 | | 5.41 | | 4.22 |
| OECD average | | 5.04 | | 5.11 | | 5.31 | | 6.13 | | 5.40 |

Source: World Economic Forum 2008



tinue to grow without generating much endogenous knowledge but it must be able to count on a pool of qualified and skilled labor to respond to its current challenges.

The rest of this section will focus on Mexico's performance in the three subindexes of the GCI and will assess its main shortcomings in each area.

## Basic requirements

As described above, transparent institutions, a sound macroeconomic environment, well-developed infrastructure, and a healthy and literate workforce are basic requirements for national competitiveness. They play a crucial role for *factor-driven* economies but are also very important for *efficiency-driven* economies, accounting for 40% of their overall GCI score.

Placing 60th, Mexico clusters with countries like Hungary (64th) and Russia (56th) for basic requirements. It largely outdoes Brazil (96th), India (80th), Indonesia (76th), and Turkey (72nd) as well as the Latin American average (4.47 for Mexico vs. 4.22 for the region). Yet the gap between the country, the best performers in the sample (Korea and Chile, ranked 16th and 36th respectively) and the average for the Organization for Economic Cooperation and Development (OECD) (5.40) highlights the magnitude of the challenge Mexico faces in its attempt to achieve first-class institutions, infrastructure, literacy, and public health standards and — to a lesser extent — stable macroeconomic fundamentals.

### Institutions

The institutional environment provides the framework within which individuals, firms, and the government interact to generate income and wealth in an economy. Its efficiency and transparency bear strongly on productivity and growth. "Competitiveness-friendly" institutions are ones that guarantee property rights and contract enforcement and operate in a fair and efficient manner; they also stimulate entrepreneurship, maintain macroeconomic stability, manage risk-taking by financial inter-

**Table 5** Efficiency enhancers for Mexico and selected countries/regions

| | Higher education and training | | Goods market efficiency | | Labour market efficiency | | Financial market sophistication | | Technological readiness | | Market size | | Efficiency enhancers | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country/Region | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| Brazil | 58 | 4.12 | 101 | 3.90 | 91 | 4.15 | 64 | 4.36 | 56 | 3.59 | 10 | 5.54 | 51 | 4.28 |
| Chile | 50 | 4.34 | 26 | 4.91 | 17 | 4.90 | 29 | 5.05 | 42 | 3.99 | 47 | 4.26 | 30 | 4.58 |
| China | 64 | 4.05 | 51 | 4.48 | 51 | 4.49 | 109 | 3.64 | 77 | 3.19 | 2 | 6.58 | 40 | 4.41 |
| Hungary | 40 | 4.51 | 66 | 4.20 | 83 | 4.23 | 61 | 4.42 | 40 | 4.21 | 45 | 4.28 | 48 | 4.31 |
| India | 63 | 4.06 | 47 | 4.52 | 89 | 4.16 | 34 | 4.98 | 69 | 3.27 | 5 | 5.96 | 33 | 4.49 |
| Indonesia | 71 | 3.88 | 37 | 4.67 | 43 | 4.59 | 57 | 4.48 | 88 | 3.02 | 17 | 5.11 | 49 | 4.29 |
| Korea, Rep. | 12 | 5.51 | 22 | 5.00 | 41 | 4.60 | 37 | 4.85 | 13 | 5.51 | 13 | 5.44 | 15 | 5.15 |
| Russian Federation | 46 | 4.40 | 99 | 3.90 | 27 | 4.74 | 112 | 3.60 | 67 | 3.36 | 8 | 5.71 | 50 | 4.29 |
| South Africa | 57 | 4.13 | 31 | 4.79 | 88 | 4.17 | 24 | 5.22 | 49 | 3.70 | 23 | 4.77 | 35 | 4.46 |
| Turkey | 72 | 3.87 | 55 | 4.38 | 125 | 3.57 | 76 | 4.11 | 58 | 3.53 | 15 | 5.16 | 59 | 4.10 |
| **Mexico** | **74** | **3.83** | **73** | **4.14** | **110** | **3.97** | **66** | **4.30** | **71** | **3.25** | **11** | **5.48** | **55** | **4.16** |
| Latin America & the Caribbean average | | 3.74 | | 4.01 | | 4.15 | | 4.12 | | 3.20 | | 3.43 | | 3.77 |
| OECD average | | 5.12 | | 4.94 | | 4.68 | | 5.11 | | 5.01 | | 4.81 | | 4.94 |

Source: World Economic Forum 2008

**Table 6** Innovation and sophistication factors for Mexico and selected countries/regions

| | Business sophistication | | Innovation | | Innovation and sophistication factors | |
|---|---|---|---|---|---|---|
| Country/Region | Rank | Score | Rank | Score | Rank | Score |
| Brazil | 35 | 4.58 | 43 | 3.50 | 42 | 4.04 |
| Chile | 31 | 4.65 | 56 | 3.35 | 44 | 4.00 |
| China | 43 | 4.50 | 28 | 3.87 | 32 | 4.18 |
| Hungary | 68 | 4.05 | 45 | 3.45 | 55 | 3.75 |
| India | 27 | 4.85 | 32 | 3.74 | 27 | 4.29 |
| Indonesia | 39 | 4.55 | 47 | 3.42 | 45 | 3.98 |
| Korea, Rep. | 16 | 5.22 | 9 | 5.18 | 10 | 5.20 |
| Russian Federation | 91 | 3.70 | 48 | 3.41 | 73 | 3.56 |
| South Africa | 33 | 4.62 | 37 | 3.64 | 36 | 4.13 |
| Turkey | 60 | 4.23 | 66 | 3.16 | 63 | 3.70 |
| **Mexico** | **58** | **4.24** | **90** | **2.95** | **70** | **3.60** |
| Latin America & the Caribbean average | | 3.97 | | 2.89 | | 3.43 |
| OECD average | | 5.05 | | 4.39 | | 4.72 |

Source: World Economic Forum 2008

mediaries, provide social insurance and safety nets, and enhance participation and accountability. The institutional framework is a key determinant of how a society distributes the benefits and costs of development strategies and policies. It also influences investment decisions and the way production is organized.

In addition, fair and competent private institutions have been long recognized by competitiveness experts and practitioners as a relevant complement to public institutions in generating an environment that is conducive to growth. This includes, for example, the role of corporate ethics and transparent accounting and reporting practices in maintaining investor and consumer confidence.

The institutions pillar assesses the quality of both public and private institutions, devoting separate subpillars to each, accounting for three-fourths and one-fourth of the final pillar score, respectively. The *public institutions* subpillar looks at a country's general legal framework (including the extent to which property rights are protected and enforced), public ethics standards, the efficiency of public administration, and the overall level of security (intuitively important to creating an environment where businesses can flourish). In turn, the *private institutions* subpillar includes elements of corporate ethics and accountability.

Mexico ranked 97th for institutions, making this pillar the country's second worst after labor market efficiency. The country fares poorly on this item when compared to the rest of the sample, outranking only laggard Russia (110th). The distance between Mexico and Korea (28th), Chile (37th), and South Africa (46th), as well as with the OECD average (5.04, as opposed to 3.49 for Mexico), is striking. Mexico's institutions have plenty of room for improvement — with one caveat: the pillar's overall rank conceals important differences in the quality of its public and private institutions; the former came in 102nd place but the latter a less worrisome 78th.

Institutional reforms have played a subordinate role to economic ones in Mexico's national debate and strategy

until very recently. Some have questioned this since the rule of law and well-functioning and trustworthy institutions are widely considered prerequisites for a vibrant market economy. Similarly, many experts believe that economic reforms should have been carried out in tandem with large-scale institutional transformations in the medium term.[14] Institutional weaknesses have undermined Mexico's capacity to reap the full advantages of economic liberalization in the past decade. Influential interest groups (monopolies, quasi-monopolies, and certain labor unions) have been able to hijack the political process and capture most of the new wealth. This has fuelled discontent about the results of the economic reforms among broad segments of the society.

The areas of concern in this pillar include: property rights protection (86th),[15] and weak ethical standards in the public sector (100th). The latter is also reflected in a very low trust of politicians (98th) and in the perceived favoritism in decisions made by government officials (90th). Red tape and inefficiencies remain important hindrances. Security is considered a problem, with the country ranked 123rd — Mexico's worst showing on any umbrella item. Contributing factors included rampant organized crime (127th), violence (125th), and a low level of trust in the police (124th). These factors are believed to impose significant costs to businesses. Indeed, violence has been on the rise, both in traditional drug-trafficking centers and in other areas. In response, one of President Felipe Calderón's first actions after being sworn in on December 1, 2006, was to deploy 24,000 soldiers to hot spots. An underlying problem is the country's extremely weak criminal justice system. Studies have shown that the probability of being arrested and brought before a judge after committing a crime is 3.3%.[16] Of all crimes reported, only 18.5% are fully investigated and resolved.[17] About 66% of convicts receive jail sentences of less than three years, meaning that about two-thirds of resources are spent in investigating, prosecuting, and punishing relative less serious offences; felonies such as drug trafficking and homicides receive less attention and continue to rise.[18]

A reform of the criminal justice system designed to improve accountability and transparency, restore trust and confidence among citizens, and ensure higher conviction rates should rank high on the national agenda. A bill approved by congress in February 2008 represents an important step; however, it is unclear whether the changes can be implemented. Additional desirable modifications would include: procedural and legal changes to reduce the time needed to resolve lawsuits; the creation of a civil service career structure in the police force and investigative agencies to make law enforcement more appealing as a profession and improve its reputation and thus help attract and retain talented and qualified people; improvements in the crime reporting process; greater emphasis on human rights; and an overhaul of the penitentiary system.

### Infrastructure

Well-functioning and extensive infrastructure plays a fundamental role in increasing an economy's potential for growth. Both the amount and quality of infrastructure make important contributions to the private sector's rates of productivity and investment.[19] Particularly critical are adequate roads, railroads, ports, and air transport; an uninterrupted electricity supply; and adequate telecommunications. Widespread, good-quality infrastructure can also help reduce inequality and poverty by connecting poor communities to markets, allowing children in remote areas to attend schools or get access to virtual education, and improving health standards by providing drinking water and sanitation services. Hulten found that approximately 40% of the growth differential between low- and high-growth countries can be traced to differences in the effective use of infrastructure.[20]

In the 1990s, Mexico made important progress in upgrading and extending its infrastructure, especially in terms of improved access to water and sanitation, electricity, and communications; however, relative to comparable countries it lost ground except in water and access to basic sanitation.[21] Mexico follows a trend observed for the rest of Latin America: it is estimated that the region would need to invest up to 6% of GDP in infrastructure catch up with Korea and keep up with China.[22]

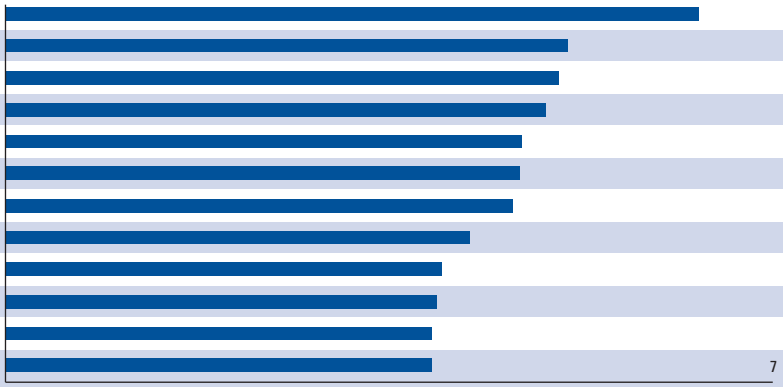
This mixed performance is reflected in the 68th ranking (score of 3.51) registered by Mexico in the infrastructure pillar. It places ahead of the Latin American average (3.22) and countries such as Indonesia (86th), Brazil (78th), and India (72nd) but well behind the top performers in the sample, Korea (15th) and Chile (30th), and the OECD average (5.11). In particular, the quality of the port infrastructure (94th) and electricity supply (87th) stand out as areas of concern.

In response to the above, the government announced a National Infrastructure Program in June 2007 to increase public and private investment in infrastructure through 2012. The program's goals include the modernization or construction of around 20,000 kilometers of highways and rural roads, the modernization and upgrading of existing road infrastructure, the expansion of the railway and airport systems, and investment in ICT infrastructure.[23] Financing that involves private-public partnerships (PPPs) will receive priority given limited public resources. The program should benefit from fortuitous trends in the capital markets, which have demonstrated a greater willingness to provide long-term financing in local currency. The World Economic Forum's Infrastructure Private Investment Attractiveness Index (IPAI),[24] developed in 2007 for 12 selected Latin American countries, can provide insight on the degree of Mexico's attractiveness for private investment in infrastructure.

The overall IPAI rankings (Mexico came in 5th of 12) and a snapshot of Mexico's environment for PPPs in infrastructure can be found in Figures 4 and 5, respectively. Among Mexico's strengths: a favorable macroeconomic

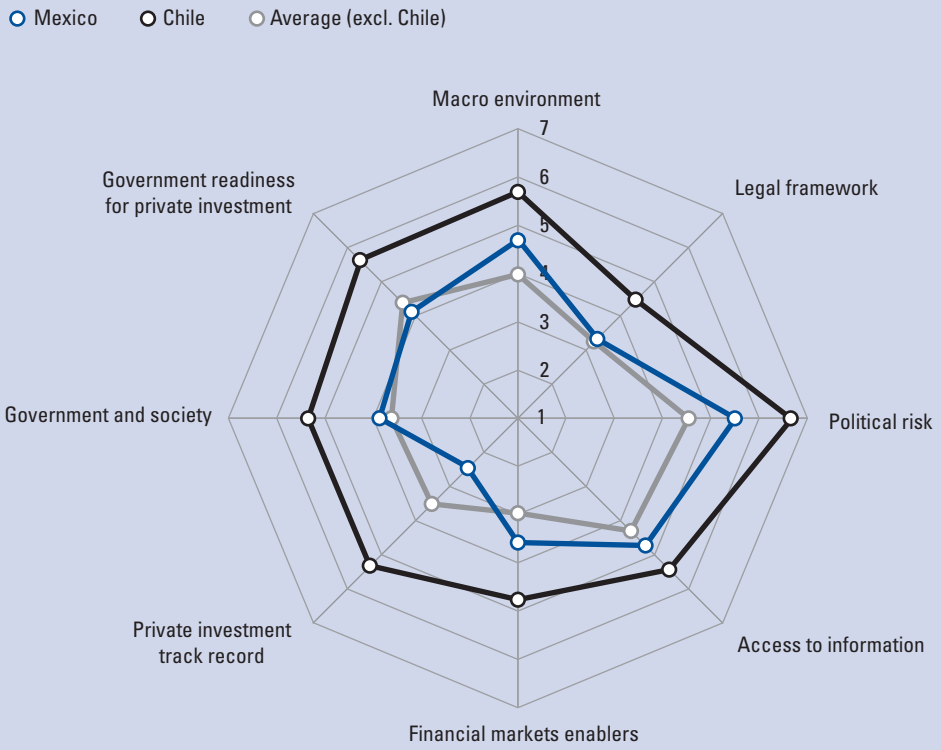
**Figure 4** IPAI ranking, 2007

| Rank | Country | Score |
|---|---|---|
| 1 | Chile | 5.43 |
| 2 | Brazil | 4.40 |
| 3 | Colombia | 4.33 |
| 4 | Peru | 4.23 |
| 5 | Mexico | 4.04 |
| 6 | Uruguay | 4.02 |
| 7 | El Salvador | 3.97 |
| 8 | Guatemala | 3.64 |
| 9 | Argentina | 3.41 |
| 10 | Venezuela | 3.37 |
| 11 | Bolivia | 3.34 |
| 12 | Dominican Republic | 3.33 |




Source: Mia et al. 2007

**Figure 5** Mexico's performance at glance in the IPAI




Source: Mia et al. 2007

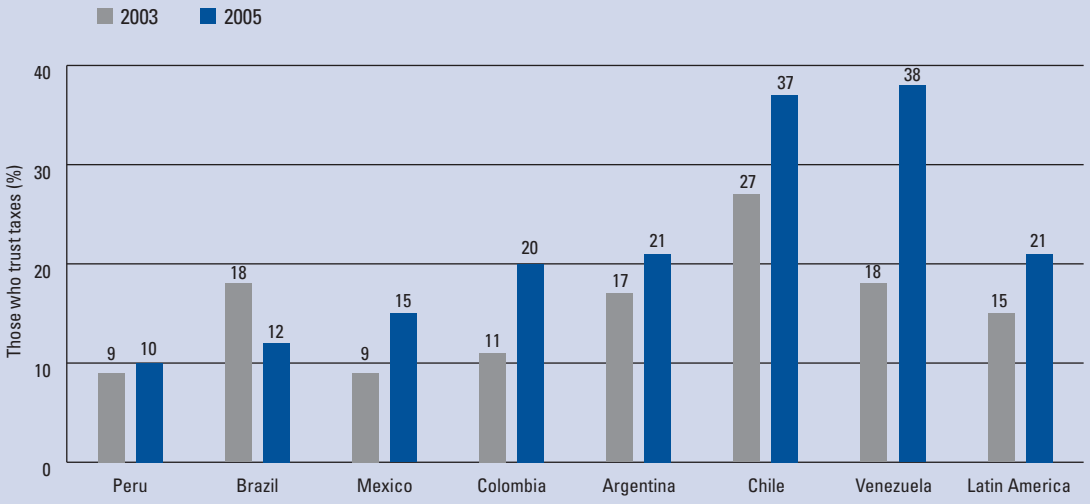
environment, including fairly well developed bond markets; low political risk; and easy access to information. On the downside, the country has a poor track record of private investment in infrastructure over the past decade (0.8% of GDP compared to the regional average 1.8%), and the government's low level of readiness to facilitate private investment in infrastructure, particularly in terms of the PPP legislation and degree of centralization of infrastructure strategy.

Some large-scale projects have been auctioned off and commissioned by the Federal Electricity Commission and Toll Road Rescue Trust (FARAC). The toll road auctions in particular seem to indicate a strong willingness in the private sector to assume investment risks in a stable macroeconomic environment. The government must try harder to improve the environment for PPPs, notably by ensuring that they are carried out by using resilient structures in financial and economic terms. It is hoped that this would encourage more private involvement in infrastructure projects for the benefit of all social stakeholders.

### Macroeconomic stability

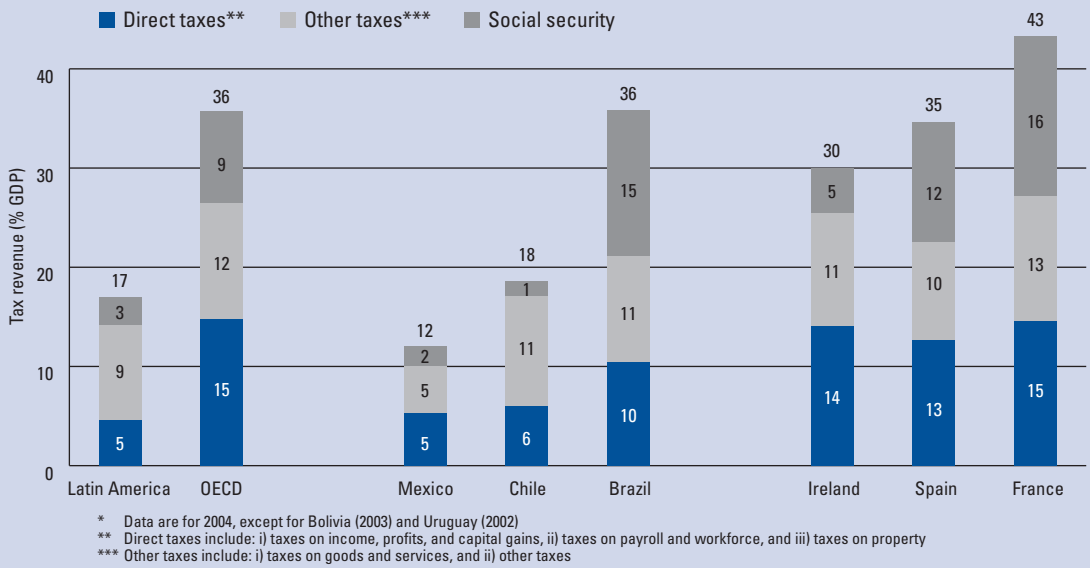
Strong macroeconomic fundamentals are a necessary condition for well-functioning and prosperous economies. They provide a sound environment in which businesses can operate and generate wealth. The GCI includes a macroeco-

**Figure 6** Citizen trust in public spending in Latin America, 2003 and 2005




Source: OECD Development Center 2007 (based on Latinobarometro)

**Figure 7** Tax revenues as a percentage of GDP: Mexico vs. selected countries/regions, 2004*




* Data are for 2004, except for Bolivia (2003) and Uruguay (2002)
** Direct taxes include: i) taxes on income, profits, and capital gains, ii) taxes on payroll and workforce, and iii) taxes on property
*** Other taxes include: i) taxes on goods and services, and ii) other taxes

Source: OECD Development Center 2007



nomic stability pillar among its basic requirements of competitiveness. This takes into consideration a handful of hard indicators such as government budget balance and debt, inflation, interest spreads and national saving rates.

Ranking 48th of 134 countries, Mexico has delivered a rather convincing performance on this dimension in recent years. This is especially significant given the country's recent history of cyclical financial crises that coincided with the end of each six-year presidential term. Relative to the sample group of countries/regions, Mexico ranks 5th of 11 on this item, behind extremely successful countries such as Korea (4th), China (11th), Chile (14th), and Russia (29th). With a score of 5.32, it also outperforms the Latin American average (4.68), matching the OECD average (5.31), and ranks well ahead of sample countries with dismal macroeconomic records such as Brazil (122nd), Hungary (115th), and India (109th).

Several factors have helped Mexico achieve an "investment grade" macroeconomic environment:[25] single-digit inflation, controlled by a constitutionally independent Central Bank; prudent fiscal policy, coupled with a flexible exchange rate regime, adopted following the "Tequila" crisis; the reduction of the government debt to a manageable level (22.7% of GDP); and efforts to change the debt profile from external to internal and from short-term to longer-term maturities.

Notwithstanding these positive developments, several shortcomings need to be addressed before Mexico can walk a stable macroeconomic path into the future. Particularly worrisome is the persistent and heavy dependence of public finances on oil revenues. Although

## Box 1: Energy reform

As described in the analysis of the macroeconomic stability pillar, the reform of the energy sector constitutes an important challenge, given the fiscal dependence on oil revenues and the lack of competition in the sector. The Mexican Constitution reserves the right to exploit national hydrocarbon resources to the state, and PEMEX operates on its behalf. Oil reserves fell in December 2007 by 5.1% from the previous year. At current substitution and extraction rates of approximately 3 million barrels per day,[1] proven oil reserves would last only nine more years. The investment rates of the past two years are not sufficient to increase the production rates,[2] or even to keep current production stable; on the contrary, the latter has been decreasing in the past two years.[3] In order to maximize Mexico's oil wealth and production stability in the medium-term, important and rapid changes in PEMEX's efficiency and financial performance as well as investment decisions and operations are needed. A new fiscal regime was introduced in 2006, in order for PEMEX to have additional resources, but the newly available funds are not sufficient given the importance of the investment needed. In addition, given the long delays in making investments operational in the industry, new alternative financing mechanisms for PEMEX's investments are of utmost importance. For this to materialize, reform of the company's corporate governance is essential to align management incentives with efficiency. The discovery of new oil deposits largely depends on major investment with technologies not currently available to PEMEX. In order to have access to these technologies, the state will most likely have to enter into joint ventures with private oil companies or international state-owned energy groups. On a related note, PEMEX's own social security regime should also be aligned to the recently reformed civil servants regime and possibly to the private-sector regime.[4]

The government needs to find ways to maximize the value of national oil resources. State-owned oil companies in other countries, such as Petrobras and StatOil, have been able to use competition generated by energy policy reforms not only to become global energy players, but also to share calculated risks with private oil companies in order to maximize their national energy resources.

The current monopoly in oil refining and hydrocarbons distribution has often come at the expense of consumers. A national energy reform agenda should aim at aligning worker productivity in national energy companies to international standards, creating a management structure that allows for greater flexibility and efficiency in investment, deregulating further barriers to private-sector investment in secondary energy sectors such as natural gas, oil refining, and electricity distribution and transmission.

Currently a constitutional energy reform is being discussed in Congress to address some of these challenges. While some of the changes envisaged would be historic, given Mexico's long-standing stance against foreign participation in the oil sector, the new regulation may fall short of attracting investment from the major oil companies and helping the country to extract more oil in the short term, given that it does not provide for equity shares in the exploration and extraction projects, but rather intends to compensate international companies in cash for their services. Private capital participation in refining and transportation activities will probably also remain excluded. Limitations in refining activities may be especially worrisome, considering that Mexico increasingly uses foreign refineries to process the majority of its oil, missing the opportunity to add value to hydrocarbons and remaining focused on selling crude oil.

On a more positive note, the reform will allow PEMEX to work more closely with the private sector and have more managerial autonomy.

[1] http://www.rigzone.com/news/article.asp?a_id=58467
[2] Between US$13 and US$15 billion per year.
[3] According to PEMEX, Mexico's oil production has been declining from 3.2 mbpd in May 2006 to 2.9 mbpd in February 2008. Source: www.pemex.com
[4] Of the approximately 140,000 employees in 2005, over 12,000 were involved in non core activities such as medical and telecommunication services.



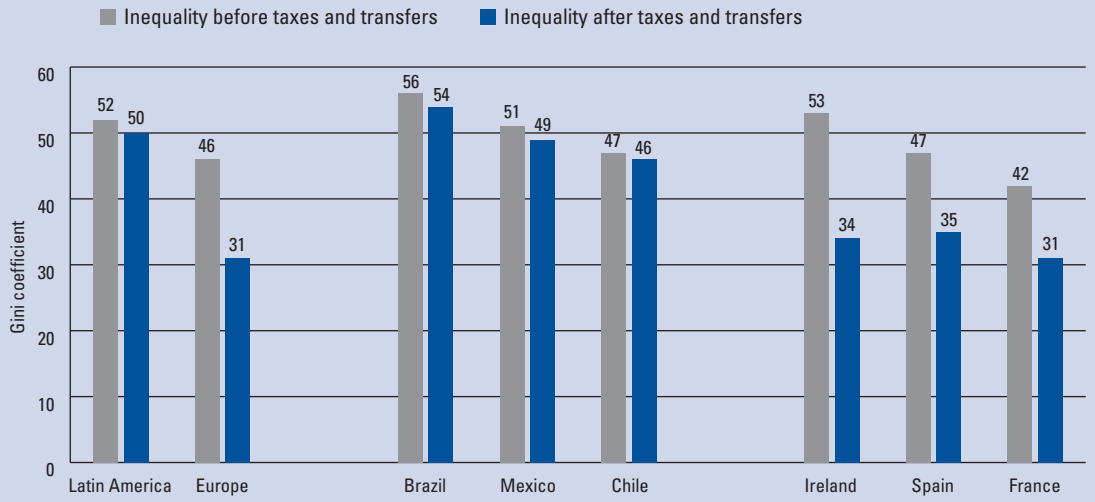
important advances have been made to improve the budget process,[26] increasing transparency and introducing fiscal rules to address the volatility of revenues from the state energy company PEMEX, the government has managed to only marginally increase non-oil tax revenues (see Box 1). Petroleum revenues still accounted for approximately 36% of the total in 2007. One problem is the low level of citizen trust and confidence in public spending (evidenced by Mexico's 80th position on its perceived wastefulness); this engenders widespread tax evasion.

The low level of fiscal legitimacy in Mexico, including in comparison to the Latin American average and most countries in the region, is demonstrated in Figure 6. On a more positive note, the levels of trust toward public spending seem to have risen from 2003 to 2005.

Tax revenues as a percentage of GDP stand at 12%, far behind the OECD average (36%) and even lower than Latin American (17%), as demonstrated by Figure 7.

A fiscal reform bill approved by the Mexican Congress in 2007 is expected to increase tax revenues by 2% of GDP over the current six-year administration. Measures include allowing states to levy an additional sales tax on goods and services and an "informality tax" of 2% on cash deposits exceeding 20,000 pesos. This is an encouraging step, but it will need to be complemented by efforts to improve tax collection, enlarge the extremely narrow tax base by pulling people out of informality, and rationalize the tax system. A slew of exemptions —

**Figure 8** Inequality and taxes




Source: OECD Development Center 2007 (based Goñi et al. 2006)

notably for agriculture, forestry, fishing, and pharmaceuticals — add to the complexity of the tax system and the potential for evasion. Moreover, some studies have shown that these exemptions are not progressive but regressive and do not reach their intended target, poor Mexicans. A recent study concluded that less than 10% of the subsidies related to exemptions in the value-added tax reach the poorest 20% of Mexicans.[27]

Any important fiscal adjustment in the medium term will have to be linked to an energy reform package, given the size of PEMEX's contribution to public finances. Mexico clearly needs energy reform not only to improve the efficiency of its markets in goods and services but also to make public finances less dependent on oil revenues. This will be discussed further in the analysis of the market efficiency pillar below.

The role of fiscal policy in reducing income inequality must also be taken into consideration. One interesting study analyzes the measure of inequality most commonly used by economists, the Gini coefficient, after taxes and transfers (see Figure 8).[28] Goñi et al. conclude that, while Europe succeeds in reducing its inequality on average by 15% through tax expenditures and transfers, the corresponding percentage for Mexico is a disappointing 2%. The authors argue this can be largely explained by two factors: transfers in Latin America average 7.3% of GDP compared to 14.7% in Europe; and Europe's better targeted and more progressive tax and transfer systems.

### Health and primary education

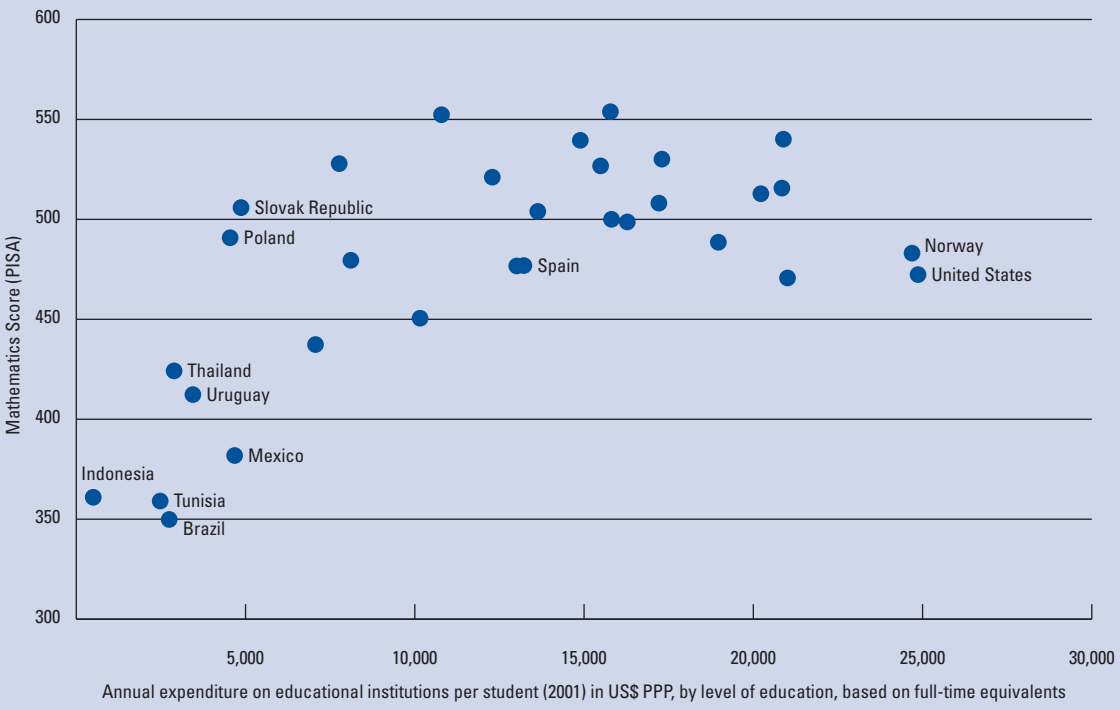
A healthy and literate workforce is key to a country's potential to improve its productivity and competitiveness. Workers in poor health cannot function to their full potential and create significant costs for businesses. Likewise, basic education fosters human resource efficiency by enabling employees to correctly perform tasks and adapt to the changing needs of the production system. Examples of the positive cause-and-effect relationship between measures of health and education and per capita income growth abound in the economic literature. Recent studies demonstrate the importance not only of full enrollment but also of the quality of education.

With a score of 5.55, Mexico ranked 65th in this pillar, after Korea (26th), Hungary (49th), China (50th), and Russia (59th) in the sample. It is worth noting that Mexico outperforms the regional star economy Chile, which came in 73rd in health and primary education. Nevertheless, Mexico lags well behind the OECD average (6.13), which suggests that there is still much left to do.

Mexico ranks 62nd in health quality. Although good by Latin American standards, health indicators remain far below those of most OECD countries. The government faces important challenges in providing universal access to basic healthcare services, notably because of the large informal sector. The level of public spending as a share of total healthcare spending has been increasing, but remains 45% of the total, well below the 73% OECD average. Only about half of the population is covered by health insurance, and there are large regional disparities between the richer north and the poorer south in terms of insurance coverage, public healthcare expenditure, and standards of quality. At around 6.5% of GDP in 2005, total spending in healthcare was quite low in comparison to the OECD average (8.9%).[29]

Given the country's demographics, health costs are bound to grow. Thus improved access to preventive care for uninsured citizens represents a priority.[30] According to the OECD, the Mexican government appears on track to meet this goal by 2010. At the same time, schemes known as *Oportunidades* (Opportunities) and *Progresa* (Progress) have been providing cash since the 1990s to some 5 million poor families so that they can go to health clinics, receive health education, and keep their children in school.[31]

**Figure 9** Investment in education vs. performance in math




Source: OECD Development Center 2007



Given the desire of the government to achieve universal healthcare coverage, new PPP mechanisms should be explored to share these tasks with the private sector. Successful in other countries, "build, operate and transfer" (BOT) mechanisms should be favored over privatization.[32] BOT schemes allow the private sector to play a greater role in providing services while ensuring quality through pre-established agreements on standards.

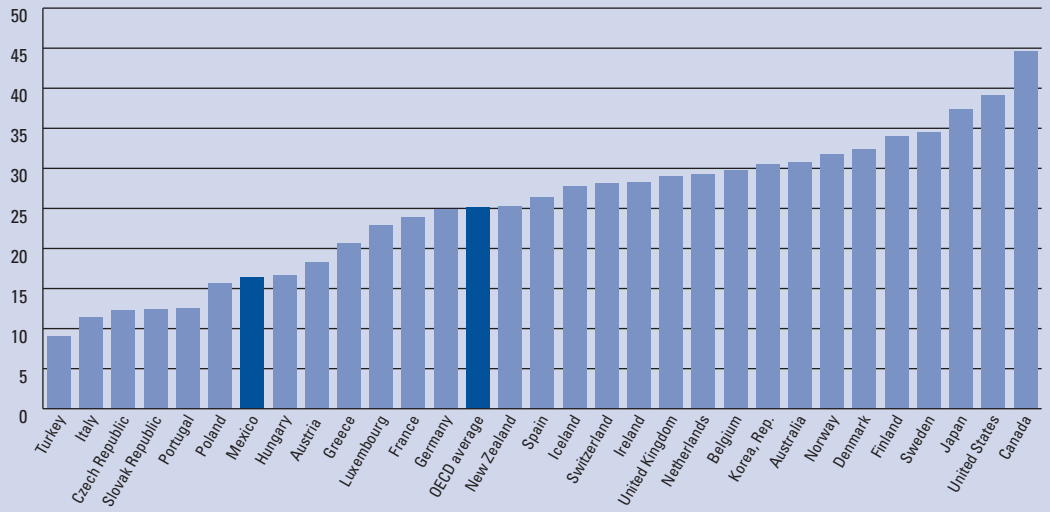
Mexico ranks 66th in the *primary education* subpillar. The country has achieved almost universal enrollment in primary education (97.8% according to the latest data from the United Nations Educational, Scientific and Cultural Organization, UNESCO), and it invests heavily in education (5.3% of GDP, corresponding to a 31st position out of 134 economies). Yet the quality of the primary education system is a major issue (116th). Investment in education has increased significantly over the past 15 years. Data from the Ministry of Finance show that public expenditures on education rose from 3.7% of GDP in 1990 to an estimated 5.9% of GDP in 2005. This compares to an OECD average of 5.6%. Private spending on education has also increased in the past decade, from about 0.2–0.3% of GDP in the first half of the 1990s to 1.5% in 2004.[33]

The relatively high outlays for education suggest that the problem is not how much but rather how resources are invested. Mexican 15-year-olds score poorly in the OECD's standardized tests (the Program for International Student Assessment, PISA) compared to their counterparts in Thailand and the Slovak Republic, countries with similar levels of spending (see Figure 9).[34] As much as 90% of expenditures in 2005 were earmarked for wages (80% for teachers and 10% for support staff) even though 60% of primary school teachers did not have a university degree and 70% of secondary school instructors had no teacher training, according to the OECD.[35]

The powerful teachers union, the National Union of Education Workers (SNTE), the largest labor union in Latin America, has been in large part responsible for blocking reforms that would increase the quality of spending and help ensure equal access to education. Poor teacher performance and learning outcomes are associated with the SNTE-dominated, centralized collective bargaining for many work rules, according to one study.[36] In 1992, the SNTE reached an agreement that would allow for additional negotiations and grant the union greater bargaining power at the state level.[37] While it is hampering the educational reform process, the union is also extracting rents. This will be further described in the section below on the efficiency of markets for goods and services.

Evidence suggests that quality, measured in terms of the knowledge that the students acquire that can be measured by cognitive tests, is critical to economic growth. Thus urgent action is needed to de-politicize the educational system and therefore allow for more flexibility in curriculum development and the hiring and training of teachers and incentive schemes linked to student performance.

**Figure 10** Percentage of adults 25–64 who have attended higher educational institutions, 2004




Source: OECD 2007d

## Efficiency enhancers

As other countries at a similar stage of development, Mexico relies in large part on efficiency enhancers to ensure sustained economic growth. These include: good-quality higher education, efficient factor markets, the capacity to make use of existing technology (notably ICT) in one's domestic production system, and a market large enough to enable economies of scale. Accordingly, these efficiency enhancers have a 50% weight in the overall GCI score for Mexico.

Mexico, with a score of 4.16, is ranked 55th in this subindex, outperforming Turkey (59th) and the Latin American average (3.77). But it still languishes among the worst on this score (see Table 5) and lags well behind the OECD average (4.94). The country displays a very mixed performance across the pillars, with ranks stretching from 11th (market size) to 110th (labor market efficiency).

### Higher education and training

The importance of an efficient higher education and training system to provide an adequate pool of skilled and trained labor cannot be overstated. This is especially true for countries that have reached higher (*efficiency-* or *innovation-driven*) development stages; for them, low-cost production provides less of a competitive advantage. Higher education is also key to fostering the absorption of technology and innovation. Countries constantly featured at the top of the Forum's competitiveness rankings — such as the United States, the Nordic countries, and smaller economies such as Israel and Singapore — all share a common focus on higher education in their recent developmental histories.

The quality of higher education, especially for math and science, has long been a concern for Latin America, and Mexico is no exception. Ranked 74th, the country lags behind the rest of the sample, clustering with countries such as Indonesia (71st) and Turkey (72nd). It is worth noting how fellow OECD member Korea, often put forward as top competitor for Mexico, ranked 12th on the higher education and training pillar. This could partly explain the different growth paths followed by these countries in the last two decades.

Enrollment rates in Mexico for secondary and tertiary education are fairly poor: 87.2% and 26.1%, respectively, according to the most recent data available from UNESCO, putting Mexico in the 67th and 74th positions, respectively. This problem is compounded by an especially gloomy assessment of the quality of the educational system (109th), notably in math and science (127th). In the latest PISA survey, conducted by the OECD in 2006, Mexico placed below the OECD average of 500 points in science (413), math (406), and reading (410) — chalking up one of the worst performances among the 57 countries assessed. Only 3% of Mexican students reached the highest levels in the 2006 PISA science scale, compared to an OECD average of 9%.[38] The poor results by 15-year-olds on this standardized test have a direct effect on completion rates in higher education (see Figure 10) — a disappointing 16.4% for Mexico, placing the country below the OECD average (25.2%) and far below top OECD performers, such as the United States, Canada, and Korea (30.5%).

Those Mexicans who do graduate from college tend to get degrees in the social sciences, law, and professional services (43.6% according to OECD in 2002). Only 13.9% receive diplomas in engineering, for instance.[39] Again this is in marked contrast with Korea, which boasts the highest percentage of graduates in engineering (27.4% in 2002) in the OECD. The lack of progress in

areas such as engineering is considered an obstacle to innovation.[40]

In order to make the higher educational system more responsive to the needs of an *efficiency-driven* economy, greater emphasis should be placed on adopting OECD standards of learning. This should include changes in the curriculum to focus on subjects important for a rapidly changing world, such as languages and ICT, as well as scientific and technical training. Efforts should be made to recruit students into these majors.[41]

On a more positive note, Mexico deserves recognition for the quality of its management schools (53rd) and the relative availability of specialized research and training services (55th).

### The efficiency of markets for goods and services

Well-functioning markets for goods and services ensure that resources are allocated to their most appropriate uses. This provides an economy with the right mix of products based on supply-and-demand conditions. As mentioned above, this becomes particularly important for countries as they move to higher development stages, since their competitiveness increasingly rests on efficient production systems and markets. Key underpinnings to efficient markets for goods and services include healthy standards for competition among economic actors, both national and foreign, and adequate demand conditions. Market structures that undermine competition cause higher prices, diminished supply, and higher costs to society than competitive conditions. Lack of competition is probably the biggest hindrance to entrepreneurship, innovation, and — ultimately — socioeconomic progress. In this spirit the goods market efficiency pillar analyzes the extent to which government regulations and interventions create distortion, including agricultural policies, anti-monopoly policies, taxation, and the regulatory framework for opening and operating a business.

With an overall rank of 73rd for the efficiency of its goods and services markets, Mexico is placed in the same league as countries like Hungary (66th). It outperforms Russia (99th), Brazil (101st), and the Latin American average (4.14 for Mexico vs. 4.0). Mexico has a long way to go to match the world-class efficiency of Korea (22nd), Chile (26th) and South Africa (31st). It also lags behind the OECD average (4.94).

The GCI highlights some areas of particular concern regarding the standards of competition in Mexico: the extent of market dominance and the effectiveness of the anti-monopoly policy are assessed very poorly, 103rd and 92nd, respectively. Barriers to foreign and national private investment remain high, particularly in some services and infrastructure sectors, such as telecommunications, energy, and domestic land transportation. Other problematic aspects include the extent and effect of taxation (89th), the cost of the current agricultural policy (105th), and trade openness (105th for the trade-weighted tariff rate). In particular, Mexico's average most favored nation (MFN) tariff remains higher than the average of middle-income countries; this fact is becoming more relevant as trade increases with countries that are not part of preferential agreements.

On a positive note, it has become easier to set up a business in the last two years. Notably the number of days required to get started dropped from 58 in 2006 to 27 days in 2008.

The country opened its economy in the late 1980s and privatized several key companies in the 1990s. These policies drastically reduced the extent of state intervention in the economy and liberalized trade.[42] Yet the GCI assessment reflects the need to follow through on these initiatives to promote greater efficiency in the markets for goods and services. The parameters for competition remain far from perfect for most parts of the Mexican economy. For example, as mentioned above, the powerful teachers' union SNTE extracts rents in the education sector thanks to its *de facto* monopoly position; many firms have difficulty obtaining financing because of the country's history of high concentration in banking and capital markets; the energy sector needs greater competition and a shift in strategy to ensure long term sustainability; and an onerous social security system encourages people to remain in the informal sector.

The lack of competition in important non-tradables dampens capital investment and reduces total factor productivity. It also hoists a heavy burden on local producers who venture into international markets, saddling them with higher production costs and unreliable supplies. Utilities (notably natural gas and electricity) present quality problems and high prices, which make them among the world's most expensive. Unionized workers in the petroleum, telecommunications, and teaching sectors earn significantly higher wages than their peers in other industries with similar levels of education and experience, according to household survey data for the 2000–04.[43] Petroleum workers earned 71% more, telecommunications workers 30% more, and teachers 48% more than would be expected. This contrasts with a small 7% premium for workers in manufacturing, where most companies face international competition.

One major problem here is the lack of independence of regulatory agencies in Mexico. The Central Bank is a notable exception, but most regulatory bodies in Mexico depend on the executive branch for funding and personnel. They have limited authority to impose and collect fines.[44]

### Labor market efficiency

Flexible labor markets ensure that the workforce is allocated as efficiently as possible. They are critical to improving competitiveness in all economies. This is even more so for countries that are competing mainly on high-value-added goods in dynamic markets that require continuous adjustments in national production systems; the labor market must be flexible enough to allow workers to gravitate to whatever the key sectors are at a given time.

Well-functioning labor markets can also help reduce poverty and foster social equality. This is especially true for countries such as Mexico that are characterized by very unequal income distribution and widespread hardship.[45]

With a score of 3.97, Mexico is ranked a disappointingly low 110th for labor market efficiency, by far its worst assessment among the 12 pillars of competitiveness. This is particularly troubling since the country's competitiveness rests crucially on the efficiency of factor markets. Mexican labor markets are assessed as second to last in the sample, outperforming only Turkey (125th) and lagging behind even the regional average (4.15). Moreover, the impressive showings of regional leader Chile (17th), Korea (41st), and the OECD average (4.68) demonstrate the magnitude of the challenge for Mexico in this realm.

The GCI assessment reflects the inflexibility of the formal labor market in Mexico. Extremely burdensome labor regulations include high firing costs (still worth 52 weeks of salary, even after an encouraging decrease from last year of 22.30 days, according to the World Bank, 81st out of 134 countries)[46] and high payroll taxes (including social contributions).[47] Coupled with an onerous and inefficient tax system, these factors hinder labor mobility, keep human resources "trapped" in low productivity sectors, discourage training, and cause job shortages in the most dynamic sectors.[48] In such a context, salaries are not allowed to play their essential role in allocating labor according to demand; indeed, wages do not reflect the productivity of economic sectors well. In fact, salaries rose more than productivity in 1995–2004, according to the *Instituto Mexicano para la Competitividad* (Mexican Competitiveness Institute, IMCO).

An overregulated labor market offers a powerful incentive for informality. The informal market accounted for over 60% of the active labor force in 2006 and is estimated to have absorbed 475,000 out of an estimated annual 700,000 jobs generated by the Mexican economy from 2000 to 2006.[49] This has serious implications for social equality and national productivity since informal jobs tend to be unstable, poorly paid, and offer diminishing returns. The informal market also reduces the tax base, compromising the stability of public finances, as mentioned in the section on macroeconomic stability.

The Calderón administration pushed through changes in the pension system for civil servants in March 2007. Among the new rules is one allowing for the portability of pensions across sectors. However, structural reforms are still required to make the system less rigid and enable the labor market to allocate workers according to the needs of the production system. These reforms must be accompanied by better education and training; labor mobility can only make a difference in conjunction with a labor pool that consists of people who are skilled, eager to learn, and constantly improving their qualifications.

### Financial market sophistication

The present global financial crisis has underlined the importance of efficient financial markets for the good functioning of national economies. A sophisticated and efficient financial system is indeed an important feature of any competitive economy, especially in higher stages of development. Comparative country studies tend to find that the depth of the financial system predicts future economic growth, physical capital accumulation, and improvements in economic efficiency — even after controlling for initial income levels, education, and a variety of policy indicators.[50] Some studies even suggest that developing deep and efficient financial systems is correlated not only with a healthy economy, but also with poverty reduction and lower income inequality.[51]

Development of the financial system contributes to economic growth by reducing the costs of acquiring and processing information, helping investors diversify risks, and reducing monitoring costs. As a consequence, it improves resource allocation. In the absence of intermediaries, economic agents would have to assume the large cost of evaluating every business, firm, manager, sector, and whatnot before deciding where to put their savings. Intermediaries handle these tasks, cutting the cost of acquiring information and improving the assessment of investment opportunities. Financial intermediaries also encourage innovation by helping to identify entrepreneurs with the best and potentially most profitable ideas and products, thus reinforcing the Schumpeterian process of "creative destruction."[52]

The financial market sophistication pillar gauges the sophistication and efficiency of the financial system and its soundness and trustworthiness. It analyzes variables such as the ease of obtaining bank loans, the soundness of banks, the ease of raising money on the local stock market, and the availability of venture capital. With an overall score of 4.30, Mexico ranked 66th on this pillar, just above the Latin American average (4.12). Mexico lagged over 40 positions behind the best country in the sample, South Africa (24th), and the best Latin American performer, Chile (29th). It also fell well behind the OECD average (5.11).

As evidenced by a remarkable 21-position improvement from 2006 in the pillar, Mexico's financial systemhas been recovering from the endemic fragility of the past caused by macroeconomic instability and recurring financial crises. Several factors have contributed to the soundness and profitability of the banking sector since the "Tequila" crisis: important changes in oversight,consolidation, and more openness to foreign investment.[53] The inflow of foreign investment helped the consolidation process along and brought in knowledgeable people with expertise in areas such as credit analysis.[54] These changes led to dramatic increases in efficiency.

**Table 7** Banking infrastructure (per million inhabitants)

| Country | Branches | ATMs | Terminals with services |
|---|---|---|---|
| United Kingdom | 619 | 1,122 | 18,982 |
| Mexico | 109 | 311 | 2,742 |
| Chile | 135 | 328 | n/a |
| Brazil | 136 | 1,101 | 9,374 |
| Canada | 534 | 1,824 | 20,538 |
| United States | 457 | 1,645 | 15,012 |

Source: IMCO 2007

Nevertheless, important challenges remain. Small and medium enterprises and consumers still find it difficult to obtain capital, a fact highlighted by Mexico's low marks for the ease of access to loans (95th), venture capital availability (99th), and financing through the equity markets (77th).[55] Behind these rankings is a vicious circle of scarce credit and the inadequate protection of legal rights. Creditors find it hard and time-consuming to obtain judicial orders that will allow them to execute collateral and guarantees. This of course makes them less inclined to expand credit. Furthermore, the real estate and property registry databases, essential for the corroborating information on collateral, use outdated computer systems or still work with paper files. Thus creditors must wade through difficult and lengthy processes to verify ownership, and check existing liens and related information.

Underlying the problems of access to capital is the still insufficient banking infrastructure. This can be observed in Table 7.

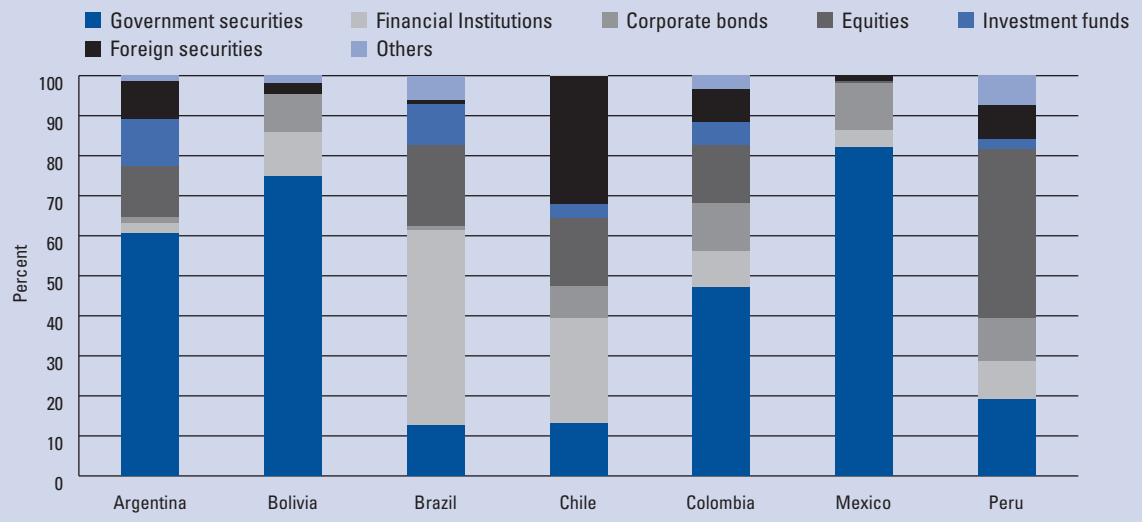
The lack of venture capital and private equity is also problematic, especially since these kinds of capital are used to finance start-ups and foster innovation. In 1999–2004, Latin America received 1% of all private equity flows worldwide; Mexico captured 18% of that. This is related to the negative returns in the region (-10.7%) during that turbulent period, economist and former Secretary of Finance Aspe Armella has argued.[56] He links the underdevelopment of the private equity industry in Mexico to fiscal disincentives, limited institutional participation, and barriers to using initial private offerings (IPOs) as exit strategies for private equity investments. The limited participation of pension funds in private securities crucially undermines the development of the private equity industry.[57]

Good news can be found in the development of Mexico's capital markets, especially for fixed income instruments. This has been driven by a clear public debt management strategy designed to gradually open up participation in the primary market for securities auctions and introduce a market-making scheme for government debt. This has helped increase secondary market liquidity. Annual debt management strategies were announced and a quarterly auction calendar was made available to investors. This helped boost domestic debt from 8% of GDP in 1994 to 22% in 2004.[58] Structured finance operations in the local market have also experienced significant growth in recent years. From 2000 to 2005, total domestic issuance increased from US$65 million to US$4.9 billion, accounting for 40% of the region's total issuance, with most of the activity concentrated in securitized accounts receivables, toll roads, and mortgage backed securities. This was significantly boosted by the creation in 2001 of the *Sociedad Hipotecaria Federal* (Federal Mortgage Society), the second-tier development bank providing a variety of innovative financing alternatives to bank and non-bank firms.

Furthermore, Mexico's derivatives market has greatly developed in recent years. The growth in the use of futures and forwards has been remarkable. The largest derivatives market locally is Over the Counter (OTC) and the most widely traded instruments are currency options, forwards, cross-currency swaps, and interest-rate swaps and futures on the IPC Index, the main Index in the Mexican Stock Exchange. At the end of 2005, the notional amount outstanding in the OTC market stood at US$530 billion. There is also an active market for derivatives in the organized exchange, MexDer, which began operations in 1998 and has seen an interesting development, with an increase of daily average traded during 2006 vs. 2005 of up to 170% for TIIE future, 120% for IPC future, 109% for Dollar future, 367% for IPC Option, 81% for M10 future.

Changes in pension funds and their regulation would contribute to the further development of equity and corporate debt capital markets.[59] Managers of mandatory pension funds operate under strict rating restrictions; they are allowed to invest only in the highest rated securities. This has led to the concentration of investment in both equities and bonds in a small number of companies.[60] Furthermore, pension funds invest heavily in government debt, which accounts for 70% of their assets (see Figure 11). They shy away from the production sector, and play little if any role in strengthening the corporate governance of companies they do invest in. By contrast, in Brazil over 100 companies have adhered to São Paulo Stock Market's *Novo Mercado* (New Market), which admits only firms that voluntarily agree to certain standards of corporate governance, and pension funds work closely with companies preparing IPOs.[61] Voluntary collaboration between issuers and providers of capital has helped improve corporate gover-

**Figure 11** Distribution of portfolio's investment in Mexico




Source: OECD Development Centre 2007

nance in Brazil. In turn more funds are flowing from Brazilian fund managers and from abroad, and both the stock market index and trading volume have shot up.[62]

In Mexico, regulations that hamper the healthy diversification of pension assets should be re-examined with an eye toward achieving more diversification while preserving world-class standards of asset quality.



### Technological readiness

In today's globalized world, technology has increasingly become an essential element for firms that hope to compete and prosper. Given its impact on production processes across different sectors and industries, ICT, in particular, now plays a central role in boosting national productivity.

Technology is important for low-income and developed economies alike, but what really matters for countries like Mexico is the availability of knowledge — no matter what the source. At its current stage of development, Mexico does not need to generate knowledge to continue to grow. It can still benefit from the integration of foreign technology in its production processes and everyday life. The technological readiness pillar assesses precisely this aspect, together with ICT penetration.

With a score of 3.25, Mexico ranked 71st in this pillar, clustering with countries like Russia (67th) and India (69th) and outperforming China (77th), and, by a small margin, the Latin American average (3.20). The country continues to lag behind the OECD average (5.01) as well as Hungary (40th), Chile (42nd), and especially bellwether Korea (13th). Korea could serve as a source of inspiration for Mexico. That country offers a textbook example of how to quickly and advantageously join the knowledge economy. Korea followed an integrated public-private strategy focused on ICT, innovation, and education. Massive investment in education and ICT infrastructure established an environment favorable to further advances in information technology, more public-private partnerships and coordination, and cooperation between firms and universities. Korea also managed to attract high-tech multinationals and take advantage of their spillovers to foster a local knowledge-based intermediate goods industry.[63]

Mexico's performance in individual variables demonstrates how far the country has to go catch up with the world's most networked economies in ITC penetration,[64] technology availability (92nd), and the ability of its firms to absorb technology (92nd). In particular, Mexico is among the OECD countries that have least invested in ICT. Fixed and mobile telephony and Internet hosting have grown dramatically in the last five years, by 21% and 67%,[65] respectively, but Internet use remains fairly low (16.9% in 2005, according to the International Telecommunication Union, ITU) by OECD standards. Korea, for instance, boasts 71% growth over the last five years.

Mexico ranked 60th for the variable on FDI and technology transfer. But despite considerable incoming FDI flows (see Figure 12) associated with at least some technology transfer, the country does not appear to have fully taken advantage of an impressive set of competitive advantages that include a unique geographic location and the young labor force to insert itself into the global knowledge-based value chain. Poor education standards, the lack of a centralized innovation policy, and underdeveloped ICT infrastructure all stand as obstacles.

### Market size

A sufficiently large market is central to improving productivity. It allows firms to benefit from economies of scale, in turn encouraging them to invest in research and development (R&D), innovate, and constantly improve their production processes. Since relevant markets

increasingly stretch beyond national borders, the GCI includes in its assessment both domestic and foreign markets.

With a score of 5.48, Mexico ranked a satisfactory 11th for the size of its market, in the same league as Russia (8th), Brazil (10th), and Korea (13th). On this score it outperforms both the Latin American (3.43) and OECD (4.81) averages. A very large domestic market (ranked 12th out of 134) is further extended by exports (32.5% of its GDP). It ranks 16th for the size of its foreign market.

In terms of domestic market, Mexico's population is nearly 110 million, and purchasing power is growing. Recently attained macroeconomic stability, stronger growth, expanding credit, and social programs for the poor have contributed to a marked reduction in the percentage of Mexicans under the poverty line (from 37% in 1996 to 14% in 2006) and the emergence of a more robust middle class. The number of families that earn between US$600–US$1,600 a month jumped from 5.7 million in 1996 to 10.7 million a decade later.[66]

The most recent demographic trends bode well for a further expansion of the domestic market. For the first time in decades, the economically active population outnumbers the rest of the population (i.e. the sum of retired population and children).[67] And the trend is expected to last another 30 years. If supported by investment in human and physical capital, productivity and growth prospects could benefit as the domestic market grows.

The size of Mexico's foreign market is boosted by its extensive network of free trade agreements. Mexico is a world leader in signing such pacts. It has inked deals that involve 43 countries on three continents — translating into a potential market of one billion consumers.[68] Since the early 1990s, Mexico has concluded free trade agreements with countries and regions as diverse as Chile (1992), the United States and Canada (NAFTA, 1994), Venezuela and Colombia (the G3 Free Trade Agreement, 1995), Israel (2000), the European Union (2000), and Japan (2005). Mexico is also an active member of important regional forums, such as the Asia Pacific Economic Cooperation Association, the Latin American Integration Association, and the Free Trade Area of the Americas.

NAFTA has provided Mexico with free access to its main market, the United States. From NAFTA's inception to 2005, regional trade in North America grew by 128% to a record US$772 billion. NAFTA has also served as a catalyst for attracting FDI to Mexico and helped it diversity its exports.

Figures 12 and 13 show the evolution of Mexico's FDI inflows and manufactured exports, respectively, for the last few decades. FDI increased from US$11 billion in 1994 to US$19 billion in 2006,[69] roughly equivalent to 3% of GDP. FDI is helping Mexico shift from low- to higher-tech manufacturing. And since restrictions on foreign ownership in banking were lifted in the 1990s, it has bolstered the financial sector. Mexico is also beginning to get some traction from its geographical location — especially in the automotive (5% of FDI) and other sectors in which competitiveness relies on transportation costs and just-in-time logistics. In these sectors, the country is increasingly integrated into the production and distribution systems of the United States.

Exports have also become more diversified. Mexico's exports were dominated by manufactured products (80.7%) in 2007, of which 44.7% came from the *maquiladora* assembly sector.[70] This magnifies a trend observed in the region. Commodity exports in Latin America declined from over 50% to 30% from 1985–87 to 1999–2002. Foreign sales of manufactured products rose from 50% to over 70% during the same period.[71]

## Innovation and sophistication factors

The capacity to generate innovation and produce unique value-added products via sophisticated production processes is a central driver of competitiveness for countries that have reached the last and most advanced stage of development, as explained above. Mexico has not reached the *innovation-driven* stage yet; therefore, innovation and sophistication factors are not yet crucial to the country's sustained growth. Thus these factors account for only 10% of its overall GCI score.

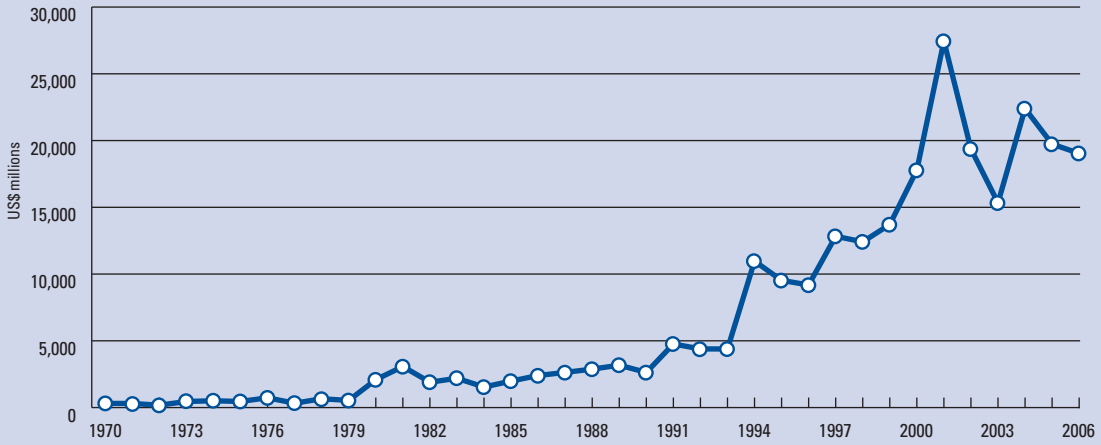
The country came in 70th for innovation and sophistication (with a score of 3.60), putting it among the worst performers in the sample, just after Russia (73rd). Nevertheless, Mexico outperformed the Latin American average (3.43). Also the innovation and sophistication factor subindex is the worst ranked across the three GCI subindexes.

### Business sophistication

The business sophistication pillar captures elements at the microeconomic level that affect a healthy and competitive business environment. The operations, strategies, and business networks of sophisticated firms help them achieve greater efficiency in the production of goods and services. They foster productivity and, therefore, competitiveness. Important elements include the quantity and quality of suppliers, the presence of effective clusters, well-developed production processes, the nature of a firm's competitive advantage, and the extent to which a firm controls international distribution and marketing. Business sophistication is especially critical for firms operating at the top end of value chains, which are mainly located in high-income countries. However, it is bound to become increasingly important for *efficiency-driven* economies such as Mexico as they move along the development path.

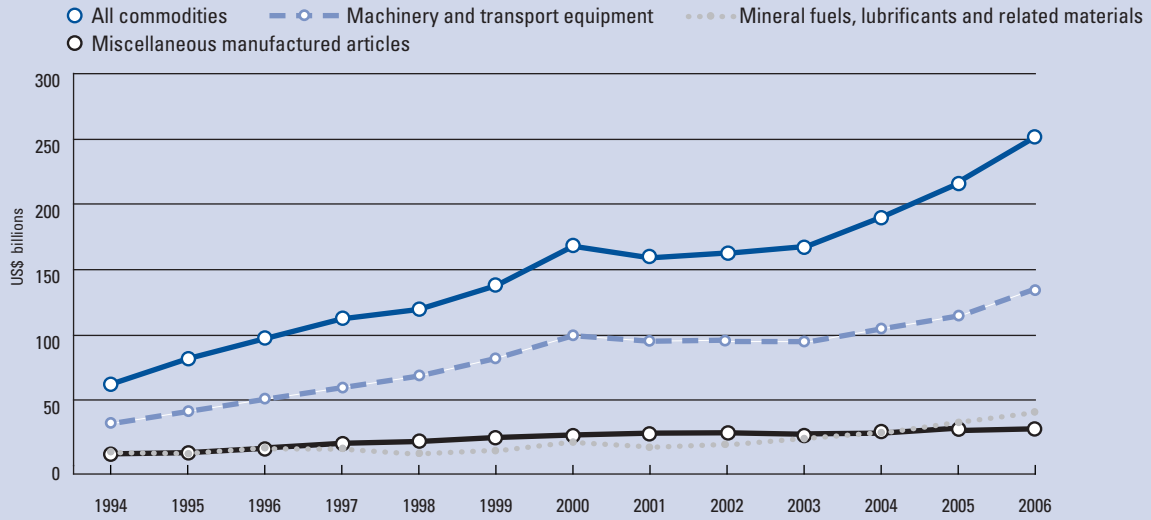
For its development level, Mexico displays a fairly sophisticated business sector, reflected in a 58th overall rank (corresponding to a 4.24 score). Contributing to this score are relatively developed clusters (58th), good-

**Figure 12** FDI flows to Mexico, 1970–2006




Source: UNCTAD 2007

**Figure 13** Evolution of main exports, 1994–2006




Source: United Nations 2008



quality local suppliers (46th), and a fairly broad value chain (59th), among other factors. Within the sample, Mexico ranks lower than similarly *efficiency-driven* economies like South Africa (33th) and Brazil (35th), but it outperforms important comparators such as Russia (91st), Hungary (68th), and Turkey (60th) and tops the Latin American average (3.97).

This rather strong performance reflects Mexico's diversification. Many firms operate quite high up in the value chain and produce sophisticated, value-added goods. Assembly *maquiladoras* represent just one aspect of Mexico's production landscape. The country has been at the forefront of the recent *multilatinas* phenomenon, by which Latin American companies successfully expand globally thanks to superior technology and organization.[72] One of the largest cement producers in the world, with US$18 billion in annual sales in 2006,[73] CEMEX is a textbook example of a *multilatina*. The company has expanded operations abroad through acquisitions, rolling out an efficient business model (built around extremely advanced IT systems) beyond the region to places such as the United States, Indonesia, the Philippines, and the United Kingdom.

### Innovation

Innovation is widely seen as a strategic driver of national competitiveness in the long run. It is the only "good" that does not suffer from diminishing rates of return. This is especially true for countries that are on the technological frontier. For them, the capacity to generate new and innovative products or processes becomes essential for sustained growth. As mentioned above, Mexico can still benefit from adopting external sources of technology. However, with an eye toward the future, it should begin to attempt to realize its own innovative potential. Any national development strategy should include as a goal the establishment of an environment that is friendly to and encourages innovation.

With a rather mediocre score of 2.95, Mexico ranked 90th for its innovation potential, last in the sample — 24 places behind second-to-last Turkey (66th) and 81 positions behind Korea (9th). One look at the OECD average (4.39) provides an idea of how much ground Mexico has to make up.

Innovation has traditionally been a weak point for Latin America, and this is confirmed by the low regional average in the innovation pillar (2.89). Very much in line with the regional performance, Mexico displays important weaknesses in most dimensions relevant to innovation, including investment, university-business cooperation, and scientific and technological potential. Capacity for innovation and spending on R&D are assessed as quite low (at 67th and 71th, respectively). Research institutions receive a sub-par rating (79th), and university-industry research collaboration is judged insufficient (84th). Nor does the government seem to be using its procurement policy to foster innovative and efficient high-tech products (104th) or to provide adequate protection for intellectual property rights (82nd). The insufficient pool of scientists and engineers (105th) is also a concern, as highlighted above in the section on the higher education and training pillar.

The lack of focus on innovation is evident in the low per capita number of registered patents per million population for Mexico, i.e., 0.5 in 2007. Though this is not far from the regional average,[74] it compares poorly with emerging economies such as Taiwan (270.4), Israel (158.1), and Korea (130.9). Indeed, Mexico fell among the OECD countries with the lowest R&D investment relative to GDP (0.5%) and industry R&D investment relative to value-added (0.3%) in 2005.[75] With respect to business R&D investment, a note of optimism can be introduced: the private sector has been consistently increasing its participation in national R&D,[76] from 14.28% to 41.90% in 1992–2005, according to the *Red de Indicadores de Ciencia y Tecnologia RICYT -Iberoamericana e Interamericana* (Network on Science and Technology Indicators).[77] Moreover, Mexico has increased the share of business R&D financed by the government from 2.8% in 1995 to 5.7% in 2005 and has adopted important tax incentives to support innovation among companies. According to the OECD,[78] one unit of R&D expenditure by firms resulted in 0.37 units of tax relief.

## Conclusions

This paper has underlined the significant progress made by Mexico in the last decade or so toward creating a strong foundation for sustained competitiveness. At the same time, it has not been shy about pointing out shortcomings and challenges.

The country has broken free from endemic macroeconomic instability. It has made impressive strides toward opening, liberalizing, and improving the efficiency of its economy. It has also diversified its economy. Yet a number of important weaknesses remain in key areas.

Among the *efficiency-enhancers*, overly rigid labor markets and imperfect competition conditions in the goods and services markets hamper economic efficiency. They need to be addressed by further liberalization and structural reforms. The poor quality of the higher education system, reflected in the unsatisfactory performance of Mexican students on international tests, is a major cause of concern. As for other countries whose competitiveness is hinged on efficient production systems and markets, Mexico needs a qualified, constantly learning and adaptable workforce. In addition, Mexico also suffers from an insufficient pool of graduates in math, science, and engineering. This reduces the capacity of Mexican firms to advance further in the value chain. National innovation and the capacity to absorb and adapt foreign technology are also hurt.

Mexico continues to display serious shortcomings in some of the *basic requirements* of competitiveness. The quality of its institutions is worrisome. The list of problems is long: poor public governance, rampant corruption, low levels of citizen trust in politicians, widespread red-tape and government inefficiency, an onerous tax system with a small tax base, and an inefficient legal framework. Epidemic levels of crime and violence impose considerable costs on businesses, not to mention ordinary Mexicans. This is well understood by policymakers, but further action is urgently required.

At the same time, Mexico is a country of great potential, with a unique geographical position, a young population, and a rapidly expanding market. This potential must and can be fulfilled by a joint effort of all political parties, the business sector, and civil society to address the deficiencies highlighted above. Only then can the country take advantage of its diverse competitive advantages and ensure sustained growth and enduring prosperity for its citizens.

The current administration deserves credit for efforts to end the political deadlock that dominated the terms of its two immediate predecessors. The government has managed to push important bills through congress, including pension reform for public employees, fiscal reform, electoral reform, and reform of the criminal justice system. It is also currently negotiating a long overdue energy reform bill. These are significant steps in the right direction. They will increase productivity and foster growth, provided they are duly implemented. Consensus building continues to be a priority, coupled with a focus on action and diligent execution. Furthermore, the resilience of Mexico's economy is being put to the test by the current global financial turmoil, given its strong dependency on the US business cycle. The government will need to address the challenges brought on by the economic slowdown, while also tackling the significant crime and violence surge observed in its territory in recent times, by reinforcing trust in public institutions and the rule of law.

## Notes

1 With a US$893 billion economy in 2007, according to the IMF 2008.

2 According to the United Nations Conference on Trade and Development (UNCTAD) 2007, Mexico attracted around US$19.04 billion in 2006, ahead of Brazil (US$18.78 billion) and Chile (US$7.950 billion).

3 United Nations Population Fund 2008.

4 See *Consejo Ejecutivo de Empresas Globales* (Executive Council of Global Enterprises) 2006, page 48.

5 EIU 2008a.

6 For a more detailed analysis of the GCI, see Sala-i-Martin et al. 2008.

7 The classification adopted here is a slightly modified version of Michael Porter's theory of stages of development (Porter 1990). For further details, see Sala-i-Martin et al. 2008.

8 Countries are allocated to the different stages of development according to their GDP per capita at market exchange, as a proxy for wages. This criterion is then corrected with a second one measuring the extent to which countries are *factor driven*, using as proxies the share of exports of primary goods in total exports (goods and services). We assume that countries that export more than 70% of primary products are to a large extent *factor driven*.

9 The weights have been derived from a growth regression using three decades of data using as proxies the main categories included in the GCI.

10 For a more in-depth analysis of the survey's process and methodology, see Browne et al. 2008.

11 The list of countries chosen for the comparative sample includes Chile, the top performer in Latin America, the BRICS countries (Brazil, Russia, India, China, and South Africa), Korea and Indonesia in Asia, and Turkey and Hungary in Europe. Also the regional average scores for Latin America and the OECD are taken into account, given Mexico's double "nature" as a Latin American country and an OECD member.

12 Our analysis is conducted on a constant 2005–06 sample, meaning Mexico's rankings among only the economies included in the 2005–2006 GCI computation, excluding the economies included for the first time in 2006–07, 2007–08, and 2008–09. That is, taking into account only the 117 included in 2005–06.

13 After Chile (28th), Puerto Rico (41st), Barbados (47), Panama (58th), and Costa Rica (59th).

14 Hausmann et al. 2004.

15 According to Business Software Alliance 2006, 65% of the software bought in Mexico comes from counterfeit or illegal sources; this points to a high degree of non-observance of copyrights.

16 Zepeda 2004.

17 Ibid.

18 Zepeda 2006. Zepeda reports that in 2006, 213,000 individuals were in jail (of whom 92,000 had not been sentenced), with a daily minimum fiscal cost of US$3.2 million.

19 Borensztein et al. consider good quality infrastructure, in particular in transportation and telecommunications, as a key determinant in attracting FDI. See Borensztein et al. 1998.

20 Hulten 1996.

21 Mia et al. 2007.

22 Fay and Morrison 2005.

23 EIU 2007.

24 For further details on the IPAI's concept and methodology, see Mia et al. 2007.

25 Currently for Standard & Poor's at BBB+ with a stable outlook.

26 Important reforms started under Pedro Aspe Armilla's tenure as secretary of finance.

27 Larre et al. 2007.

28 Goñi et al. 2006.

29 EIU 2007.

30 This effort is being carried out via the *Sistema de Proteccion Social en Salud* (System of Social Security in Heath), centered on a voluntary health insurance schemes), and *Seguro Popular* (Popular Insurance), financed mainly by contributions from federal and state governments, with means-tested contributions from affiliates.

31 The World Bank found that these programs significantly helped to raise enrollment rates. Similarly, improvements in health and nutrition linked to the program have also been striking, as measured by increases in the height of children and reductions in the incidence of disease. See World Bank 2006.

32 In other countries, BOT mechanisms have proven an efficient way of involving the private sector and transferring some of the risks to it, while achieving the most important goal of providing a quality service.

33 EIU 2007.

34 Developed jointly by OECD member countries through the OECD's Directorate for Education, the PISA gauges the degree to which 15-year-old students, approaching the end of compulsory education, have acquired some of the knowledge and skills essential for full participation in the knowledge economy. PISA surveys are conducted every three years and focus on science, math, and reading. The last survey conducted in 2006 included 57 countries, up from 41 in 2003, covering close to 90% of the world economy. Further information can be found at: www.pisa.oecd.org.

35 OECD 2005.

36 Guerrero et al. 2006.

37 World Bank 2006.

38 OECD 2007a.

39 This is also reflected in the survey data on the availability of scientists and engineers, included in the innovation pillar, for which Mexico ranked 105th.

40 Murphy et al. provide evidence suggesting that countries with a higher proportion of engineering college majors grow faster, whereas countries with a higher proportion of law graduates are less dynamic. See Murphy et al. 1991.

41 See IMCO 2007.

42 As already mentioned, the signing of NAFTA and other trade agreements allowed the country to diversify away from primary commodities and develop an important manufacturing sector and other higher-value-added industries. Manufactured goods exports expanded by 11% per year in dollar terms on average in the 10 years to 2005, compared with 6% for the OECD on average (OECD 2007b).

43 Guerrero et al. 2006.

44 The Federal Communication Commission can impose fines, but it has little ability to enforce them. This depends on the judicial system. At the same time, the Federal Telecommunication Commission can only give recommendations to the corresponding ministry. It lacks independent enforcement powers.

45 The most recent Gini coefficient for Mexico was 46.1, lower than Brazil (57.0), but much higher than Korea (31.6). See World Bank 2008.

46 Unlike Chile, Mexico has not significantly liberalized the labor legal framework in the wake of the market reforms of the 1990s. The framework remains very much the one established by the 1917 constitution and the federal labor law adopted in 1970. Over flexibility and efficiency, priority is given to the protection of workers rights. These include the provision of a minimum salary, severe restrictions on forms of employment other than permanent contracts, a protection mechanism for workers in work-related disputes, and promotion criteria based on seniority and "unionization" rather than competence (the so called *"Escalafón ciego"*).

47 Mexico is ranked 89th in the variable for non-wage labor cost, estimated by the World Bank at 21% of total salary. On a positive note, the cost has been brought down from last year, when it accounted for 23.9% of total salary.

48 Although McKinsey (in Farrell et al. 2007) ranks Mexico 2nd in its index of the most attractive offshore centers (given its low labor cost and attractive geographical position), it warns about the difficulties encountered by companies in finding suitable talent, especially for high-skilled jobs.

49 *Instituto Mexicano del Seguro Social* (Mexican Social Security Institute 2006), quoted in IMCO 2007.

50 De la Torre and Schmuckler 2007; and Levine et al. 2000.

51 Levine 2005.

52 Rajan and Zingales 2003.

53 Restrictions on foreign ownership in the banking sector were lifted in 1998.

54 According to the EIU, by 2006 80% of banking sector assets was controlled by foreign investors, notably by BBVA-Bancomer, Banamex, HSBC and Banco Santander Mexicano. See EIU 2007c.

55 In the past decade a decrease, not an increase, in the numbers of issuers has been observed. Market capitalization as a percentage of GDP is less than

25%, four times less than in the developed world or Chile, according to the Bolsa Mexicana de Valores (BMV, Mexican Stock Market, www.bmv.com.mx).

56 IMCO 2007.

57 Rather than increasing direct buying of equities and participating on the boards of companies listed in the stock exchange, pension managers have tended to limit most of their exposure in equities to Exchange Traded Funds. Thus they are not active shareholders.

58 De la Torre et al. 2007.

59 In 1997 an important reform was passed changing the pay-as-you-go system to a fully funded one with individual accounts.

60 In 2004, 93% of all corporate debt on the balance sheets of pension funds was rated AA or higher, while in the equity markets 10 firms represented 70% of the value traded (see BMV website, available at: www.bmv.com.mx).

61 *Novo Mercado* is a listing segment designed for shares issued by companies that voluntarily agree to abide by corporate governance practices and transparency requirements in addition to those already required by the Brazilian law and the Brazilian Securities and Exchange Commission. Given its voluntary nature, it is widely thought that the *Novo Mercado* is a success because both investors and companies consider corporate governance obligations to be advantageous.

62 As of February 2008, Brazil became the largest emerging market in the Morgan Stanley Capital International Global Emerging Market index, accounting for 14.95% of the index. In 2002, Brazil accounted for just 5.3% (see www.mscibarra.com).

63 For a full account of the different competitiveness strategies followed by Mexico and Korea, see Villareal Ramos and Villareal Arrambide 2006.

64 Ranked 80th, 63th, 55th, and 56th, respectively, for mobile telephone subscribers, Internet users, personal computers, and broadband Internet subscribers.

65 OECD 2007c.

66 The Economist 2007c.

67 According to the *Consejo Nacional de Población* (National Council of Population) (quoted in *Consejo Ejecutivo de Empresas Globales* 2006), the number of children per fertile mother has decreased from 7 to 2.1 from the 1970s to 2005.

68 See http://www.gob.mx/wb/egobierno.

69 UNCTAD 2007.

70 The *maquiladora* or *maquila* system has been one of the main forms of offshoring to Mexico from the United States. It takes advantage of the duty-free regime between the two countries. The numerous *maquiladoras*, clustered along the US-Mexico border, assemble products from imported material and equipment, which are then re-exported to the United States.

71 ECLAC-CEPAL 2004.

72 According to Alfaro and Hammel, the average number of foreign deals for the largest Latin American countries (home of most *multilatinas*) has increased from four per year in 1993 to 40 in the late 1990s and early 2000s. See Alfaro and Hammel 2006.

73 The Economist 2008.

74 Chile, Argentina, and Uruguay, the best performers in the region in this respect, display 1.5, 0.9 and 0.9 patents per million population, respectively. Costa Rica and Brazil follow at 0.7 and 0.5, respectively (see US Patent and Trademark Office 2008).

75 OECD 2007c.

76 The government and universities still accounted for 40.69% and 7.22%, respectively, in 2005.

77 RICyT 2007.

78 OECD 2007c.

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# Annex 1: Structure of the Global Competitiveness Index 2008–2009

This annex presents the structure of the Global Competitiveness Index 2008–2009 (GCI).

The numbering of the variables matches the numbering of the Data Tables in the *The Global Competitiveness Report 2008–2009*. The number preceding the period indicates to which pillar the variable belongs.

The hard data indicators used in the GCI are normalized on a 1-to-7 scale in order to align them with the Executive Opinion Survey's results.[a]

Those variables that are followed by the symbol[1/2] enter the GCI in two different places. In order to avoid double counting, we give them a half-weight in each place by dividing their value by 2 when computing the aggregate score for the two categories in which they appear.[b]

The percentage next to each category represents this category's weight within its immediate parent category. The computation of the GCI is based on successive aggregations of scores, from the variable level (i.e., the lowest level) all the way up to the overall GCI score (i.e., the highest level), using the weights reported above. For example, the score a country achieves in the 9th pillar accounts for 17% of this country's score in the Efficiency enhancers subindex. Similarly, the score achieved on the Networks and supporting industries subpillar accounts for 50% of the score of the 11th pillar. Reported percentages are rounded to the nearest integer, but exact figures are used in the calculation of the GCI.

The weight of each of the three subindexes (Basic requirements, Efficiency enhancers, and Innovation and sophistication factors) depends on each country's stage of development, as discussed in the text.[c]

## Basic requirements

Weight (%) within immediate parent category

### 1st pillar: Institutions ..... 25%

**A. Public institutions ..... 75%**

1. Property rights ..... 20%
   - 1.01 Property rights
   - 1.02 Intellectual property protection[1/2]
2. Ethics and corruption ..... 20%
   - 1.03 Diversion of public funds
   - 1.04 Public trust of politicians
3. Undue influence ..... 20%
   - 1.05 Judicial independence
   - 1.06 Favoritism in decisions of government officials
4. Government inefficiency ..... 20%
   - 1.07 Wastefulness of government spending
   - 1.08 Burden of government regulation
   - 1.09 Efficiency of legal framework
   - 1.10 Transparency of government policymaking
5. Security ..... 20%
   - 1.11 Business costs of terrorism
   - 1.12 Business costs of crime and violence
   - 1.13 Organized crime
   - 1.14 Reliability of police services

**B. Private institutions ..... 25%**

1. Corporate ethics ..... 50%
   - 1.15 Ethical behavior of firms
2. Accountability ..... 50%
   - 1.16 Strength of auditing and reporting standards
   - 1.17 Efficacy of corporate boards
   - 1.18 Protection of minority shareholders' interests

### 2nd pillar: Infrastructure ..... 25%

**A. General infrastructure ..... 50%**

- 2.01 Quality of overall infrastructure

**B. Specific infrastructure ..... 50%**

- 2.02 Quality of roads
- 2.03 Quality of railroad infrastructure
- 2.04 Quality of port infrastructure
- 2.05 Quality of air transport infrastructure
- 2.06 Available seat kilometers (hard data)
- 2.07 Quality of electricity supply
- 2.08 Telephone lines (hard data)

### 3rd pillar: Macroeconomic stability ..... 25%

- 3.01 Government surplus/deficit (hard data)
- 3.02 National savings rate (hard data)
- 3.03 Inflation (hard data)[d]
- 3.04 Interest rate spread (hard data)
- 3.05 Government debt (hard data)

### 4th pillar: Health and primary education ..... 25%

**A. Health ..... 50%**

- 4.01 Business impact of malaria[e]
- 4.02 Malaria incidence (hard data)[e]
- 4.03 Business impact of tuberculosis[e]
- 4.04 Tuberculosis incidence (hard data)[e]
- 4.05 Business impact of HIV/AIDS[e]
- 4.06 HIV prevalence (hard data)
- 4.07 Infant mortality (hard data)
- 4.08 Life expectancy (hard data)

**B. Primary education ..... 50%**

- 4.09 Quality of primary education
- 4.10 Primary enrollment (hard data)
- 4.11 Education expenditure (hard data)[1/2]

## Efficiency enhancers

### 5th pillar: Higher education and training ..... 17%

**A. Quantity of education ..... 33%**

- 5.01 Secondary enrollment (hard data)
- 5.02 Tertiary enrollment (hard data)
- 4.11 Education expenditure (hard data)[1/2]

**B. Quality of education ..... 33%**

- 5.03 Quality of the educational system
- 5.04 Quality of math and science education
- 5.05 Quality of management schools
- 5.06 Internet access in schools

**C. On-the-job training ..... 33%**

- 5.07 Local availability of specialized research and training services
- 5.08 Extent of staff training

### 6th pillar: Goods market efficiency ..... 17%

**A. Competition ..... 67%**

1. Domestic competition ..... variable[f]
   - 6.01 Intensity of local competition
   - 6.02 Extent of market dominance
   - 6.03 Effectiveness of anti-monopoly policy
   - 6.04 Extent and effect of taxation[1/2]
   - 6.05 Total tax rate (hard data)[1/2]
   - 6.06 Number of procedures required to start a business (hard data)[g]
   - 6.07 Time required to start a business (hard data)[g]
   - 6.08 Agricultural policy costs
2. Foreign competition ..... variable[f]
   - 6.09 Prevalence of trade barriers

6.10 Trade-weighted tariff rate (hard data)
6.11 Prevalence of foreign ownership
6.12 Business impact of rules on FDI
6.13 Burden of customs procedures
10.04 Imports as a percentage of GDP (hard data)

**B. Quality of demand conditions ..... 33%**
6.14 Degree of customer orientation
6.15 Buyer sophistication

### 7th pillar: Labor market efficiency ..... 17%

**A. Flexibility ..... 50%**
7.01 Cooperation in labor-employer relations
7.02 Flexibility of wage determination
7.03 Non-wage labor costs (hard data)
7.04 Rigidity of employment (hard data)
7.05 Hiring and firing practices
6.04 Extent and effect of taxation[1/2]
6.05 Total tax rate (hard data)[1/2]
7.06 Firing costs (hard data)

**B. Efficient use of talent ..... 50%**
7.07 Pay and productivity
7.08 Reliance on professional management[1/2]
7.09 Brain drain
7.10 Female participation in labor force (hard data)

### 8th pillar: Financial market sophistication ..... 17%

**A. Efficiency ..... 50%**
8.01 Financial market sophistication
8.02 Financing through local equity market
8.03 Ease of access to loans
8.04 Venture capital availability
8.05 Restriction on capital flows
8.06 Strength of investor protection (hard data)

**B. Trustworthiness and confidence ..... 50%**
8.07 Soundness of banks
8.08 Regulation of securities exchanges
8.09 Legal rights index (hard data)

### 9th pillar: Technological readiness ..... 17%

9.01 Availability of latest technologies
9.02 Firm-level technology absorption
9.03 Laws relating to ICT
9.04 FDI and technology transfer
9.05 Mobile telephone subscribers (hard data)
9.06 Internet users (hard data)
9.07 Personal computers (hard data)
9.08 Broadband Internet subscribers (hard data)

### 10th pillar: Market size ..... 17%

**A. Domestic market size ..... 75%**
10.01 Domestic market size index (hard data)[h]

**B. Foreign market size ..... 25%**
10.02 Foreign market size index (hard data)[i]

## Innovation and sophistication factors

### 11th pillar: Business sophistication ..... 50%

**A. Networks and supporting industries ..... 50%**
11.01 Local supplier quantity
11.02 Local supplier quality
11.03 State of cluster development

**B. Sophistication of firms' operations and strategy ..... 50%**
11.04 Nature of competitive advantage
11.05 Value chain breadth
11.06 Control of international distribution
11.07 Production process sophistication
11.08 Extent of marketing
11.09 Willingness to delegate authority
7.08 Reliance on professional management[1/2]

### 12th pillar: Innovation ..... 50%

12.01 Capacity for innovation
12.02 Quality of scientific research institutions
12.03 Company spending on R&D
12.04 University-industry research collaboration
12.05 Government procurement of advanced technology products
12.06 Availability of scientists and engineers
12.07 Utility patents (hard data)
1.02 Intellectual property protection[1/2]

**Notes**

a. The standard formula for converting hard data is the following:

$$6 \times \frac{(\text{country score} - \text{sample minimum})}{(\text{sample maximum} - \text{sample minimum})} + 1$$

The *sample minimum* and *sample maximum* are, respectively, the lowest and highest country scores in the sample of countries covered by the GCI. In some instances, adjustments were made to account for extreme outliers. For those hard data variables for which a higher value indicates a worse outcome (e.g., disease incidence, government debt), we rely on a normalization formula that, in addition to converting the series to a 1-to-7 scale, reverses it, so that 1 and 7 still corresponds to the worst and best possible outcomes, respectively:

$$-6 \times \frac{(\text{country score} - \text{sample minimum})}{(\text{sample maximum} - \text{sample minimum})} + 7$$

b. For those groups of variables that contain one or several half-weight variables, country scores for those groups are computed as follows:

$$\frac{(\text{sum of scores on full-weight variables}) + \frac{1}{2} \times (\text{sum of scores on half-weight variables})}{(\text{count of full-weight variables}) + \frac{1}{2} \times (\text{count of half-weight variables})}$$

c. As described in the chapter, the weights are the following:

| Weights | Factor-driven stage (%) | Efficiency-driven stage (%) | Innovation-driven stage (%) |
|---|---|---|---|
| Basic requirements | 60 | 40 | 20 |
| Efficiency enhancers | 35 | 50 | 50 |
| Innovation factors | 5 | 10 | 30 |

d. In order to capture the idea that both high inflation and deflation are detrimental, inflation enters the model in a U-shaped manner as follows: for values of inflation between 0.5 and 2.9%, a country receives the highest possible score of 7. Outside this range, scores decrease linearly as they move away from these values.

e. The impact of malaria, tuberculosis, and HIV/AIDS on competitiveness depends not only on their respective incidence rates, but also on how costly they are for business. Therefore, in order to estimate the impact of each of the three diseases, we combine its incidence rate with the survey question on its perceived cost to businesses. To combine these data we first take the ratio of each country's disease incidence rate relative to the highest incidence rate in the whole sample. The inverse of this ratio is then multiplied by each country's score on the related survey question. This product is then normalized to a 1-to-7 scale. Note that countries with zero reported incidence receive a 7, regardless their scores on the related survey question.

f. The Competition subpillar is the weighted average of two components: Domestic competition and Foreign competition. In both components, the included variables provide an indication of the extent to which competition is distorted. The relative importance of these distortions depends on the relative size of domestic versus foreign competition. This interaction between the domestic market and the foreign market is captured by the way we determine the weights of the two components. Domestic competition is the sum of consumption (C), investment (I), government spending (G), and exports (X), while foreign competition is equal to imports (M). Thus we assign a weight of (C+I+G+X)/(C+I+G+X+M) to domestic competition, and a weight of M/(C+I+G+X+M) to foreign competition.

g. Variables 6.06 and 6.07 combine to form one single variable.

h. The size of the domestic market is constructed by taking the natural log of the sum of the gross domestic product valued at PPP plus the total value (PPP estimates) of imports of goods and services, minus the total value (PPP estimates) of exports of goods and services. Data are then normalized on a 1-to-7 scale. PPP estimates of imports and exports are obtained by taking the product of exports as a percentage of GDP and GDP valued at PPP. The underlying data are reported in the Data Tables section of the Global Competitiveness Report 2008–2009.

i. The size of the foreign market is estimated as the natural log of the total value (PPP estimates) of exports of goods and services, normalized on a 1-to-7 scale. PPP estimates of exports are obtained by taking the product of exports as a percentage of GDP and GDP valued at PPP. The underlying data are reported in the Data Tables section of the Global Competitiveness Report 2008–2009.

# Part 2

# Selected Factors of Competitiveness

CHAPTER 2.1

# Growth Diagnostic: Mexico

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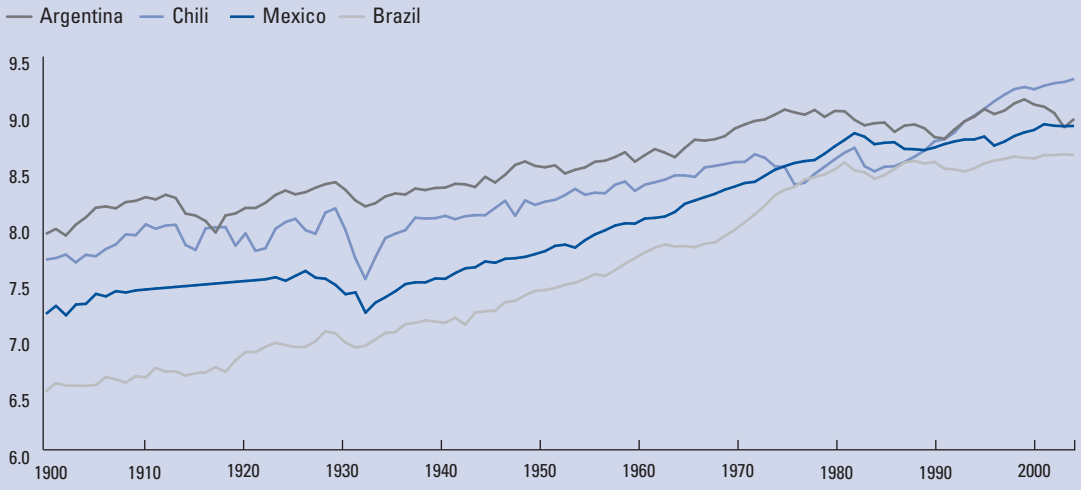
The purpose of this paper is to apply growth diagnostics methodology to the case of Mexico in order to identify binding constraints to growth. First, we describe the growth process. In this section, we explore Mexico's long-term growth path and then focus on recent dynamics. We pay particular attention to the reaction of the Mexican economy to the crisis of the mid 1990s as well as to the US recession in 2001.We then move to the growth diagnostics decision tree, using a variety of diagnostic techniques to evaluate potential constraints to growth. Such a differential diagnosis is based on the principle that, if a constraint is binding, then, among other things:

- The shadow price of the constraint should be high. For example, if the supply of education is insufficient to meet employer's demands, the returns to education should be high. In the case of Mexico, these returns are not, suggesting that the quantity of education provided is not a binding constraint.
- Movement in the constraint should produce significant movement in growth. For example, if access to finance in Mexico has improved significantly, it should result in accelerated growth. In the case of Mexico, it has not, suggesting that access to finance is not a binding constraint.
- Agents in the economy should be engaging in efforts to avoid or by-pass the constraint. For example, in the case of electricity, if existing provision is insufficient, there should be evidence of businesses self-generating; this is indeed the case in Mexico, suggesting electricity infrastructure might be a binding constraint.
- Agents more intensive in that constraint are less likely to thrive, and vice versa. In the case of electricity, those sectors more intensive in electricity should be growing less if that constraint is binding. In the case of Mexico, the opposite is true: electricity-intensive sectors are growing very fast, suggesting that electricity might not, in fact, be a binding constraint.
- High rents do not trigger entry because *ex ante* risks imply high current profit. For example, barriers to entry and high microeconomic risks should imply higher mark-up rates. In the case of Mexico, markups are low, suggesting that barriers to entry and micro-economic risks are not binding constraints to growth.

Using these diagnostics techniques, we move down the growth diagnostics decision tree, which is framed with the question "Why is investment not higher?" We begin with the distinction of low investment because of a high cost of finance, or low investment because of low appropriable returns. Given that Mexican investment declined rather than rose at a time when access to international finance improved, country risk declined, and interest rates declined, it is clear that the binding constraint to growth in the country is one of low appropri-

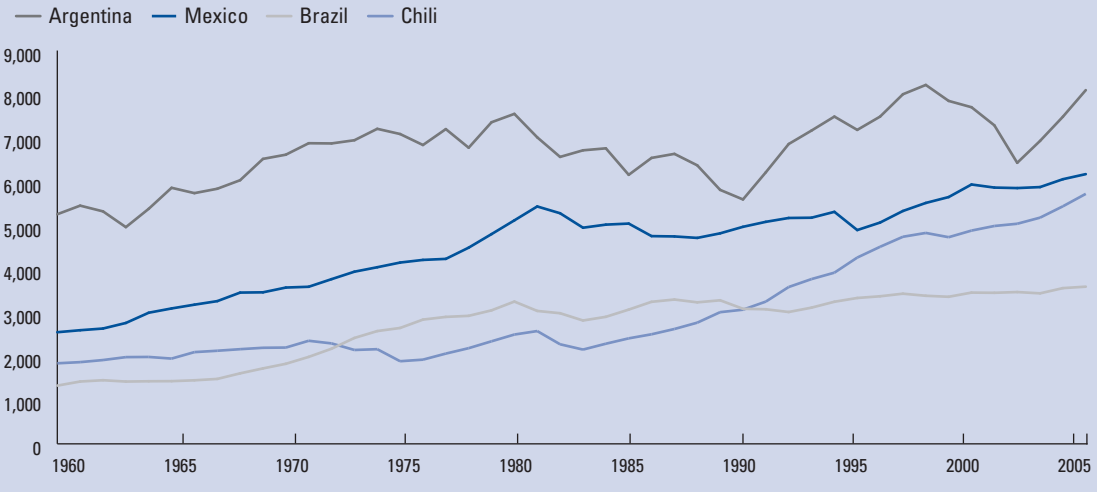
The authors wish to thank Felipe Kast, Reinier Schliesser, Alfie Ulloa, Rodrigo Wagner, and Andres Zahler for excellent research assistance. This analysis was originally prepared for the Inter-American Development Bank Growth Diagnostics Research Network.

**Figure 1a** Historical and recent GDP per capita (log of 1900 international dollars)




Source: Maddison 2004

**Figure 1b** Historical and recent GDP per capita (2000 US dollars)




Source: World Bank, *World Development Indicators*

able returns. On this side of the decision tree, we eliminate other potential constraints.

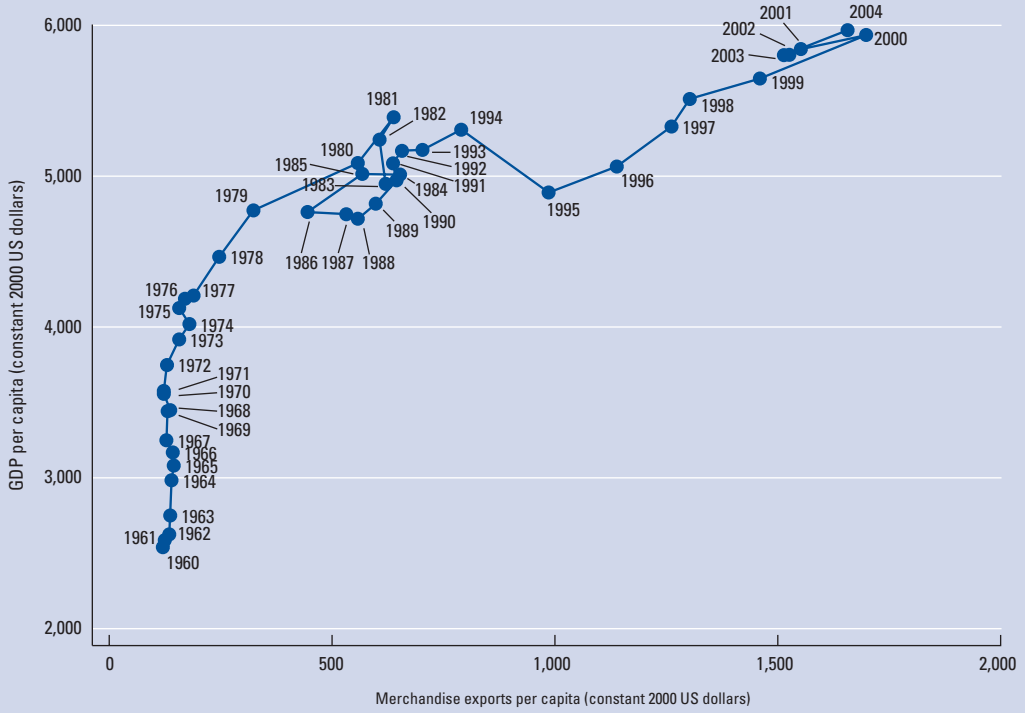
At the conclusion of this diagnostic, we are left with many discarded hypotheses. The evidence strongly suggests that growth in Mexico is not constrained by access to finance, macroeconomic uncertainty, political uncertainty, high or variable taxes, labor market rigidities, or coordination failures in the discovery of new productive activities. Although Mexico exhibited a delayed response to the US recession, this was mainly because adjustment happened in the context of full employment, where jobs that were lost in the tradable sector did not go to unemployment but instead to non-tradable sectors. We found no evidence of rigidities in the non-tradable sector causing stickiness, or of other business climate rigidities or microeconomic risks constraining economic growth. The displacement of Mexico's market share of exports to the United States by China also was a negative shock to the country's terms of trade, further complicating its adjustment to the US recession.

The constraint with the most supporting evidence of its binding quality is the supply of education. However, there are some conflicting signals that place this conclusion in doubt, namely that returns to education have continued to fall despite the resumption of growth after 2002. We are left with no smoking gun: there is not enough evidence to identify a unique constraint to growth that is harming the economy across a wide cross-section of activities. This finding has particular policy implications, which are discussed in the final section of this chapter.

## Mexico's growth history

Mexico has been among the better-performing Latin American economies for the past century. The 50-year Mexican miracle following the Great Depression saw the country catch up with Argentina and Chile, but starting in the 1980s growth decelerated (Figure 1). Output per capita stagnated during the "lost decade" of the 1980s and accelerated slightly after the Tequila crisis

**Figure 2** Exports and GDP, dynamics in Mexico, 1960–2004




Source: World Bank, *World Development Indicators*

during the second half of the 1990s, but has been rather unimpressive since. During a period where Chile's output per capita more than doubled, Mexico's grew by only 20%. Such comparisons with Chile may be misleading, however, as Chile's acceleration since the late 1980s is a recovery from very poor performance in the 1960s and 1970s, making its longer-term performance not much better than Mexico's.

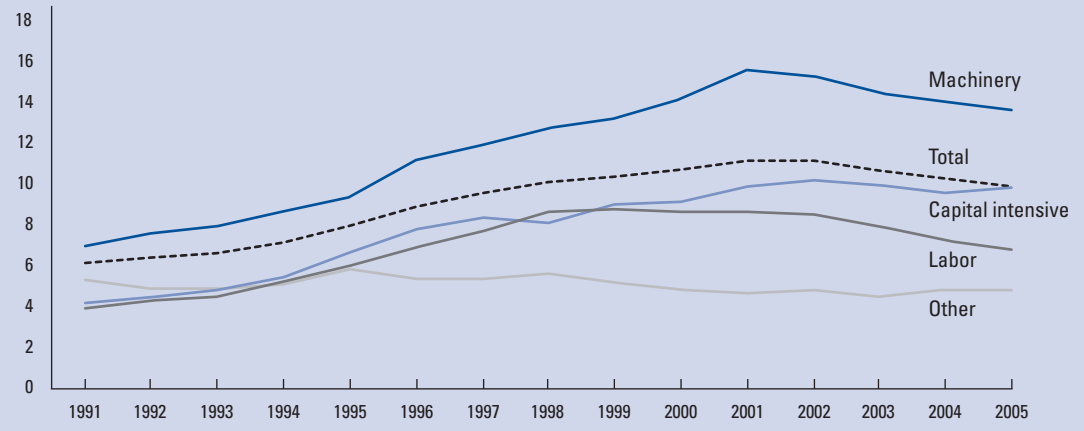
Although not an outlier in Latin America, Mexico's performance is nonetheless disappointing. In terms of output per worker, the country has yet to regain levels of output reached in 1980,[1] or even the smaller local maximum in the year 2000. The Mexican economy stalled in 2000 and suffered a recession that lasted until 2003. The economy has since returned to growth, although at a modest rate. Given this performance, it has fallen behind rather than converge with the countries of the Organisation for Economic Co-operation and Development (OECD). Mexican output as a percentage of the output of OECD countries fell from near 30% in 1981 to less than 21% by 2004.

Recent growth dynamics are clearly linked to export performance (Figure 2). Before oil prices skyrocketed and then collapsed in the 1970s and 1980s, Mexican growth was internal rather than export-led. Export growth began in the late 1970s and continued until the terms of trade collapse in the early 1980s, then stagnated until the mid 1990s. But from 1995 to 2000, export growth sped up, fueling accelerated economic growth. From 1995 to 2000, the economy grew at an average annual rate of 5.5%. This export boom can be traced in part to the currency depreciation in 1995, combined with a reduction in real salaries and the implementation of the North American Free Trade Agreement (NAFTA). It is important to note that, during this export and growth acceleration, there were high interest rates, low levels of credit to the private sector, and instability in the international financial system. Despite these constraints, exports and growth boomed.

Unfortunately, the 2000–05 growth experience shows a marked break from the 1995–2000 record. After 2000, when the United States entered a recession, the export boom and growth acceleration hit a wall. Other causes of this deceleration were the strong competition from China in the North American market, the erosion of trade preferences as other economies gained greater access to the United States, and a rise in unit labor costs. Between 2000 and 2005, the Mexican economy expanded at an annual rate of only 1.8%. This slowdown occurred despite the reductions in interest rates, the recovery of credit to the private sector, and better access to international financial markets thanks to Mexico's investment grade status for its foreign currency debt.

These dynamics clearly link growth performance with export performance. Moreover, they signal the central role of the US economy for Mexican growth, as the US business cycle is strongly linked with Mexican growth dynamics (Figure 3). This is not surprising, given that the United States is the destination for over 85% of Mexican exports. This high concentration remains true even for the non-oil export basket, and for exports before NAFTA: it is a long-term characteristic of the economy.

**Figure 3** Mexican market share (%) in US imports by commodity group, 1991–2005




Source: Authors' calculations, using UN COMTRADE

Within this overall structure, however, worrying trends can be found after the United States exited its recession in 2002. Non-oil exports from Mexico to the United States have not recovered at the same pace as US import demand, meaning that, since 2002, Mexico has lost market share in the United States. This loss in market share amounted to 1% of the US import market — 1.5% if we exclude oil — and was particularly strong among labor-intensive exports, although muted among capital-intensive exports.

During the Mexican recession in 1995, real wages contracted by 31%, which stimulated export competitiveness and basically maintained the level of employment in the tradable sector. But between 2000 and 2004, real wages were almost static, although they increased in dollar terms. Instead, employment shifted toward the non-tradable sector. The tradable sector employment declined from over 38% of total employment in 1994 to only 31% in 2004 (Table 1). This relative decrease could have been the result of workers being pushed out of tradables, or workers being pulled into the non-tradable sector by an expansion of domestic demand for non-tradables. In the case of the former, you would expect a reduction in wages and increase in unemployment. Although unemployment did rise after 2000, this increase was barely 1% of the labor force, whereas tradable employment fell by over 5%. That is, the majority of workers went into the non-tradable sector. Note that it was not a push into self-employment: rates of self-employment in the Mexican economy were the same in 2004 as they were in 2000 (12%, according to the household survey).[2] At the same time, real wages have barely fallen, and the economy remains near full employment.

Finally, while the real exchange rate depreciated sharply in response to the 1994 crisis, providing a stimulus to the export-led recovery, the reaction of the real exchange rate to the US recession in 2000 was delayed. In fact, it continued to appreciate until 2003, after which point the tradable sector began to recover.

With these dynamics in mind, we now apply the growth diagnostics methodology to the case of Mexico.

## Growth constraint: Bad finance?

It is clear that access to finance for the country as a whole has improved markedly over the past 10 years, while growth has not. Mexico's sovereign risk rating is low, and the country is now one of the few "investment grade" emerging markets in the world. There is no sign of this rating disappearing, as public debt as a percentage of GDP has continued to decline since 2000 (Figure 4) and spreads were not affected by the financial crises in Mercosur in 2001–02.

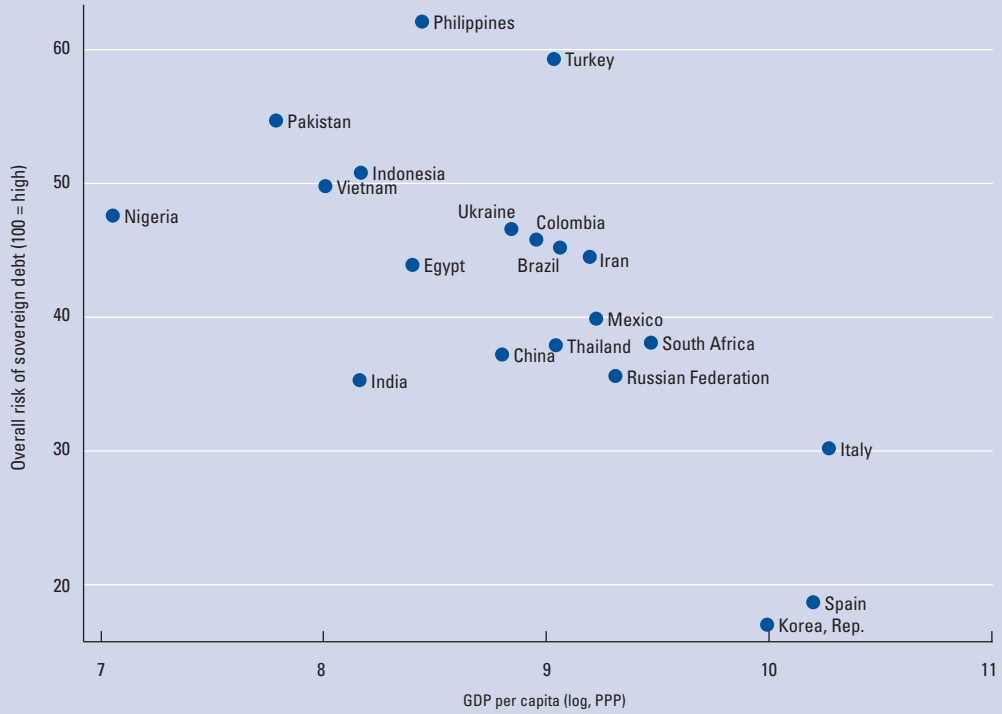
Although the Mexican financial system is not particularly deep, access to finance by the private sector has improved. Lending interest rates have been declining steadily since the late 1990s and are quite low relative to other countries, both in Latin America and worldwide, with similar levels of development. The bank interest rate spread (a measure of financial system efficiency) also declined and is relatively low. Improved banking super-

**Table 1** Employment: Tradable and non-tradable sectors (% of the labor force)

| Employment type | 1994 | 1996 | 1998 | 2000 | 2002 | 2004 |
|---|---|---|---|---|---|---|
| Tradable employment | 38 | 37 | 37 | 36 | 32 | 31 |
| Non-tradable employment | 58 | 59 | 61 | 62 | 65 | 65 |
| Unemployment | 4 | 5 | 3 | 3 | 3 | 4 |

Source: Mexican labor force survey, accessed through the Inter-American Development Bank

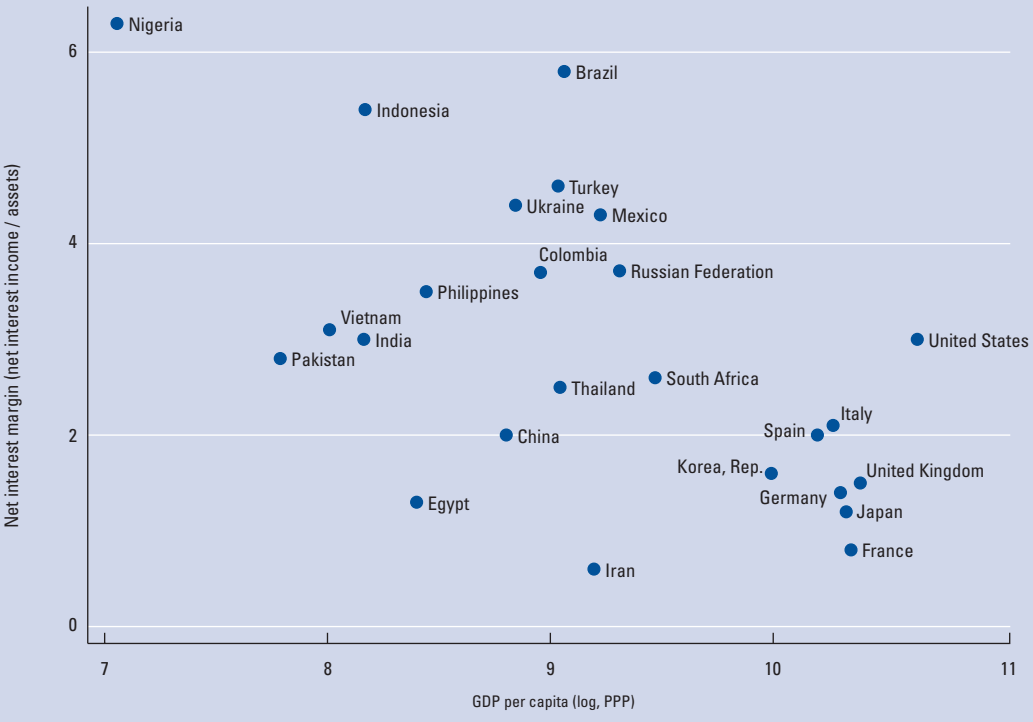
**Figure 4** Sovereign risk vs. log GDP per capita, 2005




Source: Economist Intelligence Unit
Note: A population cutoff of 40 million was used to make the data points more legible.



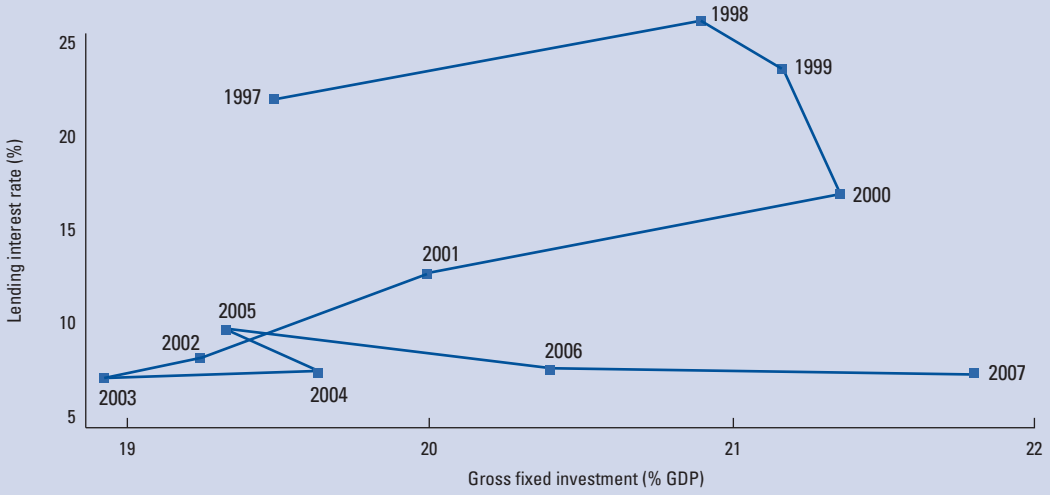
**Figure 5** Efficiency of Mexico's banking system, 2005




Source: Economist Intelligence Unit
Note: A population cutoff of 40 million was used to make the data points more legible.

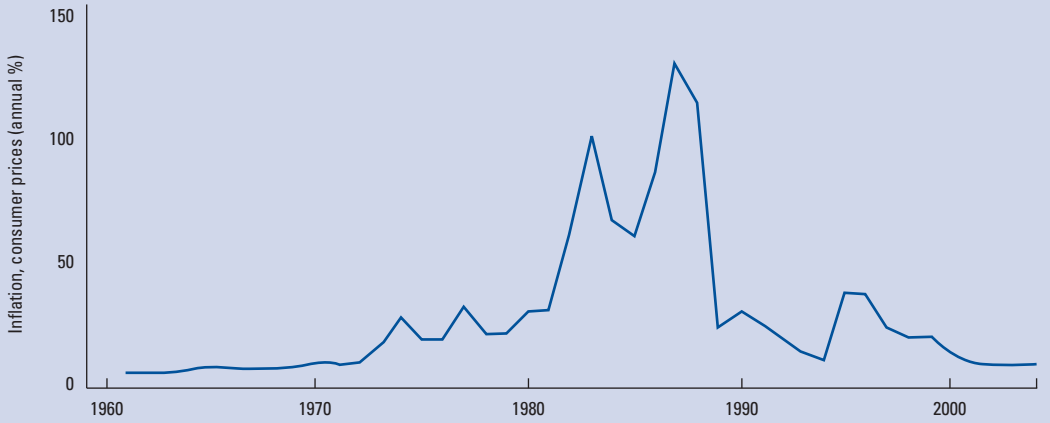
vision has brought about improvements in the financial system's efficiency,[3] and credit to the private sector has risen, including credit to enterprises.[4] Taking the net interest margin as an indicator of financial system efficiency, we see that efficiency of Mexico's financial system is greater than other regional comparators, such as Brazil and Peru, as well as high-flying Indonesia and the Ukraine (Figure 5).

**Figure 6** Interest rate and investment




Source: Economist Intelligence Unit

**Figure 7** Inflation in Mexico, 1960–2004




Source: World Bank, *World Development Indicators*

Most importantly, if a constraint is binding, then we should observe that changes in this constraint have a high growth payoff. If the cost of finance is a binding constraint to growth, then we should observe growth accelerating when this constraint is relaxed. However, from 1998 to 2003, while interest rates fell from over 25% to barely 7%, investment actually declined rather than rising (Figure 6). Moreover, from 2003 onward, while interest rates remained roughly constant, investment rose from under 19% to almost 22% of GDP.

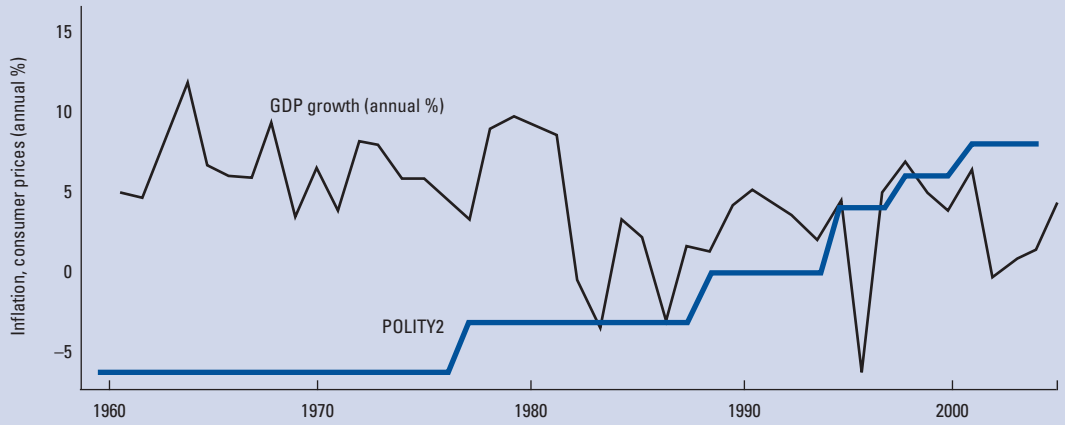
We don't see any correlation between interest rates and investment in Mexico. During a period when access to international finance improved, country risk declined, investment and growth went down rather than up. This strongly suggests that the binding constraint to growth is on the appropriable returns side of the growth diagnostics decision tree, rather than related to access to finance.

### Growth constraint: Low expected returns due to macroeconomic risks?

The private sector could be hesitant to invest out of fear that their expected returns will be eroded by macroeconomic crises such as a sharp change in relative prices, hyperinflation, or the cost of capital. In the case of Mexico, inflation became a significant problem in the 1980s, and it surged again during the Tequila crisis, but since then it has converged to the central bank's target of 3%. Indicators of expectations do not suggest that price stability will continue (Figure 7).

It would also be very difficult to argue that public debt is creating uncertainty that restricts investment. At the end of 2005, public debt was less than 45% of GDP. Importantly, the fraction of debt denominated in pesos has been rising steadily, and public debt denominated in foreign currency is only 13% of GDP. This reduces the risk of a currency crisis quickly making debt levels unsustainable. At the same time, Mexico has ample access to external finance if necessary, as the country is

**Figure 8** The Polity index vs. GDP growth




Source: World Bank, *World Development Indicators* 2005; University of Maryland Polity IV Project
Note: The Polity 2 index goes from –10 (autocracy) to 10 (democracy).

one of Latin America's few investment grade countries with minimal risk spreads. Finally, since the Tequila crisis, the government has increased the fraction of peso-denominated debt that has fixed interest rates and also extended its maturity.[5]

One concern is that the budget balance remains in a small deficit despite the boom in oil prices observed until recently, meaning that the fiscal stance excluding oil has worsened. Government income is quite dependent on oil revenues, which are volatile and subject to medium-term downside risk.[6] It is therefore worrying that fiscal revenue is dependent on such a volatile source, and also that the government has not treated the recent price boom as temporary and saved it.

However, despite this concern, it is difficult to argue that macroeconomic risk is preventing investment in Mexico.

## Growth constraint: Low expected appropriability due to microeconomic risks and inefficiencies?

Despite macroeconomic stability, investment may be held back because returns are eroded by costs that result from political risk, poor institutional quality, a rigid regulatory environment, the costs of crime and corruption, or other microeconomic risks.

In the case of Mexico, broad political institutions compare quite favorably internationally, with the World Bank indicators of voice and accountability and political stability as expected, given the country's level of income. As shown in Figure 8, since the mid 1970s, democracy has improved despite a worsening of the economic situation,[7] and indicators of voice and accountability and political stability are high given Mexico's income level. Moreover, the Economist Intelligence Unit (EIU) expropriation risk for Mexico is 4, the second-best rating possible.

The cross-country rankings on the overall business environment are generally positive. The World Bank overall regulatory quality indicator is slightly higher than expected, given Mexico's income level. Mexico's overall level of competitiveness in *The Global Competitiveness Report 2008–2009* is quite high: 60th out of 134 countries, behind only a handful of countries (Chile, 28th; Puerto Rico, 41st; Barbados, 47th; Panama, 58th; and Costa Rica, 59th) in Latin America. The country's ease of doing business ranking is 56th out of 181 economies, behind only Puerto Rico, Chile, Colombia, and the Bahamas (respectively 35th, 40th, 53rd, and 55th) in Latin America.[8]

Tax policy risk is low,[9] as are tax rates, suggesting that investment should not be restricted by fear of losing profits through excessive taxation (Table 2). Although the

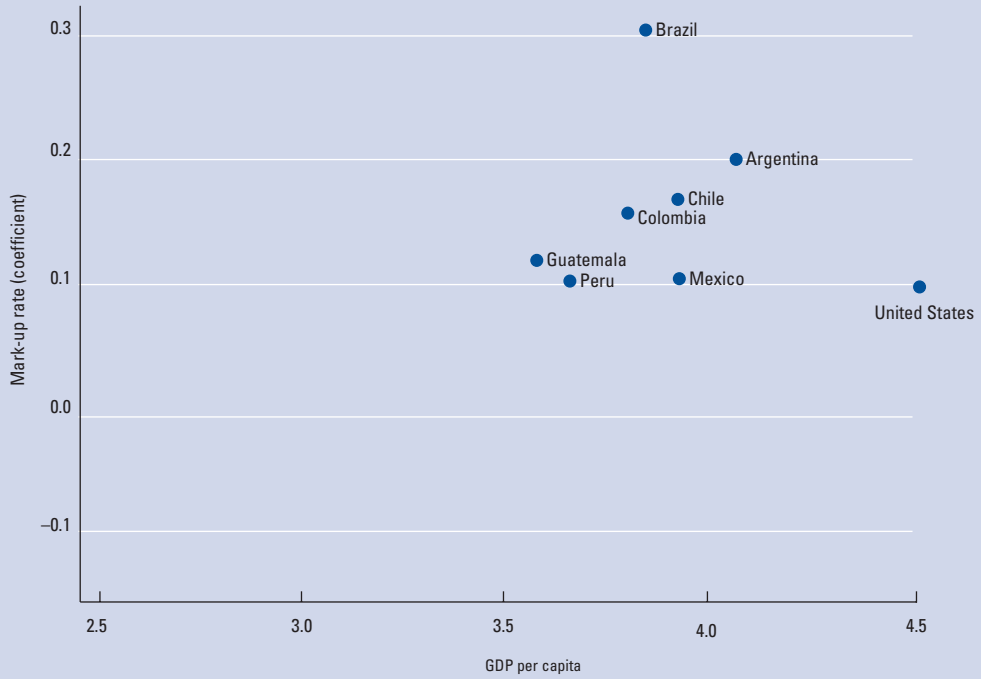


**Table 2** VAT and income tax rates in Latin America, 2002

| | VAT | | Income Personal | | Income Corporate |
|---|---|---|---|---|---|
| Country | Main rank | Number of rates | Lowest rate | Highest rate | |
| Uruguay | 23 | 2 | 30 | 30 | 35 |
| Argentina | 21 | 3 | 6 | 35 | 35 |
| Peru | 19 | 1 | 15 | 30 | 27 |
| Chile | 18 | 1 | 5 | 45 | 16.5 |
| Colombia | 16 | 9 | 22 | 38.5 | 38.5 |
| **Mexico** | **15** | **2** | **3** | **32** | **34** |
| Bolivia | 13 | 1 | 13 | 13 | 25 |
| Costa Rica | 13 | 1 | 10 | 25 | 36 |
| Brazil | 11 | 3 | 15 | 27.5 | 34 |
| Ecuador | 10 | 1 | 5 | 25 | 36.25 |
| Average | 16 | | 12 | 30 | 32 |

Source: Taken from Cubillos et al., 2005

**Figure 9** Mark-up rates vs. GDP per capita




Source: Authors' calculations using UNIDO INDSTAT and The World Bank, *World Development Indicators*
Note: Mark-up rates are the coefficient on country dummies in a regression on markups at the UNIDO 2-digit level.



country's rating in the "paying taxes" dimension of the Doing Business indicators is extremely low (ranking 149th out of 181 economies in 2008, compared with an overall ranking of 56),[10] this is due to an excessive amount of time to pay taxes, which does not seem to translate into higher costs (either direct or administrative).

The one area of potential concern among microeconomic risks is crime and corruption, which are slightly above the level expected for GDP per capita in the World Bank rankings. Mexico has a Transparency International corruption ranking of 64 out of 145 countries.[11] In the country's investment climate assessment, the cost of security as a percentage of sales is 1.7%, which is higher than it is in Brazil (1.6%), Costa Rica (1%), Chile (0.9%), China (0.8%), and Thailand (0.6%).

International data reveal that agroindustry is the non-service industry most sensitive to security costs, while electronics are the least sensitive. Therefore, if security is a significant constraint in Mexico, we would expect agroindustry to fare relatively poorly and electronics to fare relatively well. In Mexico, the opposite is true. Agroindustry is one of the fastest growing industries, while electronics is one of the slowest growing sectors — in fact, it is contracting. This is therefore one piece of evidence against crime being a binding constraint to growth.

Moreover, the idea that barriers to entry might be harming growth is not supported by the international data on mark-up rates. If there were barriers to entry, then we would expect them to be sustaining relatively high mark-up rates. Yet the average markup in Mexico, measured using UNIDO 2-digit production data, are not overly high (Figure 9): they are lower than in Colombia, Argentina, Brazil, Chile, Guatemala, and are on par with Peru and the United States.

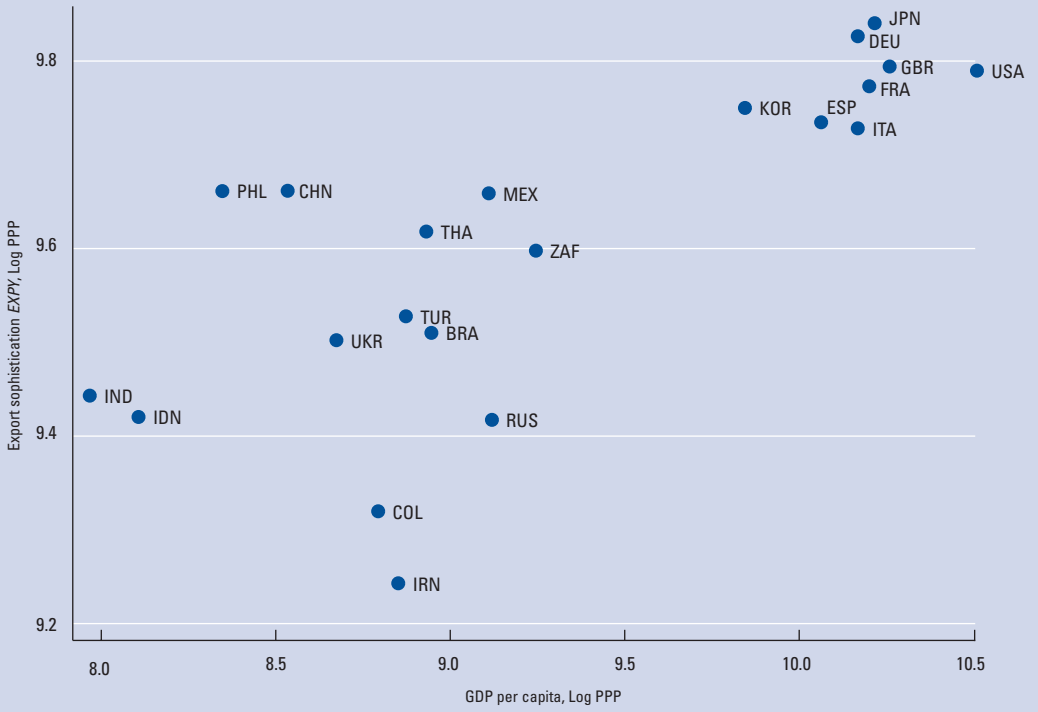
And given the overall positive international rankings in the other areas, as well as the lack of correspondence between changes in the constraints and growth dynamics, it is difficult to argue that growth in Mexico is being constrained by microeconomic risks and costs.

## Growth constraint: A lack of "self-discovery"?

Investment in Mexico may be held back not because of an explicit cost or risk-preventing investment, but instead because the country has not managed to discover any high-return activities in which it is competitive. One method of evaluating this possibility is to look at the level of income associated with the export basket. If Mexico has managed to discover export sectors that are traditionally the domain of high-wage countries, it suggests that there are attractive destinations for investment. Moreover, it has been shown that low-income countries grow faster when they export goods typically exported by countries substantially richer than themselves.[12] These are goods that are competing with countries paying much higher salaries; this gap provides a cushion to pay for differences in productivity and the time needed to overcome them through learning.

Mexico has one of the highest levels of export sophistication (*EXPY* — see Annex 1 for technical details) of a country at its income level (Figure 10).

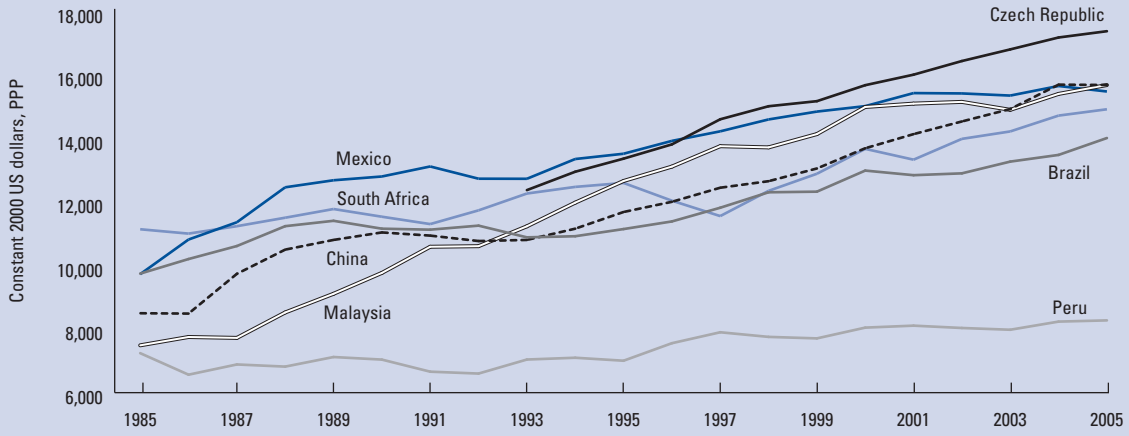
**Figure 10** *EXPY* vs. GDP per capita, 2004




Source: Authors' calculations based on The World Bank, *World Development Indicators* and UN-COMTRADE
Note: A population cutoff of 40 million was used to make the data points more legible.



**Figure 11** *EXPY*: Mexico vs. selected countries




Source: Authors' calculations using UN COMTRADE

Although its current level of income per capita is lower, its export basket is more sophisticated than countries such as Portugal and Greece.

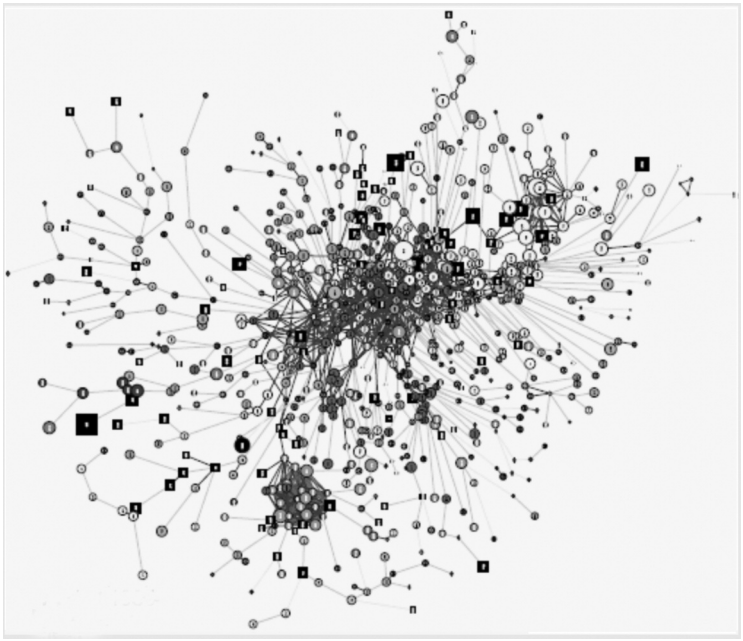
This high level of export sophistication emerged in the mid to late 1980s. Since that time, Mexico has had the highest level of export sophistication in Latin America, and one of the highest among all emerging markets (Figure 11).

Given the strong relationship between export sophistication and subsequent growth, one would have expected more rapid growth in Mexico over the past two decades than has been the case. But controlling for the value of Mexico's existing stock of discovered high-return goods, it is an outlier in terms of low growth. This suggests that Mexico is not in a situation where growth is being held back by a lack of discovery of newer higher-value goods. Rather, the binding constraints on Mexico's growth seem to lie elsewhere.

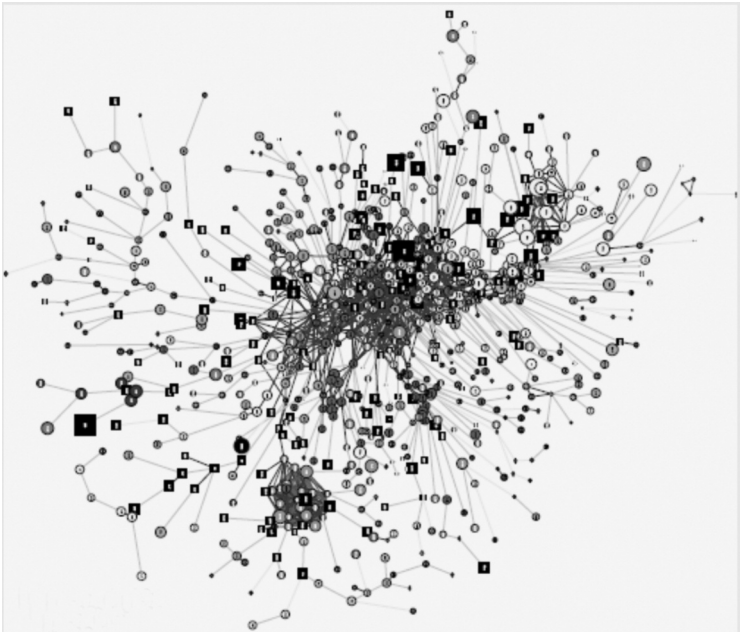
We can also evaluate this constraint by considering the country's connectedness in the product space. If the country is in a disconnected part of the space, then there are no nearby products to which to move, and the process of discovery is more likely to suffer from coordination failures as it requires jumps to distant products,

**Figure 12** Mexico's evolution in the product space

**12a: Mexico 1985**



**12b: Mexico 1990**



**12c: Mexico 1995**

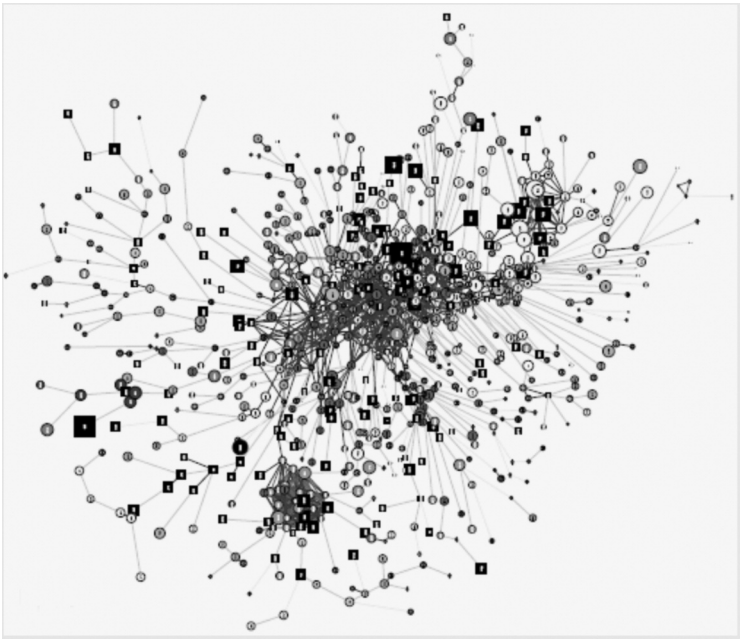
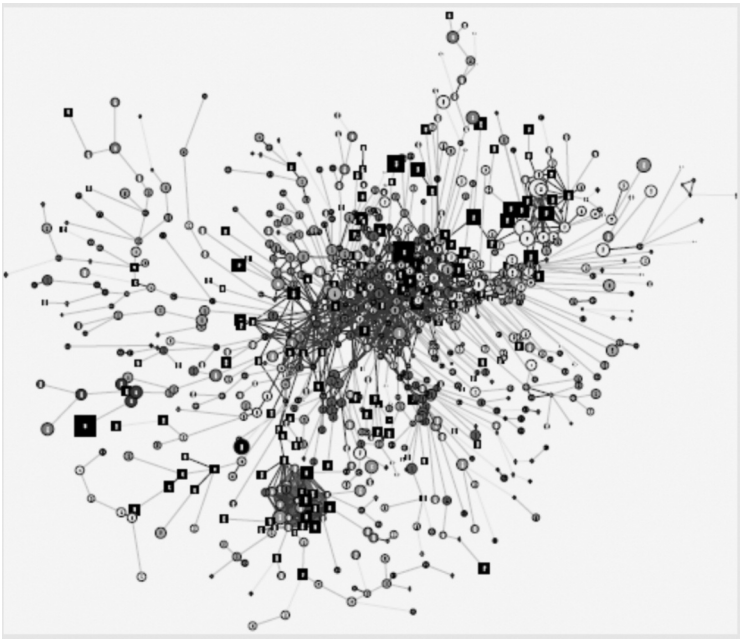


**Figure 12** Mexico's evolution in the product space (continued)

**12d: Mexico 2000**



Source: Authors' calculations

shown in Hausmann and Klinger to be very infrequent empirically.[13] Figures 12a, b, c, and d show Mexico's evolution in this product space, where a black square on top of a product indicates that it is exported with comparative advantage.

These figures show that, unlike many of its Latin American comparators, Mexico historically has a rather well placed set of productive capabilities. Even in 1985, before NAFTA, Mexico was exporting products in the garments cluster, electronics cluster, and the tightly packed industrial core. Furthermore, Mexico achieved comparative advantage in many new products in the central core of the product space, as well as the electronics cluster, between 1985 and 2000. The long-term picture for the country appears to be one of strong structural transformation, with many nearby products in the product space for future discovery.

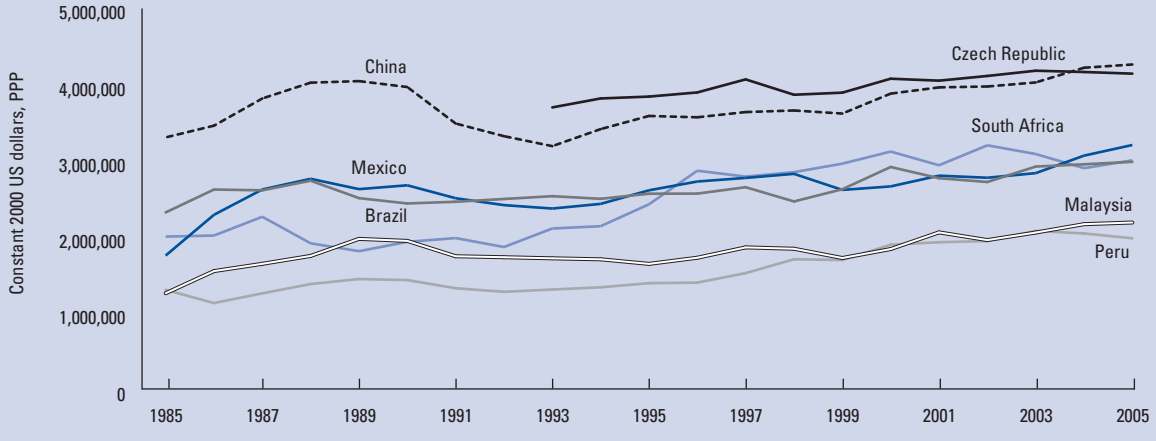
The "connectedness" of an export basket can also be represented in a single number — known as the "open forest" — which represents the option value of the current export package (see annex for technical details). The open forest for Mexico and some comparators is shown in Figure 13.

Along with the high level of export sophistication shown in Figure 13, we see that Mexico is in a relatively dense part of the product space. Mexico's options for future structural transformation are the best in Latin America, and among the best for emerging markets worldwide. These results make it very difficult to argue that Mexico's growth is held back by a lack of self-discovery.

One argument against this conclusion — that coordination failures in the discovery of new productive activities is not a binding constraint — could be that Mexico's unique position next to the United States

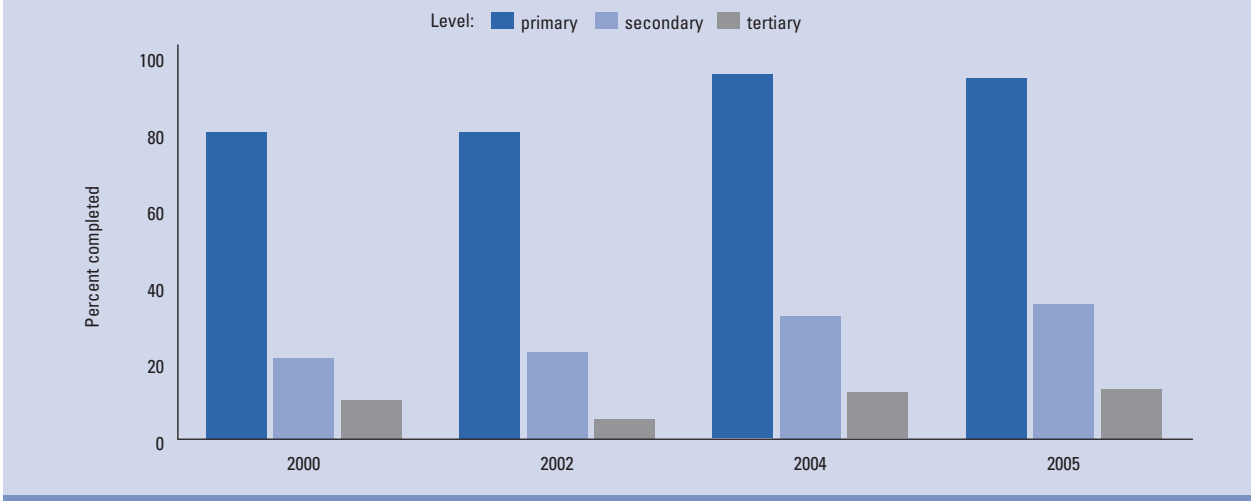


**Figure 13** Open forest: Mexico and selected countries



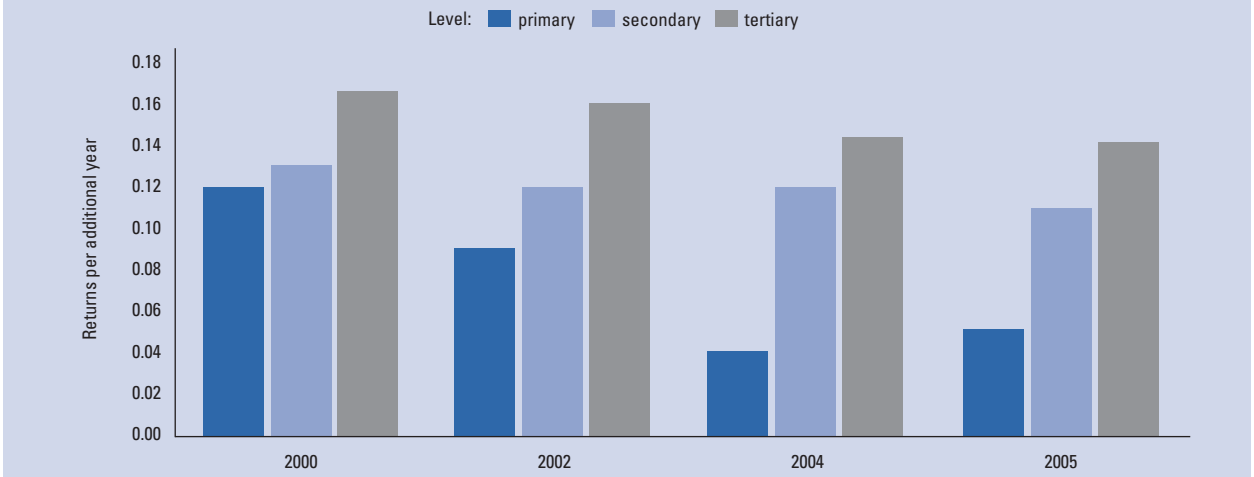

Source: Authors' calculations using Feenstra et al., 2005, for the 1975–2000 period, and UN COMTRADE for the 2000–2004 period, merged using relative changes from a 2000 observation that is common to both series.

**Figure 14a** Education in the workforce: Supply and returns




Source: Adapted from Cubillos et al. 2007

**Figure 14b** Education in the workforce: Returns to education




Source: Adapted from Cubillos et al. 2007

makes it a high-tech *maquila* — that it is assembling goods that are otherwise produced in rich countries and therefore that it has a high *EXPY*, even though in reality the activities in Mexico are mere assembly, with all of the sophisticated (and growth-enhancing) steps in the production process remaining in the United States.

In order for this scenario to be true, it would have to be unique to Mexico, given its location next to the United States. If Mexico's high-*EXPY* goods are products assembled for the United States that are not exported by other developing countries, and those other developing countries that drive the empirical result linking high *EXPY* and higher growth do so with a *different* set of goods, then *EXPY* could be mismeasured in Mexico. Otherwise, the findings in Hausmann et al. show very clearly that developing countries exporting rich-country products — most of which are performing assembly only rather than the full production process that includes R&D, marketing, and procurement — grow faster.[14]

What do the data say? The "rich-country" goods that Mexico produces are also exported by China, Costa Rica, Cyprus, Hungary, India, Jordan, Malaysia, Singapore, Slovenia, Thailand, and Ukraine.[15] It is not at all obvious that these countries are performing many more stages, such as design and marketing, in the production process, while only Mexico is concentrating in assembly alone. Instead, the other low-income exporters of these products are also likely concentrated in assembly. The empirical finding in Hausmann et al. is that poor countries that have managed to move into the assembly of rich-country products grow faster, and therefore *EXPY* is not mismeasured in Mexico.[16] Rather, it is a surprise that, unlike other developing countries with a similar level of export sophistication, Mexico is growing slowly.

Moreover, if the unique status of Mexico as a *maquila* rather than producer of most goods it exports were a cause for a lack of self-discovery, then we would expect Mexican firms to be less adept at discovering new export activities, controlling for their proximity in the product space. Again, the opposite is true: controlling for density, Mexican firms jump slightly *more* often, rather than less often, to new export activities, at least during the three five-year windows from 1985 to 2000.

**Table 3** Market share changes decomposition: Mexico vs. China in the US market (US$ billions)

| | 2000 | | 2005 | | 2005–2000 |
|---|---|---|---|---|---|
| | Value | Percent | Value | Percent | Change in market share (percent) |
| Total | 137.4 | 10.9 | 172.5 | 10.0 | –1.0 |
| Oil | 13.1 | 1.0 | 26.6 | 1.5 | 0.5 |
| Non Oil | 124.1 | 9.9 | 145.9 | 8.5 | –1.5 |
| H2H China | 56.4 | 4.5 | 56.6 | 3.3 | –1.2 |
| Non H2H China | 67.9 | 5.4 | 89.3 | 5.2 | –0.2 |
| Total M United States | 1,258.0 | — | 1,732.0 | — | — |

Source: Authors' calculation using UN COMTRADE
Note: Product lines are designated as competing "head to head" (H2H) with China if that country did not export more than US$5 million in any of the years 2000 to 2005, and never had more than one third of Mexico's market share in the United States.

Given the stock of export sectors in Mexico and their connectedness to new activities, as well as the evidence that Mexican firms are able to exploit these nearby opportunities, it is clear that a lack of self-discovery is not the binding constraint to growth.

### Growth constraint: Insufficient education?

The average level of education of new entrants to Mexico's labor force has increased significantly, from 8 to 10 years, over the past decade. The percentage of the labor force with tertiary education is 15.4%, similar to the richer Central American countries (14.9% in Costa Rica, 16% in Panama), but lower than other Latin American countries (for example, 24% in Ecuador, 29% in Peru).

The important question from the point of view of growth diagnostics is, again, whether the shadow price of education is high and rising or low and falling, and whether it is pro-cyclical. If the rate of increase in the supply of education is not keeping up with the rising demands of a modern workforce, then we should observe high and rising returns to education, particularly during good times.

During the 1990s, after NAFTA was implemented and Mexico enjoyed accelerated growth, returns to education grew significantly, particularly at higher attainment levels.[17] Moreover, of all the major Latin American economies, Mexico was the only one where the increase in returns during this period was not limited to tertiary education but was observed in secondary as well.[18] As a result, as of 2000, returns were higher than in Paraguay, Peru, and Colombia. This observation of high shadow prices that rise with growth is a signal that the supply of education was a binding constraint to growth.

However, in the most recent data, similar patterns are not observed. Figures 14a and b show that, as supply has increased from 2000 to 2005, the returns to education have consistently fallen. The Mexican economy enjoyed a return to stronger growth after 2002, during which time returns continued to fall rather than rise. The one exception is returns to primary education, which rose slightly in the most recent year.

The fact that returns to education in Mexico are not rising after 2002 despite a resumption of economic growth is a signal that the supply of education is not a binding constraint to growth. Yet this apparent contradiction could be merely the result of time lags, and more recent data, as they become available, might show that returns have begun to rise again. If this were found, in combination with the experience in the 1990s, it would be strong signal that the supply of education is a binding constraint.

In addition, there are some concerns about the quality of education in Mexico, particularly at the highest levels. New work by Pritchett and Viarengo suggests that Mexico's supply of secondary students at the very high end of cross-country measures of attainment (the "global performers") is low: 2.9 per 1,000 students, compared with India's 4.3 and Thailand's 15.1, and incomparably lower than the United States' 65.2, Slovakia's 94.2, and Korea, Rep. (Korea)'s 182.[19] If the supply of global performers, rather than average attainment, is the relevant metric for movements to new nearby export sectors in Mexico's well-connected part of the product space, then this may cause for concern.

### Growth constraint: Low social returns because of the emergence of China?

The rate of growth in Mexico may be due to low social returns to investment because of new competition from China. China has been one of the fastest growing economies in the world over the past decade, largely through export growth, which has necessarily come at the expense of other countries' international market shares.

China's emergence may have disproportionately affected Mexico because it competes in the same export sectors as China. Although China's export package was initially concentrated in textiles and labor-intensive goods, and therefore more similar to that of Central America than that of Mexico, this concentration has shifted toward machinery and capital-intensive goods. As a result, the export packages of China and Mexico have become quite similar over the past decade.

Mexico's recession was in step with that of the United States at the outset of the present decade, but it did not recover at the same pace, and therefore lost market share between 2002 and 2005, during which time China's market share in the United States grew (Table 3).

The manufacturing sector was the greatest source of growth in Mexico during the boom between 1995 and 2000, but since 2001 has shown the least amount of dynamism. Similarly, and as opposed to the situation before 2000, the tradable sector of the economy has lagged the non-tradable sector.

Overall, Mexico suffered a fall in its share of the US import market of 90 basis points between 2000 and 2005, but this includes the increased earnings from rising oil prices. Considering only non-oil exports, Mexico's loss in market share was 140 basis points. To evaluate whether or not China is to blame for this, we can identify those sectors in which Mexico faces head-to-head competition with China — such as televisions, computers, and office machinery — and compare performance in these sectors to those in which it does not compete with China — such as automobiles.

This decomposition reveals that losses were sustained primarily in products directly competing with China (120 basis points). These losses in market share represent significant foregone export earnings. Considering only televisions, computers, and office machinery and accessories, if Mexico had been able to maintain its 2000 market share, 2005 export earnings would have been US$12 billion larger.[20] This confirms other micro evidence in Rigobon that shows that Mexican firms were less able to adjust to the entry of China in the US market than other major exporters to the United States, and instead were more likely to have to simply reduce margins.[21]

But it is important to note that Mexico also lost market share in sectors *not* competing with China (20 basis points). Moreover, while the emergence of China may be an important factor in explaining why Mexico's recovery lagged that of the United States after 2001, it is an exogenous terms-of-trade shock. The country's ability to adjust to this shock may have been hampered by other constraints in the economy, but the shock itself is not a constraint. Interestingly, since 2005 Mexico has reversed this loss of market share, suggesting that adjustment is already underway. Therefore, while the entry of China may explain recent dynamics and could help point to other constraints, it is not a binding constraint to growth. Also, dollar wages in China are probably rising faster than in Mexico, so the worst of the China competition may be behind Mexico.

## Growth constraint: Infrastructure?

Overall, Mexico's infrastructure is on par with other countries at similar levels of development. The country's EIU rating is as expected, given the country's level of development, and the Global Competitiveness Index 2008–2009 ranking for infrastructure is 68th, only slightly less than the country's overall ranking of 60th.

There is anecdotal evidence that electrical infrastructure is a problem in Mexico. Worrying signals mentioned include frequent power failures, higher costs, and many firms relying on their own electrical generators during peak hours. According to the *IMD World Competitiveness Yearbook*,[22] Mexico is perceived as having worse electricity generation and distribution infrastructure than Argentina, Brazil, Chile, China, and Turkey.

Yet if electricity infrastructure was a binding constraint to growth in Mexico, we would expect electricity-intensive sectors to be growing more slowly than those sectors not intensive in electricity. In fact, the opposite is true: the sectors growing the fastest in Mexico are among the most intensive in electricity (Figure 15).

Moreover, in the World Bank investment climate assessments,[23] the degree to which electricity is rated as a significant constraint by firms in Mexico is less than in Peru, Costa Rica, and Chile, and significantly lower than in Brazil, China, and India. Perhaps electricity-intensive sectors could be growing even faster with improved infrastructure, but these signals taken together do not clearly show that infrastructure is a binding constraint to growth.

## Growth constraint: The labor market?

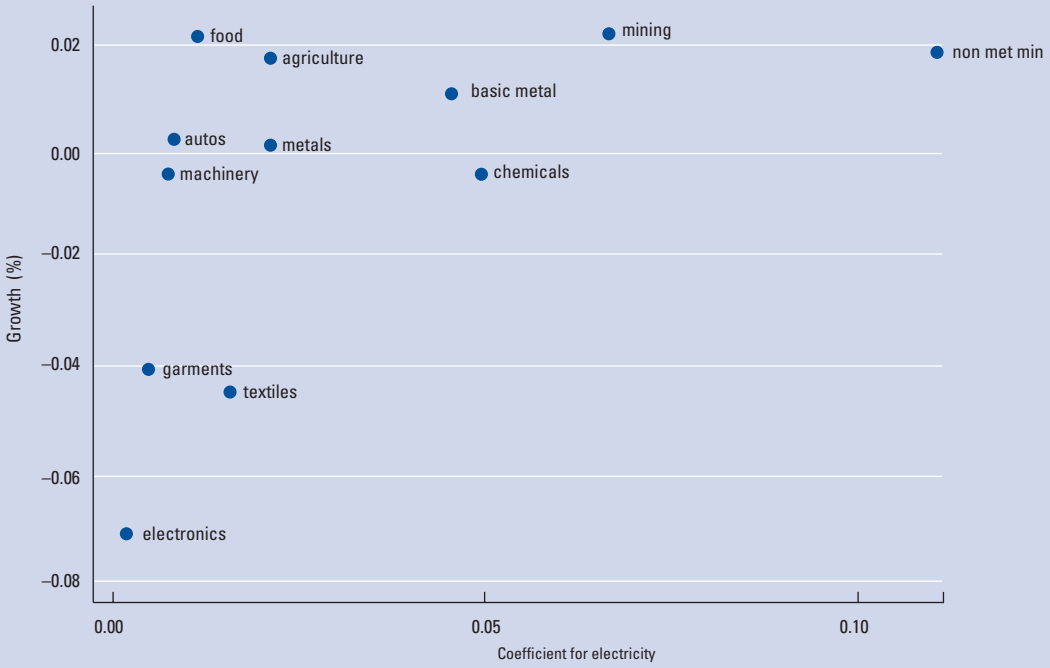
As discussed in the first section, a key difference between the crisis in the mid-1990s and the recession starting in 2000 was that, in the case of the second, wages did not adjust. According to the household survey,[24] real wages fell only 1% between 2000 and 2002 despite the larger contraction in output per worker. This might suggest that there is a problem of restrictive labor laws. However, according to the EIU restrictiveness of labor law ratings, Mexico has a rather flexible labor market for its level of development. The only comparable countries with a higher rating are Colombia, Slovak Republic, Russia, and Romania. Moreover, once you control for productivity, wages in Mexico are comparatively low (Figure 16).

Instead of restrictive labor laws, the strength of real wages is due to the non-tradable sector absorbing those leaving the tradable sector. It is true that employment growth in the non-tradable sector is concentrated among those who do not have social security (2.84% growth from 2000 to 2004), but employment also increased by almost 1% for those in the non-tradable sector with social security, and the losses in the tradable sector were not concentrated among those with social security. Therefore, labor regulations are not to blame for strong real wages in the face of the export slowdown, and do not seem to be a binding constraint to growth.

## Conclusion

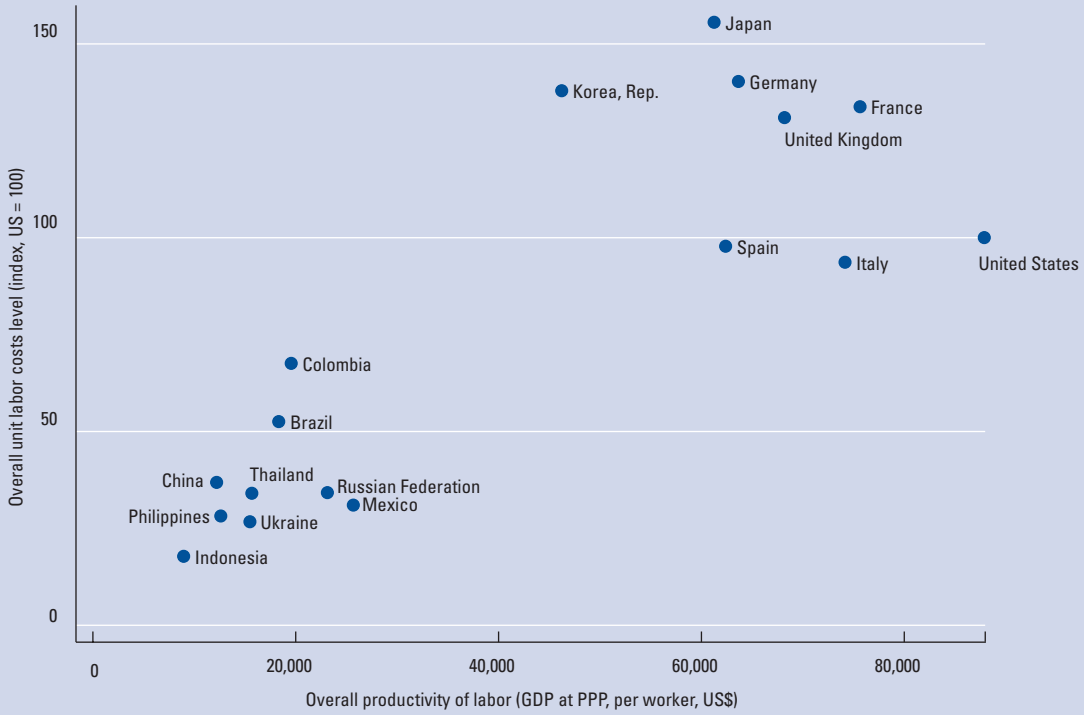
Low economic growth in Mexico is a puzzle. But this analysis has allowed us to discard many hypotheses as to a cross-cutting binding constraint to growth in the economy. Given that Mexican investment declined rather than rose at a time when access to international finance improved, country risk declined, and interest rates declined, it is clear that the binding constraint to

**Figure 15** Sector intensity in electricity vs. sector growth




Source: Authors' calculations

**Figure 16** Labor costs vs. productivity




Source: Economist Intelligence Unit
Note: A population cutoff of 40 million was used to make the data points more legible.



growth in the country is of low appropriable returns. Moreover, the evidence suggests that growth in Mexico is not constrained by macroeconomic uncertainty, political uncertainty, high or variable taxes, labor market rigidities, or coordination failures in self-discovery.

We found no evidence of barriers to entry, an overall poor business climate, or microeconomic risks constraining economic growth. The effects of the US recession were magnified by the displacement of Mexico's market share by China, yet this is a negative shock to

the country's terms of trade rather than a constraint to growth.

The one constraint with the most supporting evidence that it is binding is the supply of education. However, there are some conflicting signals, namely that returns to education have continued to fall despite the resumption of growth after 2002. Therefore, we are left with no smoking gun. There is not enough evidence to identify a unique constraint to growth that is harming the economy across a wide cross-section of activities. Yet disappointing growth is a reality, leading to one of two potential conclusions.

First, the diagnostic may have simply failed to identify the binding constraint to growth. New data may overturn some of the conclusions made above, or, alternatively, other constraints or combinations thereof that were not considered may be binding. If this is the case, this diagnostic represents a launching pad for subsequent research, which would eventually converge to the identification of a particular syndrome affecting the Mexican economy. An area we can directly point to requiring follow-up study is education.

But the alternative conclusion is that, unlike in many other countries studied with the growth diagnostics methodology, there is not a particular constraint harming a large cross-section of the Mexican economy. Instead, the constraints facing narrowly defined activities are rather diverse. For example, property crime may be particularly problematic in certain areas of the country, affecting agroindustry there but not elsewhere. A particular piece of telecommunications, immigration, or health regulation may be harming the high-end business process outsourcing sector or medical tourism sector, but not other activities in the economy. The low provision of highly educated "global performers" may be irrelevant for the manufacturing sector, but harming the ICT sector. Energy (oil and electricity) could attract more investment than is allowed by the legal system, yet these particular regulations and their effects on electricity prices may not be harming other sectors of the economy.

This is to say that, in the case of Mexico, the set of constraints holding back economic growth may be diverse and sector-specific enough that no single set of them is affecting the economy broadly. If this is the case, then appropriate growth policy should be based on the search for such sector-specific obstacles. Policies must be designed in order to identify the unique constraints facing each sector, as well as to have mechanisms able to respond to those constraints.

This suggests that the state needs to have a dialogue with the private sector. In organizing such a dialogue, certain principles should be kept in mind. First, rather than dividing the economy into arbitrary buckets based on statistical classifications, it is better to let the relevant private-sector actors self-organize based on shared interest in a particular constraint and have them come forward. In order to filter requests to truly productivity-enhancing investments and avoid rent-seeking, it may be advisable to require co-financing. The private sector's willingness to pay is correlated with the social returns to the investment, so it is informative of difficult-to-measure returns.

To further minimize rent-seeking and capture, such a dialogue should be highly transparent, with all requests made public to discipline the proposals put forth. Moreover, it should be clear that the proposals put forward to overcome sector-specific constraints are for productivity-enhancing investments through the provision of public inputs. Proposals would be for public inputs such as particular infrastructure, regulation, training, or certification, but not subsidies to compensate for low productivity.

Such a dialogue would lead to the identification of the constraint, but this then leads to an entirely different problem: how to ensure responsiveness? The public sector will have to allocate scarce resources to resolve these constraints. A policy proposal to achieve this responsiveness can be found in Hausmann et al.[25]

Since we are unable to identify a single binding constraint across sectors, this policy of public-private dialogue is an appropriate response as it will identify those constraints unique to each sector or activity. Moreover, such a policy has the benefit that, if our analysis is incorrect and there is in fact a unique economy-wide binding constraint to growth, such a dialogue will reveal it through the consistent emergence of a narrow set of constraints rather than constraints unique to particular sectors. Reforming existing policies and forums for public-private dialogue based on the principles outlined above will therefore help overcome the puzzlingly slow growth in Mexico.

## Notes

1 *World Development Indicators* 2006.

2 This refers to the Mexican labor force survey, accessed through the Inter-American Development Bank.

3 IMF 2006.

4 IMF 2006.

5 IMF 2006.

6 IMF 2006.

7 The Polity index comes out of the Polity IV Project, which "carries data collection and analysis through 2007 and is under the direction of Monty G. Marshall at the Center for Systemic Peace and George Mason University. . . . The Polity conceptual scheme is unique in that it examines *concomitant qualities of democratic and autocratic authority* in governing institutions, rather than discreet and mutually exclusive forms of governance. This perspective envisions a spectrum of governing authority that spans from *fully institutionalized autocracies* through *mixed, or incoherent, authority regimes* (termed "anocracies") to *fully institutionalized democracies*." See http://www.systemicpeace.org/polity/polity4.htm.

8 World Bank 2008.

9 Economist Intelligence Unit.

10 World Bank 2008.

11 Transparency International's Corruption Perceptions Index 2004.

12 Hausmann et al. 2006.

13 Hausmann and Klinger 2006.

14 Hausmann et al. 2006.

15 Authors' calculations using UN COMTRADE.

16 Hausmann et al. 2006

17 Lopez-Acevedo 2001.

18 Manacorda et al. 2005.

19 Pritchett and Viarengo 2008.

20 Authors' calculations.

21 Rigobon 2008.

22 *IMD World Competitiveness Yearbook* 2004.

23 This refers to the most recent World Bank investment climate assessment survey available for each country as of Fall 2005, accessed on the World Bank website; see http://www.ifc.org/ifcext/economics.nsf/AttachmentsByTitle/icabrochure.pdf/$FILE/icabrochure.pdf.

24 The Mexican labor force survey, accessed through the Inter-American Development Bank.

25 Hausmann et al. 2008a.

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# Annex 1: Technical Details

### *EXPY*

Hausmann et al. (2006) develop a measure of the revealed sophistication for each product, which they call *PRODY*, as the revealed comparative advantage (RCA)-weighted GDP per capita of each country that exports the good:

$$PRODY_k = \sum_j \frac{(x_{jk}/X_j)}{\sum_j (x_{jk}/X_j)} Y_j$$

where $x_{jk}$ equals exports of good $k$ by country $j$, $X_j$ equals total exports by country $j$, and $Y_j$ equals GDP per capita of country $j$. This is the GDP of the "typical" country specializing in that product, and can be used to measure the sophistication of a country's entire export basket, which the authors call *EXPY*. *EXPY* is simply the *PRODY* of each good ($l$) that the country ($i$) exports, weighted by that good's share in the country's export basket ($X_i$). It represents the income level associated with a country's export package.

$$EXPY_i = \sum_l \left( \frac{x_{il}}{X_i} \right) PRODY_l$$

### Proximity

This is found by first developing a measure of distance between products. We measure the distance between every pair of products based on the probability that countries in the world export both. If two goods need the same capabilities, this should show up in a higher probability of a country having comparative advantage in both. Formally, the inverse measure of distance between goods $i$ and $j$ in year $t$, which we will call *proximity*, equals

$$\varphi_{i,j,t} = \min \left\{ P\left(x_{i,t} \mid x_{j,t}\right), P\left(x_{j,t} \mid x_{i,t}\right) \right\}$$

where for any country $c$

$$x_{i,c,t} = \begin{cases} 1 & if \quad RCA_{i,c,t} > 1 \\ 0 & otherwise \end{cases}$$

and where the conditional probability is calculated using all countries in year $t$. This is calculated using disaggregated export data across a large sample of countries from the World Trade Flows data from Feenstra et al. (2005) and UN COMTRADE.

### Density and open forest

To measure what was nearby, we must use the pairwise measures of distance defined above to calculate the distance of every product from a country's export basket as a whole. We call this measure *density*. It is the distance of good $i$ from country $c$'s export basket at time $t$. It is the sum of all paths leading to the product in which the country is present, scaled by the total number of paths leading to that product. As with proximity, we define $x$ based on whether or not the country has revealed comparative advantage in the product (if $RCA \geq 1$). Density varies from 0 to 1, with higher values indicating that the country has achieved comparative advantage in many nearby products, and therefore should be more likely to export that good in the future.

$$density_{i,c,t} = \left( \frac{\sum_k \varphi_{i,k,t} x_{c,k,t}}{\sum_k \varphi_{i,k,t}} \right)$$

Density is a key variable in the process of growth diagnostics: it can be taken as an indicator of the degree of coordination needed to produce any given product. If the product is very near to the current export basket, density will be high, meaning that most of the capabilities needed in the new sector will already exist in other sectors. On the other hand, if density is low, then the human capital, physical capital, property rights, infrastructure, and every other sector-specific factor of production that the sector needs will not exist, nor can they be easily adapted from what does exist.

This then allows us to evaluate the degree to which coordination failures might be holding back a country. We can adapt density to determine if there are many nearby opportunities for structural transformation available to a country. If there are many nearby opportunities that are not being exploited, this is evidence suggesting that some other constraint is preventing their emergence. On the other hand, if the country simply has no nearby opportunities, and the only options for structural transformation are distant products that would require the simultaneous emergence of many diverse capabilities, then this is evidence suggesting that coordination failures may indeed be preventing structural transformation.

To perform this analysis, we must extend density, which is at the country/product level, to measure the opportunity set for the country as a whole (i.e., at the country level). This measure, called *open forest*, answers the question "how green is your valley?" and is the current export basket in a part of the product well-connected to other new and valuable opportunities for structural transformation, or is it in a sparse, unconnected part of the product space. It is calculated as follows:

$$open\_forest_{c,t} = \sum_i \sum_j \left[ \frac{\varphi_{i,j,t}}{\sum_i \varphi_{i,j,t}} \left(1 - x_{c,j,t}\right) x_{c,i,t} PRODY_{j,t} \right]$$

CHAPTER 2.2

# Possible Impacts of Global Climate Change Policy on Mexico and Other Developing Countries in Coming Years

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After years of largely empty promises among rich countries regarding global climate change, the climate for serious policy action is rapidly heating up. In the United States, the candidates in the 2008 presidential election agreed on the need for new measures — a domestic cap-and-trade program at a minimum and possibly participation in a successor agreement to the multilateral Kyoto regime that set rich-country emission levels for the period 2008–12. In Europe, policymakers are grappling with their already-binding targets in a more serious and analytically supported way than they did in 1997 (or than US policymakers are doing today), and the price of carbon has become a real factor in European firms' decision-making.

Middle-income countries such as Mexico are likely to have to confront the climate change issue quite soon. It is true that climate change is expected to do more damage to tropical and agrarian countries than those in the north, but these effects will take years to become large. However, ways in which awareness and actions by the industrialized countries will impact middle-income countries economically will occur much sooner.

Most likely the most serious efforts to address climate change will remain within the framework of the Kyoto Protocol and successor agreements, under the UN Framework Convention on Climate Change. Thus they will entail quantitative targets for emissions of greenhouse gases (GHGs) by participating countries, leaving it to each national government how to attain its targets, and allowing international trading of emission permits.[1]

## Four likely sorts of economic impact on developing countries

During the budget period 2008–12, only so-called Annex I countries have quantitative obligations — that is, industrialized countries (excluding the United States, which did not ratify the Kyoto Protocol). Nevertheless, four sorts of economic impacts on developing countries are likely.

The first of these economic impacts is the Protocol's spillover effects, most importantly through forms of *leakage* of emission cuts among participating countries. The effect of measures to reduce GHGs in the participating countries should be to lower the world price of oil and coal and raise the world price of natural gas, relative to what these prices would otherwise be. Implementation measures would raise the price of oil to the European or Japanese consumer, reducing world demand for oil, and thereby reducing the price in non-participating countries. Of course, there are plenty of other factors that drive energy prices as well, such as political risk, supply constraints, and world growth. The downward influence in the world price of oil would, in itself, have some negative

economic impact on Mexico, aside from its environmental implications. Another form of leakage is that energy-intensive industries — such as aluminum smelting, cement, and steel — would tend to migrate to countries not covered by the Protocol. This leakage could, in itself, create positive economic opportunities for Mexico, again ignoring the environmental implications. There are less direct spillover effects as well, many of them hard to predict ahead of time. American subsidies for corn-based ethanol, for example, have helped drive up the price of corn worldwide, which has in turned raised tortilla prices in Mexico.

The second area of impact is trading in credits under the Clean Development Mechanism (CDM). Under this feature of the Protocol, countries such as Mexico that have not taken on quantitative targets can still sell to participating countries credits for approved projects, such as preserving tropical forests and cleaning up power generation. Recently registered projects in Mexico include a methane capture plan at Coahuila. Petróleos Mexicanos (PEMEX) has proposed a variety of CDM projects. The effectiveness of the CDM at achieving its environmental goal is in no way guaranteed, and in fact can be considered not even likely.[2]

Third, there will be tremendous pressure on the United States, on the one hand, and the most important developing countries on the other hand, to adopt formal quantitative targets. China, and to some extent India, are receiving the most attention because of their great size (population) and rates of growth (GDP); China is now passing the United States as the world's largest emitter, far ahead of schedule. The United States will not sign on to binding quantitative commitments unless China, for one, signs on. Korea, Rep. (Korea) has far higher income per capita, and indeed its new president has announced the intention that Korean emissions flatten out immediately and turn down — a plan that is too ambitious to be practical from an economic viewpoint, and yet is insufficiently aggressive to satisfy environmentalists, as is so often the case. It seems inevitable that Brazil and Mexico will be included in the group of countries that are expected to take on early commitments, perhaps as early as 2012.

Fourth, the next big new controversy is likely to be efforts in various industrial countries that have adopted targets and are worried about foreign competition from those who have not, to adopt border taxes or other penalties on imports of products judged to be carbon-intensive.

This chapter leads up to an elaboration of the third and fourth kinds of impact.

## The question of participation by developing countries

The international climate change regime needs to include developing countries into the system for three reasons, which are spelled out in Annex 1.

The developing countries, for their part, point out correctly that it was the industrialized countries — not they — who created the problem of global climate change, and they should not be asked to limit their economic development to pay for it. The developing countries are said to have contributed only about 20% of the carbon dioxide that has accumulated in the atmosphere from industrial activity over the past 150 years.[3] Then there is the point that developing countries will bear a disproportionate share of the cost, because they are hotter and dryer already, and more dependent on agriculture. In this sense, they could be asking for compensation, rather than being asked to share the sacrifice. Moreover, in contrast to richer countries, they do not have the ability to pay for emissions abatement. Developing country governments properly consider the raising of their people's economic standard of living their number one priority. Achieving this objective requires raising market-measured income as well as improving the local environment, particularly reducing air and water pollution.[4]

It is hard to disagree with these arguments. But "meaningful participation" in the Kyoto system need not entail economic sacrifice by developing countries, at least not for some decades to come. This argument is not based on diplomatic or political "happy talk," but on sound economic logic, as we shall see.

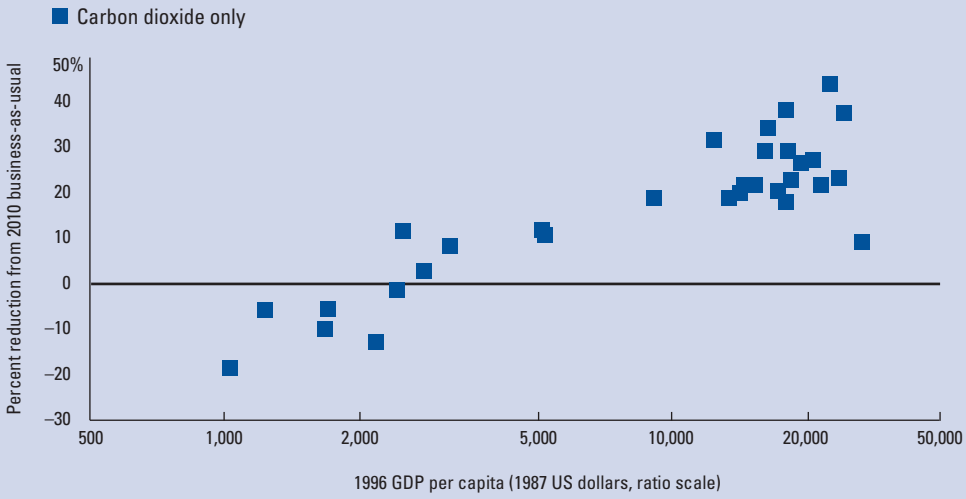
## The gains from trade

If developing countries were to join a Kyoto-like system of targets-with-trading, it would not only have environmental and economic advantages for the rest of the world, but it would also have important environmental and economic advantages for the developing countries themselves. For the sake of concreteness, consider a plan under which developing countries do no more than commit to their "business as usual" (BAU) emission paths and join the trading system. To make it even more real, think of it as a commitment that Mexico and other major developing countries would be asked to make very soon, for the 10-year period 2010–20.

The first thing to notice is that this commitment is not going to hurt developing countries. Mexico would have the right to emit whatever amount it would have emitted anyway. It need not undertake emission reductions unless a foreign government or foreign corporation offers to pay it enough to persuade it voluntarily to do so.

One anticipates that foreigners would indeed offer to pay Mexico enough to persuade it voluntarily to reduce emissions below its BAU paths. The reason is that it could be expensive for the United States, Europe, and Japan to reduce emissions below 1990 levels if the reductions are made only domestically. But the cost of reductions is far lower in China or Mexico. Thus governments and corporations in industrialized countries

**Figure 1** Targeted emissions reduction vs. GDP per capita




Sources: Frankel 2008

will be able to offer terms that make emission reductions economically attractive to these countries. The economic theory behind the gains from trading emission rights is analogous to the economic theory behind the gains from trading commodities. By doing what they do most efficiently, both sides win.

Why is it cheaper to make reductions in developing countries than in the United States? One major reason is that, in industrialized countries, one would have to scrap coal-fired power plants far in advance of their 40-year useful life, in order to replace them with natural gas facilities or other cleaner technologies. This would be expensive to do, because it would mean wasting a lot of existing capital stock. In more rapidly growing countries, by contrast, it is a matter of choosing to build cleaner power-generating plants to begin with, instead of building coal-fired plants, in the case of China, or oil-fired plants in the case of Mexico. When contemplating large increases in future demand for energy, it is good to be able to plan ahead. The benefits include learning from the mistakes of others that have gone before, and taking advantage of their technological advances.[5]

### Reductions relative to BAU, in subsequent budget periods

Developing countries will be asked to accept targets that are more stringent than BAU, especially in later budget periods. A sample guideline, again for concreteness, is that countries might be expected to agree to reductions from BAU when their levels of emissions of carbon exceed one ton of carbon per capita. Latin America in the aggregate is expected to cross this threshold soon after 2020.

The final outcome of negotiations to set such targets would probably be determined by give-and-take bargaining among the parties, such as took place among the countries that accepted targets at Kyoto. What would be a reasonable level where a negotiated compromise might converge? A fair target for developing countries might be one that fits whatever pattern tends to hold among the existing targets agreed at Kyoto. Even though the emission targets agreed at Kyoto reflected the outcome of political negotiations rather than economists' calcu-lations of some definition of optimality, it is possible to discern systematic patterns in the numbers. This approach turns out to allow some *progressivity*, with richer countries making larger reductions than poor ones. Yet it does not go nearly as far as the massive redistribution of wealth that some poor-country representatives unrealistically ask for.

Out of 30 industrialized countries' targets agreed at Kyoto (those with adequate data), the average reduction from BAU was 16%. For the less-rich half of the countries, the average reduction was 5% below BAU, which shows the progressivity in a very simple way.

Statistical analysis can help us understand the progressivity of the targets. To explain the targets chosen, we use control for variables such as per capita income. The statistical analysis exhibits a pattern of progressivity: each 1% increase in per capita income implies a 0.11 to 0.17% greater sacrifice, expressed as greater emissions reductions from BAU (Figure 1). In absolute terms, an increase in income is associated with an increase in the level of the emission target. But we know that an increase in income also implies an increase in the BAU level. The reason we get our key result — that richer countries are making greater sacrifices — is that the increase in the assigned target is less than the increase in BAU. These results are statistically significant.

Further ideas for formulas have been developed that would set targets for countries joining Kyoto. As an illustrative example, when the pattern is extrapolated to Latin America, in one calculation the projected target is about 4% below BAU. The formulas in subsequent budget periods would put gradually decreasing weight on BAU or emissions in the year of agreement. During an intermediate period, they would put increasing

weight on the 1990 level of emissions, as called for in the Kyoto Protocol. This forces emissions to peak in absolute terms and then turn down. In the longer run, as the 21st century progressed, the formulas would assign increasing weight to the criterion of equalizing emissions per capita across country targets, thereby moving in the direction of the sort of equity desired by developing countries.[6]

### Resolving concerns about unintended target stringency

One important objection to accepting any quantitative targets concerns uncertainty about how stringent targets would turn out to be. Calculations regarding the BAU path or the cost of deviations from it are highly imprecise and unpredictable. Poor countries worry that uncertainty surrounding their forecasted economic performance is so great that they cannot currently risk adopting an emissions target that would be binding five or ten years in the future. Even if a particular numerical target appears beneficial beforehand, it might turn out to be something different after the fact. If the country turns out to achieve unexpectedly rapid growth, the last thing it wants is to have to put a stop to it because the accompanying emissions threaten to overrun the target. A response to this concern would be to structure international agreements on these countries' targets to reduce the risk of being inadvertently stringent.

Symmetrically, environmentalists have also expressed a concern on the other side — that a target may, after the fact, turn out to be too lax. They fear that such a target might fail to result in environmental benefits in terms of actual emissions reductions relative to what would have happened in the absence of a treaty. Thus, it is desirable to mitigate the risk of inadvertent stringency while also mitigating the risk of inadvertent laxity — to narrow the variability of the effective stringency of the target without relaxing or tightening the intended target itself.

One solution is indexation of the emissions target. The general notion is to agree today on a contract under which the numerical target depends in a specified way on future variables whose values are as yet undetermined.[7] Future economic growth rates are probably the biggest source of uncertainty. A simple format would index a country's aggregate emissions to future income alone. Other possible proposals include in the formula other variables like population.

More specifically, for every percentage point in GDP growth that is higher or lower than forecast, the emissions target is raised or lowered by a corresponding amount. If the relationship were fully proportionate, this rule would be equivalent to what is called an emissions efficiency standard or intensity target. But a better formula would make the adjustment a little less than proportionate.[8] The proposal would require countries that are doing a bit better to contribute more than those that are not, maintaining principles of progressivity and insurance without penalizing them unduly for their success.

Indexation is only one possible approach to removing some of the economic uncertainty that holds back commitment to a quantitative emission target. Another possible idea, suitable for any country that is willing to implement its program for meeting its targets via a carbon tax or tradable permit system, is an escape clause or safety valve. This mechanism eases the quantitative limit when the price of carbon threatens to rise above a pre-agreed threshold. These solutions to the uncertainty problem would make it more likely that the target will turn out to fall within the range intended, where it brings benefits — both environmental and economic — to developing countries and industrialized countries alike.

### Penalties by participating countries against imports from others

Some important industrialized countries are considering border tax adjustments to offset effects of specific domestic GHG taxes on the competitiveness of its industry vis-à-vis countries that, like Mexico, are not covered by emission targets.[9]

The contemplated application of trade barriers is furthest advanced in the case of the European Union (EU). French President Sarkozy warned in January that "…if large economies of the world do not engage in binding commitments to reduce emissions, European industry will have incentives to relocate to such countries.… The introduction of a parallel mechanism for border compensation against imports from countries that refuse to commit to binding reductions therefore appears essential, whether in the form of a tax adjustment or an obligation to buy permits by importers. This mechanism is in any case necessary in order to induce those countries to agree on such a commitment."[10]

Subsequently the European Union agreed: "Energy-intensive industries which are determined to be exposed to significant risk or carbon leakage could receive a higher amount of free allocation or an effective carbon equalization system could be introduced with a view to putting EU and non-EU producers on a comparable footing. Such a system could apply to importers of goods requirements similar to those applicable to installations within the EU, by requiring the surrender of allowances."[11]

Less legitimate are possible applications of trade barriers by the United States.[12] Of 12 market-based climate change bills introduced in the 110th US Congress, almost half called for some border adjustment: either a tax applied to fossil fuel imports or permit requirement for energy-intensive imports. Another example is the Energy Independence & Security Act 2007 (Section 526), which "limits US government procurement of alternative fuel to those from which the lifecycle greenhouse gas emissions are equal to or less than those from conventional fuel from conventional petroleum sources."[13]

Would such measures be compatible with the global trade regime? Clearly a country taxing domestic coal production (or raising the price through a tradable permit system) can apply an equivalent tariff to imports of coal. But can measures be directed against $CO_2$ emissions *in other countries*, as embodied in electricity, or in goods produced with it? Such import barriers would be aimed at what are called Processes and Production Methods (PPMs). They were not found to be consistent with the General Agreement on Tariffs and Trade (GATT), as, for example, in the famous case where the United States had tried to protect dolphins by keeping out Mexican tuna. What about under the World Trade Organization (WTO), whose founding agreements granted more respect to the environment? Annex 2 offers three precedents relevant to the proposition that penalties against PPMs such as GHG emissions can be consistent with the WTO (though environmentalists have done a poor job building on these PPM precedents). For penalties against imports from developing countries such as Mexico to be acceptable under the WTO, they would have to be properly designed. They are more likely to be WTO-consistent if they are:

1. imposed by Kyoto ratifiers such as the European Union, rather than the United States;
2. multilateral rather than unilateral;
3. imposed against sectors directly relevant to the goals of Kyoto, particularly energy-intensive manufactures, rather than imposed as sanctions on unrelated trade; and
4. non-discriminatory.

Even in the best of circumstances, there would be difficulties. It would be hard to determine carbon content of manufactures. The biggest danger is that each country would impose border measures in whatever way suits national politics, so that they come out poorly targeted, discriminatory, and disguisedly protectionist. In this case they would deserve to run afoul of the WTO.

Of course the United States is perfectly capable of misappropriating the environmental banner out of economic motivations (ethanol subsidies). It could impose barriers against Mexico in the name of global climate protection even if contrary to international agreements.

## Policy conclusions

It is possible that Mexico will soon find itself on the wrong end of partners' import barriers that are labeled as efforts to equalize the cost of measures reducing emissions of greenhouse gases. The justification will be to avoid leakage of emissions and loss of competitiveness by energy-intensive industries in the partner country. One such partner country will be the United States. The exercise would be hypocritical if the United States has itself still not taken serious efforts such as ratifying the Kyoto Protocol. The import barriers might come as part of legislation to address climate change, such as the bills proposed by Senator Lieberman in 2007–08; or it might come as part of efforts to "renegotiate NAFTA," as discussed during the campaign by newly elected President Barak Obama.

If such measures are thinly disguised protectionism, Mexico may be able to take the case to the WTO. But the broader political issue must be taken seriously, whether the threat is hypocritical or ingenuous. Neither the WTO nor anyone else will want to get caught on the wrong side of the climate change issue in coming decades, if it can help it.

Developing countries quite rightly point out that they should not have to agree to binding numerical cuts in emissions before the rich countries do so. Meanwhile, it is clear that the United States will not ratify a Kyoto successor regime if major developing countries do not accept binding quantitative limits at the same time.

There is only one way to reconcile the seemingly irreconcilable conflict. In the budget period that begins in 2013 (that is, in the first budget period in which the United States, it is hoped, agrees to quantitative targets below its BAU path), major developing countries agree to growth targets that are set in line with their own BAU paths. The BAU path shows the rate of growth of emissions that experts estimate would take place in the absence of an international agreement. What is accomplished by this? Mexico is not hurt, because it can emit as much as it was expected to anyway. In fact, it will probably gain — from the opportunity to sell internationally permits generated by emission reductions that are cheaper to make at home than on the world market. Simultaneously, American businessmen and environmentalists should be satisfied because the arrangement forestalls leakage — that is, it prevents Mexican firms from taking advantage of a higher cost of carbon in the United States by raising their own emissions. These ideas are elaborated by Frankel.[14]

## Notes

1 Many economists would prefer alternatives such as a global carbon tax, while the Bush administration indicated a preference for purely voluntary measures. But neither of these two approaches is likely to prevail.

2 Regarding CDM, Joint Implementation (JI), or other project-based credits, the problems of baselines and "additionality" are, in my view, nearly insurmountable. The use and abuse of such provisions may only undermine the respectability of international trading of emission permits — for countries that have agreed to baselines — where there is at least a hope of compliance because there is at least something with which to comply (as opposed to deals to buy pieces of paper with no property rights).

3 It has been estimated that if one accounts for the contribution of land use change and deforestation to the atmospheric build-up of $CO_2$, developing countries are in fact responsible for about 43% of all $CO_2$ in the atmosphere now. See Austin et al. 1998.

4 In their more unrealistic moments, some spokesmen for developing countries argue that equity requires setting quantitative targets at equal amounts per capita. It is true that equity in itself suggests moving in this direction. In fact, this proposal would not even take into account that the industrialized countries have done most of the emitting to date while the environmental damage falls disproportionately on the already-hot, largely agrarian, poor countries. But the rich countries would never accept the huge effective transfer of wealth from them to the poor that is implicit in the per capita formulation. The status quo of high emissions from rich countries cannot be ignored, because the status quo is the fall-back position when international negotiations fail (the "threat point" in the language of game theory).

5 An extreme example of how measures to reduce carbon emissions can have low costs in developing countries is the case of subsidies to fossil fuels, especially coal, which is the most carbon-polluting form of fuel. Eliminating such subsidies would create substantial immediate benefits — fiscal, economic, and environmental — even before counting any benefits under a Kyoto agreement. (Mexico apparently does not subsidize coal or petroleum products, but does subsidize gas; see Saunders and Schneider 2000, Table 1, p. 4.)

6 Frankel and Aldy 2004; Frankel 2007, 2008.

7 An analogy is a cost-of-living adjustment clause in a labor contract. It specifies a given increase in the wage for every small increase in the Consumer Price Index — thus reducing uncertainty over *real* wages.

8 For example, every 1% of extra growth might call for an automatic 0.7% increase in the target. Or the coefficient could be 0.5, which would make the formula into a simpler "square root" rule.

9 This section draws in part on Frankel 2005.

10 Letter from Sarkozy to Barroso, January 2008.

11 Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emissions allowance trading system. Brussels, January 2008. Paragraph 13.

12 Resources for the Future, available at http://www.rff.org/Pages/default.aspx.

13 *FT*, March 10, 2008**.** Canada's oil sands are vulnerable.

14 See Frankel 2007, 2008.

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## Annex 1: The international climate change regime needs developing countries

Why should developing countries have to worry about mitigating climate change in the first place (leaving aside worrying about the environmental costs)? After all, the UN Framework Convention says clearly that it is up to the industrialized countries to go first. There are three major reasons:

1. The developing countries will be the source of the big increases in emissions in coming years according to the BAU — that is, the path along which technical experts forecast that countries' emissions would increase in the absence of a climate change agreement. Developing countries will represent up to two-thirds of global carbon dioxide emissions over the course of this century, vastly exceeding the Organisation for Economic Co-operation and Development (OECD)'s expected contribution of roughly one-quarter of global emissions. Without the participation of major developing countries, emissions abatement by industrialized countries will not do much to mitigate global climate change.
2. If a quantitative international regime is implemented without the developing countries, their emissions are likely to rise even faster than the BAU path, because of the problem of leakage. Estimates vary about the damage in tons of increased emissions from developing countries for every ton abated in an industrialized country. But an authoritative survey concludes "Leakage rates in the range 5 to 20% are common."[1]
3. The opportunity for the United States and other industrialized countries to buy relatively low cost emissions abatement from developing countries is crucial to keep the economic cost low. This would increase the probability that industrialized countries comply with the system of international emissions commitments. Indeed, the United States will not join a Kyoto-like agreement in the first place if developing countries do not accept analogous targets.

**Note:**

1 International Panel on Climate Change 2001, Chapter 8.3.2.3, pp. 536–44.



## Annex 2: Precedents for WTO-consistent border measures against GHG emissions

There are three relevant precedents:

1. The first precedent is the Montreal Protocol on stratospheric ozone depletion. Trade controls were written into this agreement, with two motivations: (1) to encourage countries to join, and (2), if major countries had remained outside, these controls would have minimized leakage — the migration of production of banned substances to nonparticipating countries. In the event, (1) worked, so (2) was not needed.[1]
2. The famous shrimp-turtle case was the most important WTO case establishing that a country (the United States) can apply trade penalties (against imports of Asian shrimp) when the goal is a foreign PPM (protecting sea turtles in the Indian Ocean). This case shows that there is a stronger presumption that measures targeted on environmentally destructive activities in other countries are more likely to be acceptable if the externality is global (CFCs/Ozone or shrimp/turtles), as is $CO_2$.
3. A new WTO Appellate Body decision (December 2007) regarding Brazilian restrictions on imports of retreaded tires confirms that WTO Article XX(b) includes climate change. Rulings "accord considerable flexibility to WTO Member governments when they take trade-restrictive measures to protect life or health … [and] apply equally to issues related to trade and environmental protection … including measures taken to combat global warming."[2]

**Notes:**

1 A black mark on the Montreal Protocol has been the insistence by the United States that it be allowed to use methyl bromide, a potent destroyer of the ozone layer, so that its strawberry farmers, for example, will not be at a cost disadvantage against Mexican competitors.

2 Brendan McGivern, December 12, 2007 (personal communication).

CHAPTER 2.3

# Mexico's Impact on the US Labor Market: A Reason to Renegotiate NAFTA?

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The North American Free Trade Agreement (NAFTA) is of critical importance to the Mexican economy. Since its negotiation in 1993, the Mexican economy has been transformed into a much more open economy that has become increasingly dependent on its trade with the United States. Whereas real GDP in Mexico reached an average 3% annual growth between 1994 and 2007, over the same time, the volumes of Mexican exports and imports of goods and services increased by 11 and 10% per year, respectively. As a result, exports of goods and services increased from 15.2% to 32.5% of GDP while imports increased from 19.2% to 34.4%. With the United States accounting for over 80% of Mexican merchandise exports, Mexico's relationship with the United States is clearly its most important by far. In this context, Mexico needs to be prepared for US calls to renegotiate NAFTA. In this chapter, I analyze some of the forces generating these calls and consider Mexican options.

In the first part of the chapter, I argue that immigration and trade have actually been far less damaging to the United States than many suggest. Both the poor performances of the US labor market and increased income equality in the United States have domestic origins. Nonetheless, there is no denying that political pressures have arisen as a result of the growing backlash against globalization. Consequently, newly elected President Barak Obama is likely to seek NAFTA renegotiation. In the second part of the chapter, I argue that this would be very risky. Instead, Mexico should take advantage of the opportunity to press for cooperation agreements that could advance its interests.

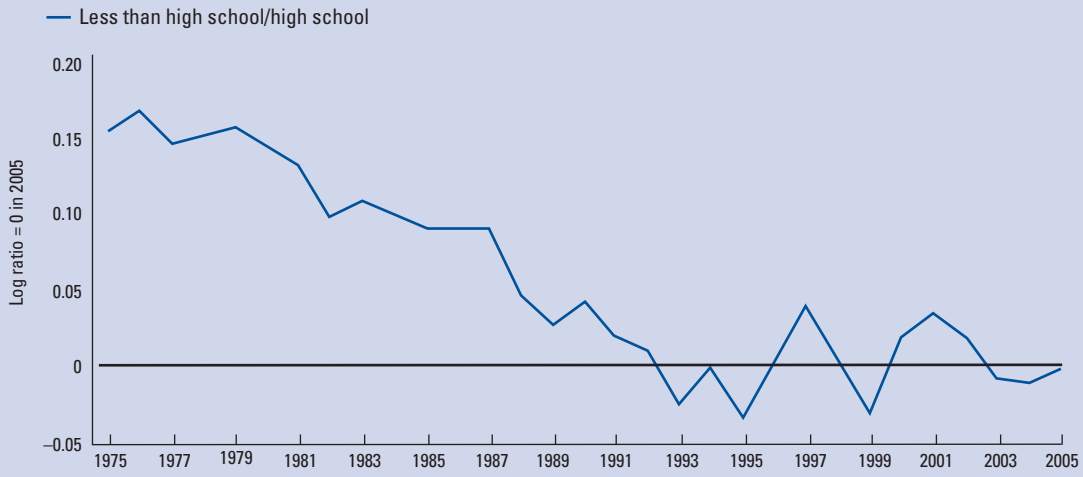


## NAFTA and its impact on the US labor market

American workers are anxious. Even before the onset of the current slowdown, their income growth had been disappointing. From 2000 to 2007, for example, average real hourly wages for both blue- and white-collar workers have increased by just 3.5% (a meager half a percent per year). In addition, although the overall unemployment rate was reasonably low in 2007, averaging 4.6%, manufacturing employment had not increased since 2003 and it remains almost 3 million below its 2000 levels. At the same time, in 2007, all-time highs were reached in the share of profits in US incomes and the share of income earned by the top 1% of Americans.

Many Americans have pointed to immigration and trade as key factors in job loss, poor wage growth, and increasing income inequality. For example, a *Fortune* magazine poll conducted in January 2008 asked Americans to name the most important reason for the recent economic slowdown. The largest number — 28% — answered "losing jobs to economies where labor is cheaper" and an additional 8% mentioned "foreign competition." As many as 78% of the respondents said that "trade has made things worse for American workers."

**Figure 1** Ratio of annual earnings of dropouts to high school graduates




Source: Bureau of Labor Statistics and US Census Bureau, Current Population Survey, Educational Attainment data, available at www.census.gov

This has placed the spotlight on United States–Mexico economic relations. In the Republican presidential primary, immigration was a major source of contention; in the Democratic primary, the candidates competed as to who hated NAFTA more. Indeed, it is likely that President Barak Obama will seek to renegotiate NAFTA. Mexico needs to prepare its response. But three key features of the US labor market suggest that these views are actually mistaken.

First, while the rich are getting richer in America, the poor are not getting poorer. In particular, since the early 1990s, the wages of the least skilled Americans — those potentially the most affected by immigration — have not fallen in relative terms.

Second, imports from Mexico were not responsible for the major declines in US manufacturing employment that took place in the years 2000 to 2003. In fact, in those years US imports from Mexico barely increased, indicating that jobs being outsourced to Mexico were not an important factor in the employment loss.

And third, the recent increases in US income inequality are the result of rising profits and incomes of the super-rich and have little to do with trade with Mexico or other developing countries. Indeed, although overall real wage growth in the United States has been sluggish since 1999, there has been almost no rise in wage inequality along the lines of skill.

## Immigration

We would expect that the impact of immigration on wages would be felt especially at the bottom of the wage distribution because recent immigrants to the United States (of whom about half come from Mexico and Central America) generally have much lower levels of education and skills than native-born Americans.

In the 1980s, by most measures, wage inequality increased in the United States, with wages in the middle growing faster than those at the bottom but more slowly than those at the top. Not surprisingly, both increased trade with developing countries and increased immigration featured prominently in explanations for this. Although most studies concluded that technological change was far more important than trade, several concluded that trade could account for between 10 and 20% of the rise in wage premium for college graduates over high school graduates.[1] Immigration was not viewed as an important factor in the rise in this premium, but some argued it was important in the weak growth of wages of workers with less than a high school education. One study estimated that immigration could explain about half of the 11% decline in the relative wages of these workers compared with those of high school graduates.[2] But this claim was sensitive to the approach used in the study. Almost no study has been able to detect a significant impact of increased immigration on relative wages in local labor markets.

What is remarkable, however, is that, since the early 1990s, the relative wages of workers at the bottom of the US wage distribution have not declined any further — by some measures, they have actually increased over those in the middle. In particular, the least well educated Americans — those with less than a high school education — have seen their wages rise somewhat *faster* than the wages of those who have finished high school (Figure 1). Similarly, wages at the tenth percentile have actually increased more rapidly than the median.

Labor economists in the United States are now trying to explain why in the 1990s workers in the middle did more poorly than those at the bottom or the top. One view is that both trade and technology hurt workers in the middle of the wage distribution and helped workers at the top.[3] Workers at the bottom were said to be immune from these pressures because they are mainly engaged in providing personal and other services that have to be supplied locally. While this story may help in

explaining wages at the top and the middle, since many immigrants are actively engaged in service activities, it does not explain why immigration would not have affected wages at the bottom.

Why might immigration, particularly of relatively unskilled and uneducated Mexican workers, not exert a dominant downward pressure on the wages of unskilled Americans since the early 1990s? One possibility is that immigrant workers are not actually close substitutes for domestic workers and therefore they take jobs that are different from those filled by Americans. Peri and Sparber (2007) and Peri (2007), for example, argue that foreign-born workers specialize in occupations that require manual tasks such as cleaning, cooking, and building. This causes natives — who have a better understanding of local networks, rules, customs, and language — to pursue jobs requiring interactive tasks such as coordinating, organizing, and communicating. Peri and Sparber report "Simulations show that this increased specialization mitigated negative wage consequences of immigration for less-educated native-born workers, especially in states with large immigration flows."[4] Another possibility is that, even though there *is* downward pressure on skilled wages being exerted by immigration, there are other offsetting factors raising these wages. One is that, as Americans become better educated, domestic workers with low skills are increasingly hard to find so the immigrants simply make up the gap. A less benign reason is that many Americans with low skills have been incarcerated.[5] Another is that the pattern of demand has shifted toward services these kinds of workers produce such as construction. All told, though, there is scant support for the view that after 1990 immigration depressed wages.

### Manufacturing employment

Over the past decade, US trade — particularly with developing countries — has increased rapidly. Because of this, the Democratic candidates seeking votes in Ohio in the 2008 US election cycle found it impossible to resist joining those who blame trade agreements such as NAFTA for the traumatic loss of manufacturing jobs in the United States over the past six years.

In fact, trade's role in America's current economic difficulties is deeply misunderstood. While the candidates kept talking about jobs going overseas, the irony is that, over the past year, trade has helped to stave off the recession. Since early 2007, the US trade deficit has actually narrowed by US$50 billion as exports have increased more rapidly than imports. Nonetheless, "NAFTA" remains a curse word for much of the US labor movement.

Undoubtedly some jobs were lost when some US firms relocated to Mexico at the time of NAFTA's implementation in 1995. After all, trade's benefits come from increased specialization. But, despite the dire predictions made when NAFTA was implemented, in its first five years, overall US manufacturing employment actually increased by 250,000—and overall US employment rose by 17.5 million.

US manufacturing payrolls did fall by 2.7 million between 2000 and 2003 and have not yet recovered. But that drop happened far too late to be ascribed to NAFTA. Instead, it happened because labor productivity continued to grow at the same time as domestic spending on computers and other equipment plummeted when the dotcom boom burst. Weak US export growth also played a role, but over those three years, imports from Mexico barely grew, and imports into the United States from all countries did not increase their share in the US market.

### Inequality

Over the past decade, imports from developing countries have grown rapidly and, simultaneously, income growth in the United States has been very unevenly shared. But a closer examination indicates that most of the increased inequality is not of the kind that would be caused by trade and is more likely to have been made in America.

Trade, particularly with developing countries, is likely to have its most important impact on wage inequality. Trade skeptics certainly have a plausible case, therefore, when it comes to wage inequality. Indeed, they have support from mainstream trade theory. In particular, if imports from developing countries make intensive use of unskilled labor — think clothing and footwear — expanded trade with developing countries could be associated with downward pressure on the wages of less-skilled workers in the United States.

In the 1980s, as noted, this seemed to be the case because at the same time as trade with developing countries increased there was a rise in US wage inequality along skill lines. But a second big surprise is that since 1999, despite the rapid increases in imports from developing countries, many US wage and compensation measures indicate little evidence of increased inequality. Between 1999 and 2006, the Employment Cost Index — which takes account of both benefits and take-home pay — shows that increases in white-collar pay (3.6%) have been roughly the same as those for blue-collar workers (3.5%). Similarly, the wages of workers with just a high school education have risen at the same rates as college graduates, and both have actually increased more slowly than earnings of high school dropouts.

Given the growing scale of the trade competition from low-wage countries, this is surprising, although it could be explained by a combination of three factors. The most benign is that the United States no longer produces many of the goods that it imports. Paradoxically, increased trade is no longer causing more inequality because specialization is more advanced. Thus

cheaper imports make consumers better off but do not exert downward pressure on US wages.

The second factor is that many of the goods imported from developing countries are actually now quite sophisticated and not particularly intensive in the use of unskilled or low-paid workers. For example, weighting US industry wages by the shares of imports from Mexico in 2005 yields an average wage that is 17% above the US average wage and 13% above the US manufacturing wage.[6]

The third factor is that, in response to trade and technological changes in the 1980s, US manufacturers now use automated production and skilled workers to produce goods that were once considered to be intensive in unskilled labor. Although this may cause displacement, this competition does not increase wage inequality. All three factors are present in US trade.

What about profits? Couldn't increased trade with developing countries put downward pressure on *all* US wages and thus increase profits? Again, in theory this could happen. But there are reasons to be skeptical. First, labor's share tends to fluctuate over the business cycle. It is typically high during recessions and low in the first part of recoveries. Despite the increased openness of the United States to trade, over the long run, labor's share in US income has not trended downward. While low, in 2007 labor's share in national income was at the same level as it had been in 1997. Second, although there was a great scare about the impact of off-shoring to India in 2004 and there are additional concerns about what might happen in the long run, it is now widely understood that the scale of the off-shoring in the form of Indian employment servicing the United States (around 800,000 workers in 2007) has been far too small to have much of an impact on the US labor force of 150 million workers. And third, labor's share has not been particularly low in the sectors that are involved in international trade. Instead, almost half the profit growth since 2000 has been concentrated in the financial sector — and that unquestionably is changing, given the current financial meltdown.

## Implications for Mexico

Those who claim that immigration and trade are the most important reasons for America's economic difficulties are fundamentally mistaken. But the weak wage and employment performance have created political pressures in the United States that need to be managed.

Mexico would be within its rights to refuse to renegotiate NAFTA. There is little support for the claims that NAFTA has been important in US economic difficulties and reopening the negotiations will create risks and difficulties in both countries. It would also be damaging to the United States to withdraw from the agreement, and a strong case can be made that the economic benefits from a new agreement would not compensate for the political risks. In Mexico, the protests over implementing NAFTA early this year demonstrated that there remain opponents who would seek to weaken the agreement, but the real political risks are in the United States. There could be a bruising battle over ratification of a new NAFTA in the US Congress. With a Democratic President and Democratic majorities in both Houses of Congress, passage of a renegotiated agreement would surely not be certain. Strengthening NAFTA provisions on labor and environment to mirror those of the US-Peru Free Trade Agreement (FTA) would help garner support among Democrats, but many of the Democrats are protectionists and they could still reject such an agreement. In addition, the provisions could lead to less support from Republicans, who would not feel pressure to vote for an agreement negotiated by a Democratic President. Another demand made by Democrats and US labor unions is to weaken some of NAFTA's provisions on investor-state dispute settlement. US multinational firms would, however, object vociferously to such changes. If these amended provisions are not included in a new NAFTA, it would give US labor a pretext to oppose it; if new provisions are included, it would weaken business support.

If President Obama does call for NAFTA's renegotiation, it could lead to pressures on Mexico to respond positively. And even if it indicates a willingness to negotiate, the uncertainty created by a protracted negotiation could be damaging to the Mexican economy. *A preferred option, therefore, would be to negotiate a new package of cooperation agreements that would allow the US President to save face without jeopardizing the existing agreement or creating uncertainty about how NAFTA might change.* The new package could include new side agreements on labor and environment that could be implemented without exposing the rest of the NAFTA agreement to the risk of rejection. The provisions of these side agreements could, for example, mirror those in the US-Peru FTA and require dispute settlement procedures that are similar to those in NAFTA. In addition, the NAFTA countries could include in the package several other cooperation agreements in areas where Mexico and Canada have particular interests. Three examples follow:

- **Security.** Both Canada and Mexico have legitimate concerns about the adoption of tighter US security measures. In particular, Mexico's competitive advantage in the US market is partly dependent on the efficiency with which the border operates, and that is now being threatened by security and visa measures. A new agreement should outline a program for increased cooperation in this area. Provisions for preclearance of business people and cargoes and the use of the most expeditious technological approaches should be implemented. Shipments within North America must move smoothly — through compliance at the point of origin and through sophisticated track-

ing of trucks, railcars, cargo planes, and ships as they move merchandise across the land, air, and sea borders.

- **Environment.** Mexico and the United States have an interest in improving the environment. The North American Development Bank (NADB) — which is designed to deal with environmental problems as determined by the Border Environment Cooperation Commission — is seriously underfunded, and Mexican municipalities are starved of revenues. The NADB's capital base should be increased incrementally from US$4.5 billion to US$10 billion, and instead of a 50-50 split between the United States and Mexico the funding should be 75% from the United States and 25% from Mexico. Other areas in which cooperation agreements could be signed include energy, immigration, and transportation — particularly resolving disputes over trucking.
- **Immigration.** A sensible immigration agreement would include (1) a modified amnesty program for illegal immigrants who have lived and worked in the United States for a long time; (2) an expansion of temporary work visas; and (3) more rigorous control of the border.

If it should turn out that this agreement package approach is not feasible and NAFTA itself is to be renegotiated, Mexico should insist that the US President obtain Trade Promotion Authority so that any agreement that is reached cannot be amended by the Congress. In addition, it should use the opportunity to press for the inclusion of reformed rules relating to subsidies and anti-dumping and to spur necessary reforms in the energy sector.

## Notes

1 See Cline 1997 for an excellent summary of the literature.

2 Borjas et al. 1997.

3 Autor, Katz, Kearny 2005.

4 Peri and Sparber 2007, abstract.

5 Borjas et al. 2006.

6 Lawrence 2008, p. 40.

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CHAPTER 2.4

# Small and Medium Firm Lending in Mexico: Lessons and Current Issues

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Small and medium enterprises (SMEs) represent more than 99% of all Mexican firms.[1] They have accounted for more than 70% of all employment since 1993, and they generate more than 50% of GDP.[2] Mexico is often cited as one of the world's most entrepreneurial countries in terms of the percentage of its population that has started or is in the process of starting a business venture. Yet there is evidence that Mexico is not friendly to entrepreneurs. It is estimated that between 60 and 90% of new ventures are started in the informal sector. In addition, although small businesses are proliferating, they do not seem to be growing, as demonstrated by shrinking numbers of medium enterprises and the registered employment within them. Thus, while Mexico has made room for entrepreneurship, it does not seem to foster the kind required for vibrant economic growth.

One of the largest roadblocks to SME development seems to be the access of these smaller firms to competitive financing. More than 60% of Mexican businesses finance their operations through trade credit, which is equivalent to an interest rate of 100% to 150% *per year*. An additional 15% of firms are financed through large corporations under similarly inefficient conditions.[3] In fact, Mexico is the worst performer of all Organisation for Economic Co-operation and Development (OECD) countries in private credit placement, and it is one of the worst in Latin America, with a level of only 18% of GDP (Ecuador and Nicaragua, for example, place 20% of GDP while Chile comes in at around 60%).

Not only has Mexico exhibited a poor financing environment historically, but the ratio of credit to GDP has actually declined over time. SMEs have been particularly hard hit by this trend. Until 1985, development banks in Mexico — such as *Nacional Financiera* (NAFINSA) and *Banco Nacional de Crédito Rural* (Banrural) — played a central role in business financing through several government-sponsored funds. Although their aim was to complement the role of commercial banks, in most cases they actually substituted all SME financing within the import substitution philosophy of the 1970s and 1980s. Due to several structural and contextual factors, including the repeated financial and macroeconomic crises as well as the nationalization of the banking sector, these development banks lowered their activity considerably during the decades of the 1980s and 1990s, and private banks did not step in to fill the void.

During the Fox presidency, a new agency was created within the Ministry of the Economy (ME) to design policies to increase SME competitiveness. An initial thorough diagnosis reported that the lack of access to competitive financing was the largest binding constraint that SMEs faced, followed by a lack of access to business skills and to competitive technologies. To activate the SME credit market, the ME launched the National Financing System program (or SINAFIN, for its initials

in Spanish). During its first five years of operation, and even though it is a relatively small program (US$160 million were invested between 2003 and 2007), it generated very positive results. From a rate of no loans to SMEs from commercial banks, around 90,000 loans were granted in 2007 alone. More than 200,000 loans have been granted through the program, with a total value of close to US$6 billion. Because of this evident success, it presents a unique opportunity to analyze how a small government intervention can lead to an explosion of a large market that was missing despite huge apparent needs.

In addition, because Mexico is a federation and because of the specific way in which this program was designed, there are large differences in the results achieved by the program in different states, where the differences are not attributable to structural factors such as the economic configuration, the party in power, or the relative wealth of the state. The program therefore presents a natural experiment where the exact same centrally defined policy generated different results in different states. Because of this, it allows us to compare results between states to gain insights both into the processes of policy design and implementation and into the particular intricacies of SME lending.



## Data and methods

To analyze the different aspects of the program, we collected extensive qualitative and quantitative data. On the quantitative side, we accessed the registry of all loans granted through the program, which contains information on all the companies that have received loans. This includes firm characteristics (sector, size, location, sales, and so on) as well as loan size and use, lending intermediary, type of guarantee used, whether the guarantee was claimed (that is, whether the loan became delinquent), and other useful information. The database contains around 106,000 separate observations extending from the origin of the program to September of 2006.

In terms of qualitative data, a series of in-depth, ethnographic interviews and observations at the federal level and across six different states were performed to further explore the details of different change efforts.[4] We totaled just under 200 formal, documented, semistructured interviews and upward of 50 other nondocumented but pertinent informal interviews. These interviews covered individuals in all relevant areas of the market, including government officials (at the federal and state levels), bank managers, nongovernmental organization (NGO) managers, business association representatives, and so on. We also made an effort to observe as many client-bank interactions as possible, as well as several loan-contract signings. On top of these interviews, we attended meetings at the ME, participated in some of their program discussions, and spent many days working in their offices and analyzing data together with their team. Additionally, we participated in several federal- and state-level seminars and symposiums where all the relevant organizational actors coincided, and met with several government officials and bank directors to discuss and validate our findings (none of these additional interactions are recorded as interviews).

## Results

Once the newly formed SME team defined the activation of a credit market as its priority, it sought to understand what was limiting its growth. To gain insights into this area, it organized a set of roundtables with business owners, business representatives, development bank managers, and managers of bank and non-bank financial intermediaries. This process revealed that business credit was failing at several points in the value chain. Commercial banks did not have any credit products that were attractive to businesses, development banks did not have any programs that could successfully foster lending, and businesses were far removed from the financial sector and did not trust banks.

### The SINAFIN and the missing market

A significant part of the breakdown came from the fact that most commercial banks had an extremely negative view of the SME segment, perceiving it as economically risky. This perception was fueled not only by lack of knowledge about the segment but also by the aftermath of the 1995 financial crisis and the poor credit culture that was generated by some previous programs. Most of the (scant) SME financing that had existed was granted through development banks and state-level government funds. The majority of these programs, with few exceptions, had poor results because of their excessive bureaucracy and, in many cases, because they were used as political tools and were run in a clientelistic fashion, which resulted in low recovery levels and the promotion of a poor payment culture. In addition, because of the 1995 banking crisis together with the banks' sole focus on government and corporate credit, Mexican banks in general lost their ability to perform business credit analysis; many of them lacked the organizational skills required to do so. On the demand side, given the historical lack of business credit and the questionable collection practices followed by the financial sector in the aftermath of the 1995 crisis, most SME owners completely lost their trust in commercial banks and stopped seeing them as a viable option for their financing needs. With this trust, SMEs also lost their ability to manage a loan application process or an actual bank loan.

Given the distance that existed between financial intermediaries and SMEs, the ME sought to create a new type of guarantee program, in conjunction with relevant players, that would allow commercial banks to experiment with new credit products for SMEs with a limited level of risk. Such pilot products would gradually allow banks to test the SME segment and slowly gain

knowledge of it by gathering statistical information and sharpening risk profiles. What followed was a design process by which three banks and several state governments became highly involved with the ME in the creation of pilot guarantee products, where each bank tested a different alternative according to its internal policies and organizational characteristics. Once a product started generating results, it would be modified according to the information it generated, which was also shared with the other active actors to also modify their versions of the product. Both the actual credit products offered and the operational characteristics of the guarantees that supported them were developed following this experimental pattern, eventually converging on two standardized solutions that were offered to the entire financial sector through an innovative auction mechanism (also the result of several iterations).

### The SINAFIN as a policymaking process

The SINAFIN is remarkable in several ways.[5] First, it managed to transform, in a period of less than five years, a sector in Mexico that has been characterized by its rigidity and resistance to change. Second, when comparing successful cases of SME credit activation at the bank, state, and federal levels, a very consistent pattern emerges in the *process* that was followed to design and implement the programs. The pattern that emerges is one where programs are designed not by a group of senior policymakers who define how to best align incentives, but by following a bottom-up, experimental approach; where it is recognized from the beginning of the process that there is more than one solution to the problem, but no solution is known *ex-ante*; where several options are attempted and are allowed to fail in order to learn where the largest barriers lie; and where information is rapidly shared to adjust the experiments and eventually converge on a solution. In this process, the role of senior managers and government officials is not so much to define what the solutions will look like but rather to provide the platform where all the relevant actors can collaborate in a joint definition, coordinate and regulate their efforts, and broker potential conflicts among them.[6]

In general, successful processes started with the identification of all the relevant organizational actors (usually through self-selection to an open invitation) and the creation of a space where all were asked to jointly analyze the problem and identify the key binding constraints that stood in the way of a solution. In the case of SME financing, for example, relevant organizational actors included banks, non-bank financial intermediaries, development banks, relevant NGOs, business associations, individual business owners, academics, and government officials. The initial consultation process generally served three important purposes:

- First, it provided an initial definition of the specific constraints that needed to be addressed.[7]
- Second, it provided a formal stage to coordinate efforts to address them.[8]
- Third, and more importantly, it allowed government officials (or in some few cases proactive private sector managers) to identify specific people within organizations who understood the problem, were enthusiastic about working on a solution, and had the ability to actually mobilize resources around it. It also allowed these interested agents to identify each other and engage in collective action.

This identification of "change agents" is important for several reasons. First, within any institutionalized setting (such as a financial market) there are basically three types of individuals: those who strongly believe in the status quo; those who can envision an alternative (but also recognize the risks involved in pursuing it); and those who are relatively ignorant about the issues but who, given the uncertainty that surrounds them, choose to defer to the first type and maintain the status quo (this group should comprise the large majority of people).[9] Note, however, that at any given moment it is impossible for actors within the system to identify others' types, as all the incentives are aligned to maintain the status quo.[10] In consequence, agents who can envision an alternative remain inactive because they don't know how many others would be sympathetic to a change effort and must assume that few, if any, would. Once types are revealed, potential change agents can easily gauge the relative support they could find for a change process and can band together to create an initial critical mass.

Second, this identification is important because organizations — especially government agencies — are typically resource and time constrained. The identification of individuals within the system who already understand the issues and are willing to mobilize around them allows for the focalization of efforts as well as a more efficient use of resources in the design of programs.[11] The third, and related, reason is that change efforts require experimentation. This is both because solutions are not known *ex ante* and because individuals who are invested in the status quo will be willing to change to an alternative only once it has proven to work. Experimentation, however, requires significant resources, effort, and the ability to mobilize both.[12] Amongst individuals who are interested in change, only some will have such ability — in the case of the SINAFIN, it was always mid-level managers — and identifying them from the beginning helps focalize efforts even more.[13]

Once the initial consultation process was completed, what typically followed was the constitution of a small working group comprised of the change agents mentioned above who spanned several organizations. As an example, in a state within the SINAFIN, the group could be comprised of local managers from two or three banks, an official from the state government, the state

delegate of the ME, and one or two business association representatives. This working group would then work together to define a series of potential solutions to the identified constraints and would design specific, small-scale experiments to test the different solutions. In the most successful cases, specific goals were set for each of the constraints, as well as the metrics to evaluate them.[14] As the different experiments resulted in minor success or failure, information was shared within the working group, new experiments were designed, and the process continued until there was convergence on a set of solutions. An important part of the process was that, as convergence was approached, the group was careful to widely disseminate their success stories to show the existence of alternatives and to activate the institutionalization of new practices.[15]

### General lessons for policymaking

It is important to note several things. First, what differentiated successful from unsuccessful cases was not the mere existence of potential change agents who envisioned the creation of a working group and were willing to engage in an effort of change. Interestingly, such individuals were prevalent in all settings. What was different, however, was their ability — usually defined by their organizational position — to mobilize the resources required to establish a working group. Second, the working groups were not always coordinated by government officials and their success was not entirely dependent on government participation. Indeed, some groups were entirely coordinated by private organizations. However, active government involvement — especially when state and federal officials work together — can dramatically improve the group's prospects. This is because governments can legitimize experimental efforts and lower downside risks for participating organizations in a way no other social actor can — the creation of credit guarantees itself is a case in point. Government agencies are also in a unique brokerage position, as they are solely able to legitimately claim not to have a vested economic interest in the process. This brokerage position grants government officials higher legitimacy to coordinate the group's efforts and to field potential conflict that may arise among participants.[16] Finally, government agencies have a significantly higher ability to both convene different organizations and disseminate positive results through the media.[17]

A third note is that it may seem paradoxical to require so much coordination to simply bring arguably self-interested parties (banks and SMEs) together in a market setting. It is important to remember, however, what the starting point was. Both banks *and* SMEs initially believed that it was not in their best interest to create the market. The activation of the credit market (like all institutional changes) required a transformation of deeply entrenched views and highly institutionalized behaviors that could be achieved only through the coordination of all the relevant organizational actors.[18] At the same time, different states have different binding constraints. While the process that successful states followed to implement the SINAFIN was very similar, the actual issues they addressed and the solutions they found to address them were quite different. Only by allowing local actors to identify their relevant constraints and potential solutions for them could the program address each state's idiosyncrasies.

### The SINAFIN and the current state of Mexican SME financing

Apart from the general insights that the SINAFIN can give us about the process through which programs can be designed, its analysis can also give us significant information on the operation of the program itself. Although it is true that the program has activated a market beyond the reach of the guarantees themselves, it is important to determine the extent to which the market has truly deepened, whether SMEs are likely to satisfy their credit needs, and whether the existing trend is likely to result in a fully functioning, healthy financing market. To reflect upon these questions, we leverage several structural characteristics of the Mexican financial sector in our analyses.

First, the banking sector in Mexico has received several shocks, starting with its 1982 nationalization and its later privatization in 1991, which was followed by the 1995 crisis and the resulting 1997 internationalization.[19] These shocks acted as a mechanism that sorted banks into centralized and decentralized organizational structures. The difference between them has to do with how lending decisions are made. For centralized banks, all lending decisions — including whether to grant a loan, its amount, and its rate — are made at a centralized office. As a result, centralized banks tend to rely on credit scores and standardized evaluation procedures. In contrast, lending decisions in decentralized banks are made at the branch level, usually by the branch manager. Given that managers can have personal knowledge of individual clients, lending decisions involve both "hard information" such as credit bureau scores or financial statements and "soft information" such as personal references or personal knowledge of the client's character.

Second, SME financing has historically been absent in Mexico until the introduction of the SINAFIN program in 2001, which successfully jump started it. What this means is that all banks started from a similar "clean slate" in terms of SME lending, which allows us to better see the impact of their organizational structures on their lending activities. Third, the SINAFIN program was offered to all banks equally, and each bank chose its own participation in the program. Fourth, because Mexico is a federation, there is significant variation at the state level in terms of their institutional and competitive environments. This means that, while the SINAFIN program was offered by the federal govern-

ment to banks that have national presence, the banks faced different state institutional environments in the implementation of the program. This within-country institutional variation allows us to isolate the effect of the interaction between a bank's organizational structure and the institutional environment in which it operates on the bank's lending practices. It also allows us to make some inferences about the extent to which selection effects are driving lending results, as well as how local institutional characteristics affect lending behavior.

Our multivariate analyses use loan amounts, loan rates, and default as dependent variables. We control for unobserved heterogeneity across states, years, and banks, as well as firm characteristics such as size and sector. Our main right-hand-side variables include the bank's organizational structure (centralized vs. decentralized); the amount of competition among banks in each state (measured as industry concentration); and other measures of institutional development, such as Moody's rating of contract enforceability in each state. In addition, we control for the ability of banks to systematically select different types of firms following an instrumental variables approach.

Our key findings are that decentralized banks, on average, tend to give larger loans to smaller businesses, which is consistent with the notion that they can leverage their differentiated access to "soft" information.[20] This is especially the case for sectors such as commerce or services, where SMEs may find it more difficult to provide "hard" information than in manufacturing. Decentralized banks are also more likely to grant loans for fixed assets. A similar but much more pronounced pattern can be seen in non-bank financial intermediaries such as the *Sociedades Financieras de Objeto Limitado* (SOFOLES), who are the most reliant on "soft" information and traditional credit analysis.

Decentralized banks also tend to be more reactive to local institutional conditions. In states where there is less competition, decentralized banks tend to charge significantly higher rates and grant smaller loans. It is important to note that there is evidence that some of these differences are driven by selection effects. That is, different banks are not only lending in differentiated terms to similar firms, but they are also lending to different types of firms. In particular, decentralized banks have the ability to select riskier firms in general, but they also have the ability to "cherry pick" less risky firms in environments where they have increased market power. On the other hand, centralized banks that typically rely on credit-scoring models can provide much quicker lending decisions to SMEs that fit their risk profile. In addition, given centralized banks' increased product standardization, they can provide simpler credit solutions when SME needs are not sophisticated. For example, revolving, working capital credit products provided by centralized banks are remarkable in their simplicity and quick response time.

The presence of strong selection effects, as well as the large differences in the amounts granted by banks compared with those granted by local intermediaries such as SOFOLES, are evidence that the market has not yet achieved significant depth. While the market has clearly been activated and a virtuous competitive dynamic has been initiated, it is also evident that banks are, for the most part, skimming mostly the top of the market, lending in modest amounts with a focus on working capital and avoiding large segments of the economy. At the same time, there are two factors that seem to encourage deeper bank participation. The first is competition, as evidenced by decentralized banks who grant significantly larger loans and at lower rates in more contested markets. The second is the strengthening of contract enforceability. It is also important to highlight the role that non-bank intermediaries are playing in the market, lending significantly larger amounts, focusing more on fixed-asset loans, and addressing firms and segments that commercial banks have chosen to neglect. These non-bank intermediaries, however, are severely limited in their growth prospects due to the lack of access to competitive financing.

## Conclusions and actionable items

The analysis of the SINAFIN program provides unique insights into the extent to which small business lending has been activated in Mexico and the key binding constraints that still remain in its development. It also helps to identify the process through which more successful transformative policies may be designed. In the latter aspect, the SINAFIN program shows that, in creating a market that has historically been thwarted by a lack of coordination and trust, policies need not only to align incentives but also to help actors regain trust in each other so they can create new ways to coordinate.[21] Accordingly, bottom-up processes that allow involved actors to detect the key binding constraints and find potential solutions to those constraints may prove much more effective than top-down approaches that are likely to face insurmountable resistance.

It is important to note the centrality of experimentation in these processes, given that no single solution to such complex problems is bound to exist and that skeptical actors will require evidence to be convinced of possible alternatives. A process of testing possible solutions in low-risk, pilot settings to later refine them and scale them up is bound to achieve much more success (and with a more efficient use of resources) than attempting to get the incentives right for all actors from the beginning. It is interesting to observe other instances of past successful policies in Mexico that have followed similar experimental, bottom or middle-up processes, such as the design of *Progresa/Oportunidades,* the activation of the mortgage market and the new *Instituto del Fondo Nacional de la Vivienda para los Trabajadores* (INFONAVIT), or the implementation of the *Servicio de Administracion y*

*Enajenacion de Bienes* (SAE). It is also interesting to consider how such an experimental, gradual process could be used to address current structural issues such as education reform, new and improved poverty programs, or the existing debate around energy and the regulation of PEMEX.

In terms of the current SME credit market, the SINAFIN has clearly achieved remarkable success in sparking a sorely needed market, but there is evidence that, in order to increase market depth, it is necessary to increase competition and push the different intermediaries to truly leverage their competitive advantages in bringing financing benefits to SMEs. In what follows, we suggest some actionable items for the two lines of discussion addressed in this document.

### Policymaking process

- In cases where policies seek to generate deep institutional changes, think of policy design as a process of experimentation (test-refine-invest) rather than as a process of getting the incentives right from the beginning.
- Initiate a policymaking process with a broad consultation of all relevant organizational actors to identify the largest binding constraints. During this process, it is also important to identify well-positioned individuals who can mobilize resources around change efforts.
- Create small working groups to design experiments and test potential solutions to the specific binding constraints.
- Disseminate information openly and transparently within working groups to adjust experimental efforts and converge upon solutions.
- Once a successful solution is found, disseminate results widely to initiate the institutionalization of new practices.
- Government officials should act as coordinators, brokers, and conflict mediators more than solely as policy creators.

### SME financing

- Increase the depth of existing credit markets, both in terms of sectors covered and in terms of products for firms that are currently covered.
  - Identify sectors or regions where banks have chosen not to enter and promote competition in them by allowing banks to test them with lower risk.
  - Promote fixed-asset loans.
  - Guarantee programs should be designed to encourage learning and competition, not to subsidize risk. Auction mechanisms and clear end dates for programs are good ways to curb reckless behavior.
- Foster entry and competition by bank and non-bank intermediaries who prove to be more flexible or willing to enter nontraditional markets (especially in alternative product spaces and in concentrated markets).
  - Allow non-bank intermediaries to participate in guarantee programs — they are currently not included.
  - Create mechanisms to facilitate access to financing lines for non-bank intermediaries, such as guarantees and securitization conduits. It is worth considering an increase in flexibility of existing regulations to allow non-bank intermediaries to capture savings under specific, well-established circumstances.

## Notes

1 This includes the formal and informal economies. There are around 900,000 firms registered in the *Instituto Mexican del Seguro Social* (IMSS).

2 The following information was obtained from the *Instituto Nacional de Estadística y Geografía* (INEGI), the *Banco de México,* the International Monetary Fund (IMF), and the *Comisión Nacional Bancaria y de Valores* (CNBV).

3 This is in comparison with current bank credit products for SMEs, which carry costs of around 24% per year.

4 We picked four states as case studies, choosing two successful and two unsuccessful states. We later visited two additional states (one successful and one unsuccessful) to provide some validation of findings.

5 Much of this section emerges from Canales 2008.

6 On experimental and bottom-up processes for institutional building and incentive alignment see, for example, Rodrik 2008.

7 On the centrality of identifying binding constraints to address institutional shortcomings, see Mukand and Rodrik 2005.

8 On the importance of an institutionalization project as a coordination mechanism for institutional change see, for example, Deeg 2005; Colomy and Kretzmann 1995.

9 For more on herd behavior see, for example, Banerjee 1992; for more on unrecognized groups with divergent beliefs see, for example, Centola et al. 2005 and Kuran 1997.

10 This relates to the basic problem of pluralistic ignorance. For more on this, see, for example, O'Gorman 1975.

11 For more on "cosmopolitan" members who understand issues across organizational boundaries and their ability to generate change see, for example, Padgett and Ansell 1993; Piaget 1965; Piore 1995; Rao et al. 2005; and Simmel 1950.

12 For more on experimentation with new practices leading to institutional change see, for example, Hargadon and Douglas 2001 and Rao et al. 2003.

13 For more on resources and experimentation for institutional change, see DiMaggio 1988; Palier 2005; for more on middle managers as change agents, see, for example, Burgelman 1983.

14 For example, in a particular state one of the identified constraints was that SMEs were simply not informed of the existence of the program and the new credit products that it generated. This meant that firms were not demanding loans at the bank branches. Different diffusion mechanisms were designed and tested, and firm response was carefully measured to evaluate each of them.

15 On the dissemination of practices as a tool for institutionalization and institutional change, see Adut 2004.

16 On the unique structural position of government as mediator, see, for example, Fernandez and Gould 1994.

17 This is well represented in a quote from a state government official who was describing the importance of result dissemination for the creation of a market: "If I want a bank manager to call me so I can pressure him to increase his market participation, all I have to do is call a reporter and tell him about the magnificent results that the manager's competitor has achieved. I guarantee you that I will get a call within the next day."

18 On the different triggers for institutional change and the complexity of group coordination, see, for example, Streeck and Thelen 2005.

19 For good summaries of the development of the Mexican banking sector, see Centeno and Maxfield 1992; Gonzalez-Hermosillo et al. 1997; Haber 2004; Haber and Musacchio 2005; and Maurer 2002.

20 For more literature on the strength of decentralized lending to SMEs, see, for example, Berger and Udell 2002; Berger et al. 2005.

21 For more on trust creation in institutionalization of new practices, see, for example, Locke 2002.

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CHAPTER 2.5

# Producing Superstars for the Economic *Mundial*: The Mexican Predicament with Quality of Education

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Although we are leery of comparing economic competition to athletic competition, we want to use the metaphor of the *Mundial de fútbol* to illustrate three points. First, in a *Mundial,* global competitiveness matters because it stacks players of different countries up against each other on a level playing field. While victory in any given league is relative, one can be the best in a local league without being very good. Second, in the *Mundial* it is not the *average* quality of the players that matters, it is the very upper tail — the best of the best. The quality of the players in the upper tail depends not just on the average of the distribution, but also on how that distribution is shaped — its variance and whether it is skewed toward the upper, high-performance tail. Third, the simple math of order statistics suggests that the absolute quality of the players depends in part on the size of the pool from which they are drawn — in a random drawing of standard normal variates, the best of 100 will be around 2.5, but the best of a million will be around 4.9. Every boy in Mexico believes that he is in the running to be selected for the *Mundial*, but can the same be said for the economic *Mundial* — does every child really believe that he or she has a shot at rising to the best of the best economically?

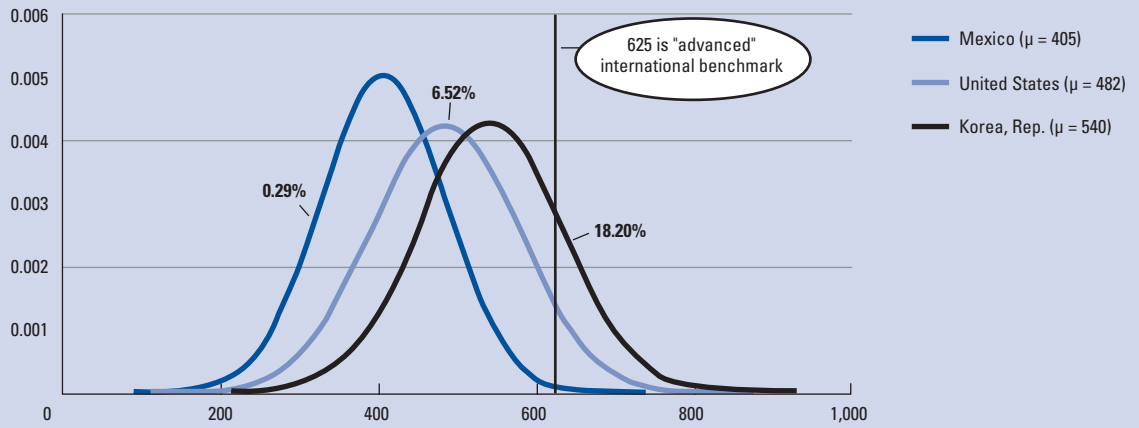
## The quality of Mexican education in an international context

The low rates of school enrollment and educational attainment of the Mexican population are widely acknowledged: out of every 100 students entering primary school, 68 complete their basic compulsory education whereas only 35 graduate from upper secondary school.[1] Only 8.5% of the population aged 18 and older held a Bachelor degree in 2003.[2] However, more recent economic research has shown that what really plays a role in determining a country's competitiveness and economic growth is the level of cognitive skills of the labor force rather than its level of schooling.[3] That is, the *quality* of education is more important than the mere expansion of schooling opportunities (i.e., the quantity of education, measured by number of years of schooling). But this research also suggests that it is not just the average quality that matters, but the quality at the top as well. In this section we examine how Mexico performs vis-à-vis the world in terms of standards of education at the secondary — both on average and at the top — and higher levels.

### Quality of education at the secondary level: Average and upper tail

In order to examine the quality of Mexican secondary education, we compare it to international secondary education standards. In this regard, the Programme for International Student Assessment (PISA) test of the Organisation for Economic Co-operation and

**Figure 1** Distribution of test scores in the PISA 2003 mathematics assessment




Source: PISA 2003 International Database

Development (OECD) allows for a consistent comparison across countries because it provides comparable measures of the knowledge acquired by 15-year-old students who are close to the end of compulsory schooling in the majority of the participating countries.[4] Moreover, the test is not curriculum-based (as is, for instance, the Trends in International Mathematics and Science Study, or TIMSS test). The focus of the PISA text is on "what people can do" rather than "what people know" — and while there are arguments for both types of tests, for our purposes the PISA raises fewer questions about the results that are caused by differences in curricular content.

The PISA evaluates how educational systems prepare students for life in a larger context. In Figure 1, we compare Mexico's distribution of test scores in mathematics with those of the United States and Korea, Rep. (Korea).[5] Test scores have been standardized, so that the OECD-wide mean is equal to 500 and the OECD-wide student standard deviation equal to 100. The designers of the PISA test also distinguish six levels of proficiency.[6] An example of the sample questions in mathematics is provided in Table A2 in Annex A.

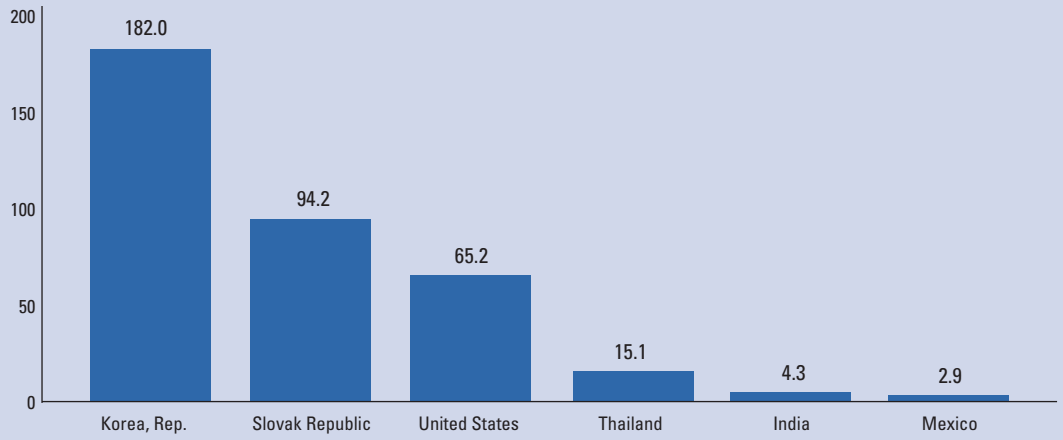
The average Mexican student is performing significantly below the OECD average, far from his Korean and American counterparts, and also below Turkish and Thai students.[7] That is, the average Mexican student achieves only Proficiency Level 1 in mathematics, which means they cannot do more than "carry out routine procedures according to direct instructions in explicit situations."[8] We do not dwell on the average score, as Mexico's lagging behind other nations on average in learning competencies in fields like mathematics and science is not news. We focus instead on two features that the comparison of averages across countries does not highlight: the upper tail and the *absolute number* (not percent) of high performers.

A test score higher than 625 is considered to be "advanced" by PISA international standards. This is, by construction, 1.25 standard deviations above the OECD mean. This is the score near the middle of students in Proficiency Level 5 (from 607 to 668). Students above this benchmark of proficiency are capable, among other things, "of advanced mathematical thinking and reasoning and can interpret complex information about real-world situations."[9] Figure 1 shows that only 0.29% of students who took the test have performed above the advanced international benchmark. This compares with 18.2% of those tested in Korea and 6.5% in the United States, implying that only 3 in 1,000 Mexican 15-year-olds tested were "advanced" or above in mathematics. This is compared with roughly 100 in 1,000 above that threshold in all OECD countries.[10]

If we compare Mexico's production of global performers per 1,000 people in the cohort, we find this number to be extremely low for Mexico (Figure 2). Again, the OECD standard is roughly 105 per 1,000; Korea is well above that level, the Slovak Republic just below, and Thailand is far below that level, with only 15 students per 1,000. But this is still five times higher than Mexico's level of 2.9 per 1,000. India has not participated in the TIMSS, but recently researchers have attempted to compare India's performance with other countries using matched questions for two states and extrapolating, in this case from TIMSS comparable questions, but normalized in the same way to be crudely comparable. India, whose *average* is much lower than Mexico's, still had a higher proportion above the threshold than Mexico.

Making scores comparable across countries implies that usually the results are reported as percents or summary statistics of scores, which do not depend on absolute numbers. However, it might be of interest to know how many students are above a particular threshold. The very small share of students at the top of the distribution implies a small absolute number of students above the advanced international benchmark. The diffi-

**Figure 2** Number out of 1,000 students estimated to be above 625 on PISA 2003 in mathematics (except for India)




Source: Authors' calculations

culty is that we have only actual information on the tested population, which was intended to be a random sample of those in school. We can make two alternative assumptions. One is that the same proportion of the non-tested students would have scored above the threshold as tested students. This gives an upper bound on the total. Alternatively, we can assume that none of the students not in school at age 15 would have scored above 625 if tested. In this case, we calculate the total number by multiplying the cohort size by the gross enrollment in secondary schools to estimate the total enrolled population. This gives us a lower bound on total number. Work done in other contexts suggests that, for Mexico, the true number is more likely near the lower bound than the upper bound as few dropouts would be above the upper bound.[11]

Table 1 shows that, based on the lower-bound estimates, around 3,500 students are above the advanced international standard, and even on the very optimistic assumptions of the upper bound, the number is only 5,822. Of 2 million 15-year-olds in Mexico, every student who attains higher than an advanced standard could fit in a small auditorium. There are many other countries that also have small absolute numbers, and we calculated a similar figure for India, Korea, the Slovak Republic, Thailand, and the United States.

The Slovak Republic — a small country that provides an education roughly equivalent in quality to education in the average OECD country — with only 85,000 in its cohort produces more global performers than Mexico. Thailand is an emerging middle-income country (its average GDP per capita is below Mexico's) without particularly stellar schooling, but it produces over 10,000 students who perform above an advanced standard per year. Korea is renowned for academic excellence in at least one area, and with only 700,000 students it produces 124,000 who test above this advanced standard. The United States does not have good test scores by OECD standards but still produces almost a quarter of a million students a year with this level of capability. This means that for every Mexican 15-year-old who achieves a score above 625 there are 69 American students above that standard.

For India we only have very crude calculations,[12] but the comparison is very instructive, particularly given India's sustained rapid growth and strong emergence in

**Table 1** Estimates of total number scoring above 625 on PISA 2003 in mathematics, selected countries

| Country | Cohort size of 15-year-olds | Gross enrollment rate in secondary school | Estimated number of test takers (enrolled 15-year-olds) | Test takers per 100 students above the "advanced international benchmark" of 625 in mathematics | Estimated absolute number of students above threshold | |
|---|---|---|---|---|---|---|
| | | | | | Lower bound | Upper bound |
| | A | B | C | D | C x D | A x D |
| Mexico | 2,007,721 | 60.00 | 1,204,632 | 0.29 | 3,493 | 5,822 |
| Slovak Republic | 85,095 | 75.00 | 63,821 | 9.42 | 6,012 | 8,016 |
| Thailand | 1,021,145 | 71.20 | 727,055 | 1.51 | 10,979 | 15,419 |
| India* | 21,994,737 | 52.30 | 11,503,247 | 0.83 | 95,659 | 182,904 |
| Korea, Rep. | 701,056 | 97.20 | 681,426 | 18.20 | 124,020 | 127,592 |
| United States | 4,178,014 | 88.00 | 3,676,652 | 6.52 | 239,718 | 272,407 |

*India has neither PISA nor TIMSS results, but a recent paper was able to estimate this number based on matching TIMSS methods. The percent is derived backward from the rawlower-bound estimate.

**Table 2** Average national scores of the six contestants in the International Mathematical Olympiad, 2001–07

| Country | Average score (out of 42 possible) of each eligible student | Size of cohort of 15-year-olds |
|---|---|---|
| Mexico | 13.3 | 2,007,721 |
| Slovak Republic | 15.9 | 85,095 |
| Thailand | 19.2 | 1,021,145 |
| India | 21.3 | 21,994,737 |
| Korea, Rep. | 28.0 | 701,056 |
| United States | 29.9 | 4,178,014 |
| China | 35.1 | 20,215,800 |

Source: Results of International Mathematical Olympiad 2001–04, 2006–07

information technology and many science-related fields. The basic educational system in India (at the primary and junior secondary levels) is extremely weak on average. A variety of recent assessments have shown that the typical Indian primary school child has extremely weak learning performance — much worse than Mexico. However, at the same time, at the higher levels there is strong competitive pressure for the student examinations at grade 10 (for eligibility for 11th and 12th grades) and for university admission. This means that the upper tail has maintained very tough standards, a very high level of private-sector participation, and very high student effort. Thus, although India has very weak *typical* student performance, the upper tail is much more substantial than one might expect. That, combined with a large cohort, results in the fact that India produces roughly 100,000 students per year above this global benchmark — 27 times as many as Mexico.

One way to illustrate the average ability of the best performers is to calculate, as we have done in this chapter, the fraction above some threshold. The other way is to compare the differences in performance of the very top performers. The International Mathematical Olympiad is a competition held every year for high school students. Each country can send up to six contestants, who are each given six very difficult questions. Their answers are marked from 0 to 7 (with 7 being the highest possible mark), so that the maximum score for any individual student is 42 points. Table 2 shows the average score per eligible student for 2000–07 (except 2005) for each of the countries in Table 1, plus China.[13] If one assumes that the process of choosing the national contestants is reasonably effective, then this is a comparison of how good the very best of each country's aspiring mathematicians are. As we see, these results are ordered exactly the same as the estimates of the number of students above the threshold. The typical Mexican contestant scores about as well as the typical Slovakian contestant, only half as well as the typical Korean, and almost a third as well as the typical Chinese contestant. Again, India — although it has worse education indicators on average than the other countries considered — outperforms at the top, in this case likely because of its large size.

These results need to be read keeping in mind the properties of order statistics. If two countries have identical means and variances but different sizes, then the large country would be expected to perform better at the top simply because of the larger sample from which it is drawn. The fact that the Slovak Republic produces six students who outperform the Mexican six is striking because the former has more than 20 times fewer high school–aged students from which to generate the six. Therefore the modestly better scores in the Olympiad are consistent with substantially better typical performance.[14]

We are not suggesting that mathematics alone is particularly central to either academic or economic performance. We did these same calculations with both PISA reading and science scores with similar results. Nor is there anything particularly important about the benchmark score of 625 that we use. Mathematics and the 625 score are used to illustrate two issues that have been insufficiently stressed in the discussion about education quality; these apply to any subject or any threshold.

The first issue is that low averages are not *just* low averages. A low average score without an elongated upper tail implies that proportionately very few students are high performers by an absolute or international standard of performance. This means the top Mexican students will be only at a level that is quite common in better-performing countries.

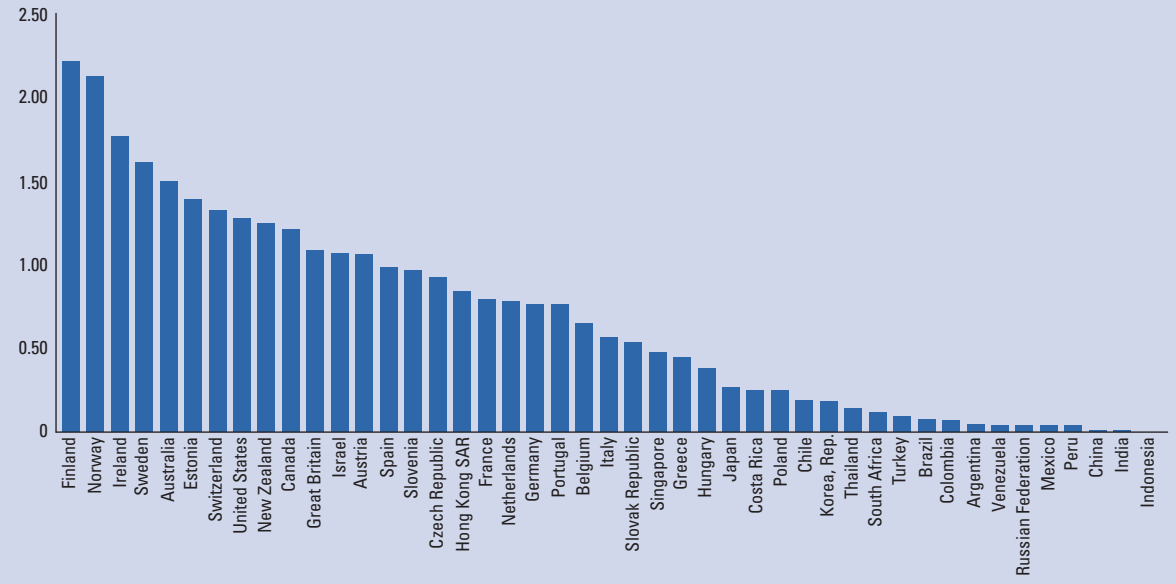
The second issue is that of the absolute numbers of high performers. Only a very few Mexican students are ready to go to college and to compete internationally.

## Low quality at higher levels of education

One might conjecture that the deficiencies in the quality of secondary students' performance are made up for in higher education. This is almost certainly not true, especially if the comparison is with students in the United States. It is of course very difficult to rank institutions of higher education, and one must take existing rankings with considerable caution. However, the broad pattern is so striking it is unlikely that other methods would overturn its results.

According to the Shanghai Academic Ranking of Top World Universities, there is only *one* Mexican university in the top 500 — *Universidad Nacional Autónoma*

**Figure 3** Ranking of universities based on Web visibility, numbers of universities in top 1,000 worldwide per million population




Source: Authors' calculations

*de México* (UNAM), which ranks 185, between the University of Miami and the University of Nebraska at Lincoln. This ranking assesses broad-based universities based on their faculty, facilities, research, and so on. Of course it omits several Mexican institutions of higher education that almost certainly are of high quality but may be too specialized to make a list aimed at assessing general universities (such as ITAM or Monterrey Tech). But even if one were to add these, the point remains that the *typical* higher education experience in Mexico is unlikely to overcome initial gaps — if anything, it exacerbates them.

There are other rankings of top universities. According to the London Times Higher Education Supplement 2007 (THES-QS), of the top 400 institutions of higher education, Korea has seven, Brazil has three, and Mexico only one. Again, UNAM enters into the ranking at 192. Not only do Mexican universities not rank with the world's best (in the top 20 are universities from the United States, the United Kingdom, Australia, Japan, Hong Kong, and Canada), but they are not superior to middle-tier US universities that round out the 400 — such as the University of Kentucky, Georgia State, and the University of Missouri.

The third global ranking focuses on the universities' Web presence. This ranking is probably also distorted in various ways, but it provides a cross-check on the others and enables us to go into more detail. If we look at the number of Mexican universities in the top 1,000 with a Web presence, we only find four Mexican institutions, or only 1 per 25,000,000 people (Figure 3). This implies that the very small number of secondary school students who perform at a globally competitive level do not have the chance to receive instruction from world-class universities. At best, those high achievers can benefit from an average tertiary education.

Moreover, education research in Mexico is still very limited. On a per capita basis, Mexico produces a very small number of highly qualified workers: in 2002, Mexico graduated 1.4 PhDs per million inhabitants, compared to 22 PhDs in the United States.[15] And out of more than 200 graduate programs, only 4 are recognized by the *Consejo Nacional de Ciencia y Tecnología* to be of high quality by international standards.

Of course this examines only domestic universities. Many Mexicans seek degrees in the United States or the United Kingdom, or other destinations. In 2006–07, about 14,000 Mexican students were estimated to be studying in the United States (only some of these were undergraduates). This still remains a small fraction of the overall education outcomes in the United States.

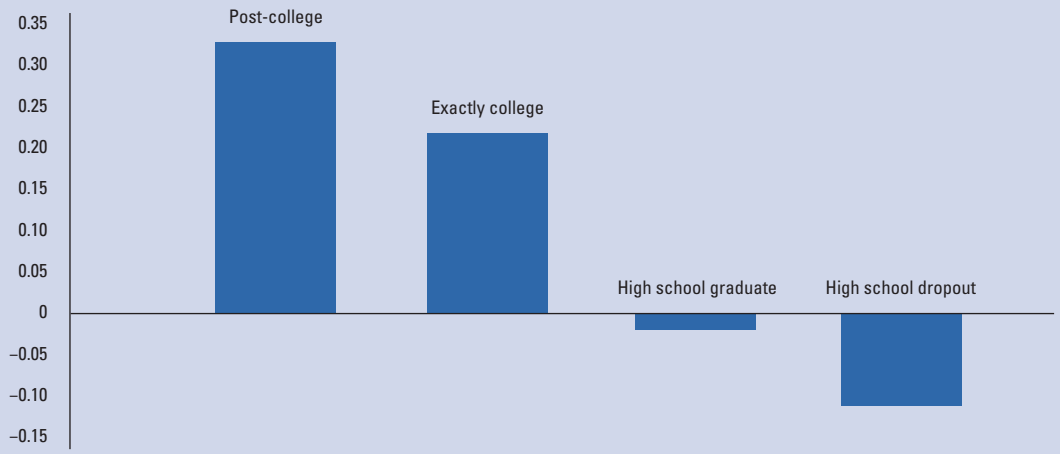
## The rise of returns to superstars in the United States

We now address the changing returns to various levels of skills, primarily in the US labor market. We will then link this to the quality of Mexican education.

The demand for workers at various skill levels has changed over time. We examine the US experience in some detail, as it shows that this expansion in inequality and the rise in the returns to "quality" has, as Krugman once argued, a fractal-like aspect[16] — no matter where you look, inequality was increasing — not just between unskilled and skilled workers but within occupations, and within the top of the distribution among the educated as much (or more) than in the bottom. Labor market inequality has increased in recent decades in the United States. This increase was virtually nonexistent at the bottom, moderate in the middle, and strong at the top of the distribution.[17] That is, wage growth appears to be polarized at the high end of the wage distribution.

The most widely remarked upon research phenomenon is the rise of the premia to a college education as

**Figure 4** Changes in composition-adjusted real log weekly full-time wages by level of education: United States, 1981–2005



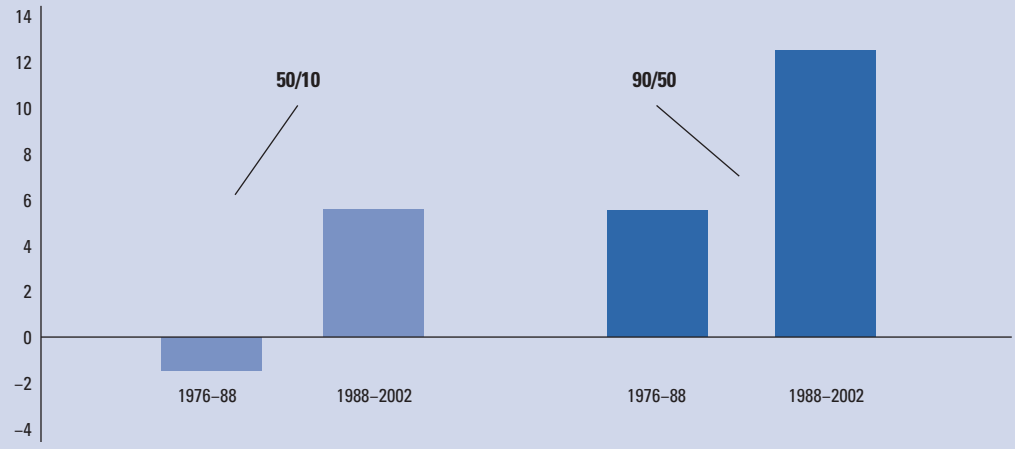

Source: Wages from Autor 2007; average years of schooling from Barro and Lee 2000

the differential growth of wages of those with and without a college degree has caused the ratios to expand. Examining the relationship between wages and education more closely, we look at the change in wages by education group (Figure 4) and can observe that both high school dropouts and high school graduates have experienced falling real wages, whereas college graduates have experienced a significant increase in labor income. Authors Autor et al. suggest that this may be partly explained by the introduction of information technology that, by complementing abstract and complex tasks, increases the demand for highly educated workers, and by being used for routine tasks, reduces the demand for less-qualified workers.[18]

However, it is also noticeable that the wages of those with a post-college degree have risen, in percentage terms, by more than those with just a college degree. This suggests that the degree of skill being rewarded does not only entail some analytical capability, but is even more than what is gained from four years of college in the United States — that is, there are higher returns for more education.

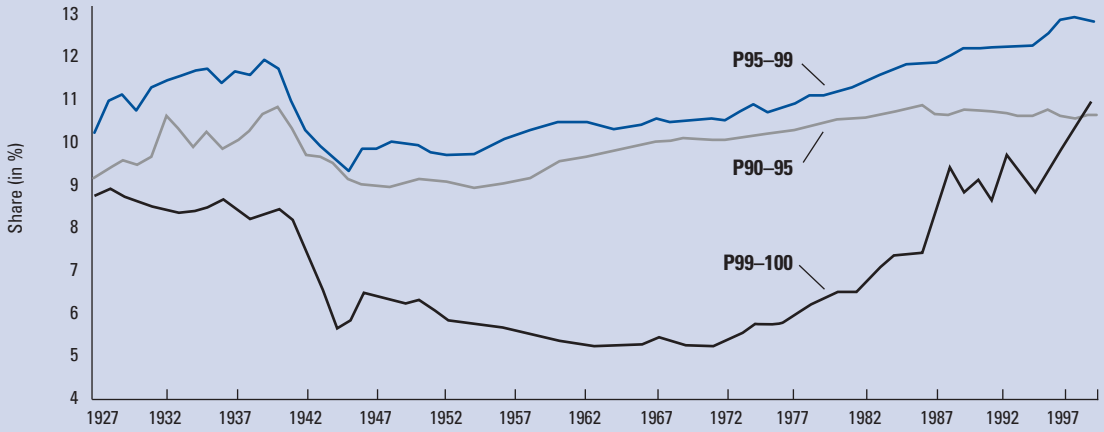
One can follow this up by examining the distribution of wages among only those who have a four-year college degree. Inequality can increase in a variety of ways, either radially and symmetrically, or asymmetrically if either the middle pulls away from the bottom or if the top pulls away from the middle. Figure 5 shows how upper- and lower-tail inequality (summarized by 90th–50th percentile and 50th–10th log wage differential) have evolved over the periods from 1976–88 and then from 1988–2002. In the earlier period, the top pulled away from the middle but the bottom gained on the middle. In the latter period (1988–2002), inequality

**Figure 5** Changes (× 100) in hourly earnings inequality among college graduate males with 24–26 years of education: United States




Source: Autor et al. 2005
Note on data: March CPS 1976–2004. Statistics pool three years of data centered on indicated year. College graduates are those with 16 or 17 years of completed schooling (surveys prior to 1992) or a baccalaureate degree only (1992 forward).

**Figure 6** Top wage shares in the long run: Wage income shares for 90–95th percentiles, 95–99th percentiles, and 99–100th percentiles, United States, 1927–98




Source: Piketty and Saez 2003

increased in both directions, but the increase of the top (90th percentile) pulled away even more rapidly from the middle. This suggests the skills that were increasingly in demand were not merely "having a college degree" but that, even among those people with a college degree, the more skilled (or at least those at the top of the earnings distribution) were even more in demand.

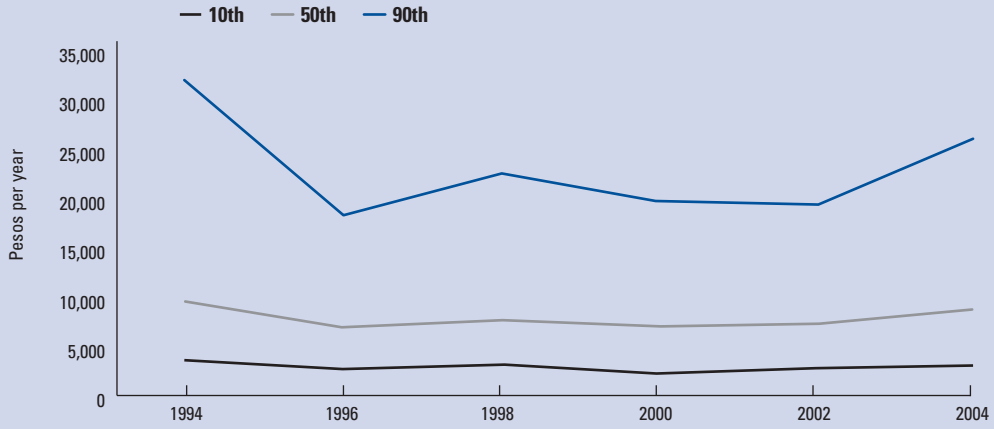
Finally, if we look at the long-run evolution of wages by percentile, we observe that the very top has really pulled away from the rest of the distribution. The share of total wage income going to the top 1% earners increased from lows of around 5% of total earnings to almost 10% of total wages by 1998 (Figure 6).[19]

As Rosen first suggested, the growing inequality can be explained by the fact that, thanks to modern technologies, the superstars are greatly rewarded whereas the runners-up get far less.[20] This affects the demand for skills along the distribution and causes the top to pull away from the rest.

There is evidence that this phenomenon is not limited to the United States but is taking place in the majority of the OECD countries, including Mexico. In Figure 7 we can observe that among the college graduates, those at the bottom and middle of the wage distribution have experienced a rather flat wage profile from 1994 through 2004. On the other hand, those at the high end of the distribution experienced a decline in wages after *el Error de Diciembre* because of the severe macroeconomic conditions brought on by the peso devaluation that adversely impacted better-educated workers. But, over time, trade liberalization as well as market-oriented reforms have increased demand for workers who are more educated. The demand for college graduates increased in all industries and was a result of the within-industry shifts.[21] After 2002, it is possible to observe that the top is pulling away from the middle and bottom of the wage distribution, even among college graduates.



**Figure 7** Average wages among male college graduates for 10th, 50th, and 90th percentiles: Mexico, 1994–2004




Source: *Encuesta Nacional de Ingresos y Gastos de los Hogares* 1994–2004; CPI are from the IMF's International Financial Statistics

**Table 3** Mexico's performance in PISA vs. selected economies

| Country/ Region | Scores on the 2006 PISA | Number of student standard deviations Mexico is behind | Ratio of country/region *average* student scored to Mexican 95th percentile student score (%) |
|---|---|---|---|
| **Mathematics** | | | |
| Mexico | **406.00** | | |
| United States | 474 | 0.8 | 87.0 |
| OECD average | 498 | 1.1 | 91.2 |
| Korea, Rep. | 547 | 1.7 | 100.4 |
| **Science** | | | |
| Mexico | **410.00** | | |
| United States | 489 | 1.0 | 89.9 |
| OECD average | 500 | 1.1 | 91.9 |
| Korea, Rep. | 522 | 1.4 | 96.0 |
| **Reading** | | | |
| Mexico | **410.50** | | |
| United States | n/a | | |
| OECD average | 492 | 0.86 | 88.0 |
| Korea, Rep. | 556 | 1.53 | 99.4 |

Source: PISA 2003 International Database
Note: The Mexican student standard deviations were calculated as the 5th–95th range divided by 1.642*2 (under the assumption of a normal distribution). The results were Math 84.9, Science 79.9, Reading 94.9 (the OECD student standard deviation is 100 by construction).

## Implications for Mexico

In this section we compare two general points of view with regard to improving the quality of education in Mexico and its potential consequences. This comparison has two dimensions. One is that of thinking through policies and determining the degree of their impact on the *distribution* of skills. A second dimension envisions Mexico embedded in a global economy and analyzes whether Mexico's education policies will result in providing the country with a more-skilled workforce to meet the expanding demand. Let us be the first to warn the reader that we are going to make two very unpopular statements. We are going to say these things without definitive proof, but as suggestive and provocative hypotheses. They should at least be considered and examined as alternatives to the overwhelming messages about education that do not make these two points explicit.

First, there is an array of options that suggests that expanding "business as usual" policies for improving education, while possibly justified on narrow cost-benefit grounds, are unlikely to transform the quality of education. Second, radial expansions of quality from Mexico's current levels will augment a portion of the range of skilled labor for which there are at least serious questions about whether global demand is expanding fast enough.

### Improve the quality of education: Trapped in a flat bowl

Let us illustrate what we mean by a *flat bowl* on a general level before delving into the specifics of the evidence about individual interventions. The illustration links three facts that are widely acknowledged but seldom considered together.

The first fact is that Mexico is far from the international frontier in terms of student quality. There are enormous differences across students in measured competencies, and hence the "student standard deviation" is very high: in the three areas of PISA, Mexico is typically between 80 and 95. Across the board, Mexico is roughly a full student standard deviation behind the OECD average (which is often roughly equivalent to the US level), and more like 1.5 student standard deviations behind cutting-edge countries such as Korea. This means that students near the very top in performance in Mexico (the 95th percentile) would be roughly the average performer in Korea; the average performer in Mexico would have to show massive improvement to be average in the United States or Korea (Table 3).

The second fact is that the absolute *magnitude* of the learning gains that are demonstrated in the typical proposed educational improvement scheme are very small.[22] The literature on education often uses effect sizes in order to have a common metric for evaluating the magnitude of learning gains (otherwise test instruments with different absolute scales would have different apparent absolute impacts).[23] The typical effect size in the literature of the standard "business as usual" expansion of inputs is roughly zero. No definitive conclusion has been reached by scholars on what education policies and reforms may be most effective in improving the overall quality of schooling. There is certainly no clear causal relationship between expenditure and students' achievement.[24] This does not mean either that "money does not matter" or "money cannot matter."[25] On the other hand, this lack of causality reveals the importance of making an effective use of resources to produce positive results. In this regard, there is general agreement on which basic aspects of education need to be addressed, such as the importance of teaching quality, the need for standards and accountability, and the possible benefits of

incentives and market-oriented reforms. However, empirical findings are not conclusive and often show that the impact of a specific policy is highly dependent both on the context of the institution where the reform is implemented and on the time of assessment.

In what follows, we provide an overview of significant education policies, most of which have been recently implemented in Latin and Central America to improve the quality of schooling. These policies can be grouped according to their focus under three categories: teacher quality, resources, and school-based management reforms.

Thus, even when it comes to available options about which there is even semi-conclusive evidence about their efficacy in actually raising scores, these options do not provide a definitive guide for substantial improvements in performance. The magnitude of their impact, even of those that are demonstrated to be statistically different from zero, is often very small. The effect size of a tenth of a standard deviation of an intervention of any kind is considered very large.

The third fact is that, even once one finds interventions that have a substantial effect size, the scope for the application of the intervention is often limited. Many proposed interventions are remediation of shortages (e.g., ways to address large class sizes, undertrained teachers, lacking facilities). But in these cases, the impact on the total or average score is the treatment effect times the potential scope of the treatment. For instance, suppose one found that underqualified teachers could be brought up to par with training. Then the total gain is the gain per trained teacher times the number of potentially trainable teachers. So, even if the training were to show an effect (which it often does not), and even if this has a huge effect size of 0.1 (which is even less plausible), then if this training is effective in 20% of the teachers, it adds up to a gain of 0.02 student standard deviations.

The upshot is that the *trip is long, the vehicle is slow, and you are almost out of gas*. We again illustrate this principle — although it is not concrete proof — by examining the empirical magnitudes of the potential gains from the type of educational reforms being discussed in Latin America generally. We then summarize the potential gains to be realized in Table 4 and Figure 8.

### *Performance-based pay bonuses for teachers*

Teachers play a key role in students' learning,[26] and teachers' salaries represent the largest share of educational expenditure. This is why teacher incentive reforms are one of the main challenges for education faced by Latin American countries. Two programs have been recently implemented in Mexico and Chile that aim to improve teaching quality by providing teachers with bonuses linked to their performance. The *Carrera Magisterial* was introduced in Mexico in 1993 to modernize primary schooling. Among other things, the program replaced the five-year-seniority teacher pay scale with a new pay structure where improvements in students' performance represented 20% of the total weight.[27] It consisted of a promotion system where teachers and principals are evaluated on an individual basis. Empirically, no positive effect has been found on students' performance; this may be partly because of the weak incentives provided for teachers and the significant role played by unions in determining the teachers' pay increases.[28]

The Chilean program introduced in 1996, *Sistema Nacional de Evaluación de Desempeño de los Establecimientos Educacionales* (SNED), seems to have been more effective. A group-based incentive is assigned to the highest-performing schools that enroll at least 25% of students in each region; this award represents 5–7% of teachers' annual wages and assigns a great weight to improvements in students' performance in determining teachers' award: 28%. Moreover, the effectiveness of students' performance is included in the evaluation and counts for 37% of the total weight.[29] There is evidence of the positive effect of this reform on students' performance, especially for those schools more likely to win the award.[30] The reforms undertaken in Chile and Mexico show that the political context and the unions play a significant role in their design and implementation.[31]

### *Finance equalization*

The *Fundo para Manutenção e Desenvolvimento do Ensino Fundamental e Valorização do Magistério* (FUNDEF) was introduced in Brazil in 1998 to reduce the inequality of the educational system. Specifically, FUNDEF's main aim was to redistribute resources from the richer to the poorer regions and to increase the wages of public teachers. The program has indeed led to an increase in teachers' wages and to a relative improvement of the public schooling system,[32] as well as an improvement in the educational system for specific demographic groups.[33]

### *Class size reduction*

Of the existing studies, 75% have found no effect from a decrease in the pupil-teacher ratio on students' performance.[34] Among the remaining 25%, the evidence is mixed.[35] While redistributing revenue, FUNDEF led to changes in educational inputs — in particular, to a reduction in class size. The available empirical evidence does not show improvement in students' performance resulting from this reduction.[36] To estimate the largest possible gain from this policy, we can consider Krueger's evaluation of Project STAR, an experiment carried out by the US state of Tennessee in the mid 1980s that involved a comparison of achievement by students randomly assigned to classes of different size. Krueger finds significant and large gains from a reduction in school size.[37]

### *School awards*

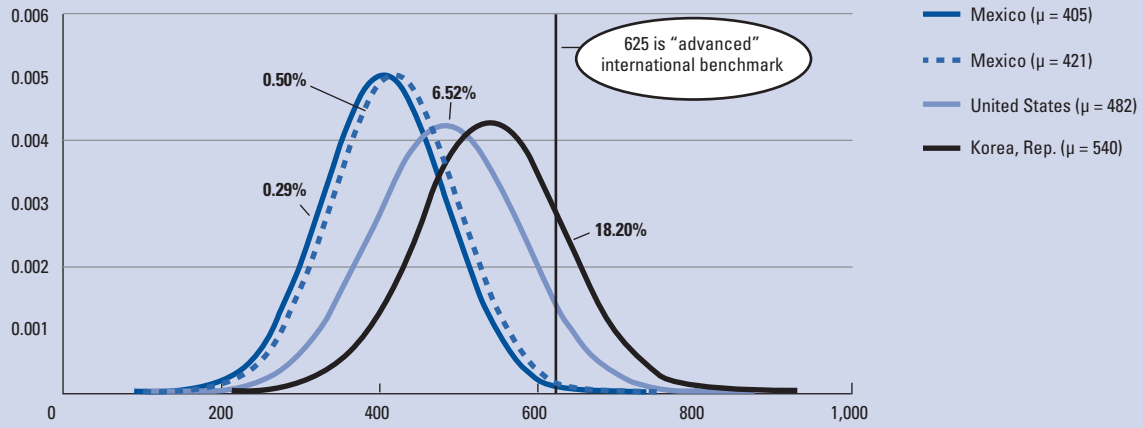
These award incentives have been only recently introduced in Latin America, so most of the existing programs have not yet been evaluated. The few assessments conducted, however, show that the collective incentives appear to be more effective than the individual ones, as they promote cooperation to achieve common objec-

**Table 4** Policy interventions, effect size, and maximum gain

| Intervention | Examples | Effect size on students' performance | Maximum gain |
|---|---|---|---|
| **Teacher quality** | | | |
| Performance-based pay bonuses for teachers | *The Sistema Nacional de Evaluación de Desempeño de los Establecimientos Educacionales* (SNED) was introduced in Chile in 1996. Among the objectives, improvement in teacher quality occupies a privileged position. It offers bonuses to schools that show excellent performance in terms of students' achievement; 90% of the SNED bonus is divided by teachers in the school (this represents 5–7% of the annual wage). | Positive impact on students' achievement especially in those schools more likely to win an award. Also positive effects on teachers' attitudes and quality of entrants into teacher education programs increased. (Mizala and Romaguera, 2005) | 0.05 increase in school performance; teachers' average salaries rose 156% from 1990 to 2002. |
| | *Carrera Magisterial* was introduced in Mexico in 1993. It provides teachers with large financial rewards that are based, among other factors, on students' test scores. Participation is on a voluntary and individual basis. | None (not robust). (McEwan and Santibanez, 2005) | |
| **Resources** | | | |
| Finance equalization | The *Fundo para Manutenção e Desenvolvimento do Ensino Fundamental e Valorização do Magistério* (FUNDEF) was introduced in Brazil in 1998. It aimed to promote greater equity in educational opportunities between states and across municipalities by providing a minimum per pupil expenditure in primary schools throughout the country. | Mixed: Reduction in spending inequality positively affects nonwhite students and students at the bottom of the distribution (Gordon and Vegas, 2005). Improvements in students' test scores for students in public schools with respect to their counterparts in private schools appear to be partly related to teachers' increased wages. The effects appear to be concentrated in the northeastern part of the country. (Menezes-Filho and Pazello, 2004) | 0.05 increase in school performance; teachers' average salaries rose 156% from 1990 to 2002. |
| Class size reduction | The *Student-Teacher Achievement Ratio* (STAR) was a randomized experiment undertaken in Tennessee in the 1980s. | Positive and significant effect on students' performance. (Krueger, 1999) | 0.2 standard deviations of test performance in reading and math |
| | FUNDEF: increased resources were partly used to reduce class size in Brazil starting in 1998. | No effect. (Gordon and Vegas, 2005) | |
| **School-based management reforms** | | | |
| Performance-based pay bonuses for principals | *Carrera Magisterial*, introduced in Mexico in 1993, allows principals to receive an award based on the overall performance of their school. Participation is on a voluntary and individual basis. | None (not robust). (McEwan and Santibanez, 2005) | |
| School awards | The *Incentivo Colectivo a Escuela* (ICE) was introduced in Bolivia in 2001 to encourage collaboration between principals, teachers, and staff in primary schools. | No assessment available of the effects on students' performance. | |
| | The *Plan de Estímulos a la Labor Educativa Institutional* (PLAN) was introduced in El Salvador in 2000 to encourage public school teachers to work together to solve the problems affecting their schools and improve the quality of educational services that they offer the community. | No assessment available of the effects on students' performance. | |
| | SNED bonus (10%) is given to schools as an "excellence subsidy." | See discussion in text. | |
| School autonomy | The *Educación con Participación de la Comunidad* (EDUCO) Program was established in El Salvador in 1992 with the aim of increasing decentralization and delegating the decision-making authority of pre-schools and primary schools to community organizations and parents. | Positive effects on teacher behavior. Teachers may have more motivation (demonstrated by dedicating more time to teaching, being absent less, and by spending more time meeting with the parents, for example). There is no conclusive evidence on the effects of these policies on students' performance. (Sawada and Ragatz, 2005) | |
| | *Autonomia Escolar* started in Nicaragua in 1993. It introduced decentralization of the schooling system with a financial-administrative focus. | Differences between autonomous and centralized schools do not seem to affect students' outcomes; results are not robust to different specifications. (Parker, 2005) | |

Source: Authors' elaborations based on Gordon and Vegas 2005; Krueger 1999; McEwan and Santibanez 2005; Menezes-Filho et al. 2004; Mizala and Romaguera 2005; Parker 2005; Sawada and Ragatz 2005; Vegas 2005

**Figure 8** Simulated effect on the PISA 2003 mathematics scores of the maximum possible effect of class-size reduction




Source: PISA 2003 International Database

tives.[38] The programs implemented in Latin America differ in their structure and requirements. The school award introduced in Bolivia in 2001 aims at providing a monetary compensation to teachers, principals, and staff based on the overall improvement of school performance. In the framework of the school award PLAN implemented in El Salvador, standards are set by the Ministry of Education and school personnel are remunerated accordingly.[39] In addition to the teachers' award previously described (which represents 90% of the SNED bonus), the Chilean program provides the remainder of the bonus to schools as an "excellence subsidy." Schools have autonomy with respect to the use of this award.[40]

Only the very costly and highly controversial class-size policy appears to have had a substantial effect on students' achievement, as found by Krueger in the 1980s experiment in Tennessee with students randomly assigned to different class sizes; even then the effect was concentrated.[41] When the other policies are effective, they appear either to have a moderate effect or to improve the performance of specific groups of students. If we do not consider any issue related to the reliability and external validity of Krueger's 1999 study,[42] and we relate the effect of smaller class-size policy to the distribution of test scores presented earlier in Figure 1, we can observe that, at best, the class-size policy would lead to a modest gain in the mean test score.

Even in this best-case scenario, if those interventions were able to increase quality by 0.2 student standard deviations — and it is worth stressing again that these standard deviations are at the outer range of any class-size effects estimated nearly anywhere, and that achieving these gains would be costly and take a long time — the average *quality* of education in Mexico would remain far below the quality of education in Korea and the United States. The percentage of Mexican students testing above the international benchmark would increase from 0.29% to 0.50% (Figure 8). Hence, in the low estimate, the total number of global high performers would increase from 3,500 to only 6,000 — after years of effort and huge increases in expenditures, one would need a slightly larger auditorium to hold the global high performers.

### Expansion of business as usual

Another popularly recommended educational policy is schooling expansion. In much of Latin America, this constitutes a call for turning higher and higher levels of secondary schooling universal. Increasing the average education level of the Mexican population would imply expanding primary and secondary education over tertiary. There are many reasons one might want to make secondary schooling universal, and that is a social policy that Mexico may wish to pursue.

The question we raise is whether universal secondary schooling would likely have much impact on Mexico's economy or economic performance. Consider the global demand and supply for various types of skills and skilled labor. If one is producing manufactured goods, then one is coping — as are all countries — with the massive expansion of the relatively low skilled labor pool linked to the addition, first by China and then India, of their billion-person populations to the effective supply of unskilled and semi-skilled labor. Any sustained wage advantage over these economies must be grounded in higher-productivity labor that leads to competitive unit labor costs. The question, for which we have no answer or evidence, is whether moving the typical Mexican worker from 8 to 9 or 9 to 10 years of schooling is going to make a substantial difference in the dynamism of the Mexican economy. This is expanding the supply of a factor that world markets (for tradables, which impact labor markets) have been suggesting is hardly in excess demand.

If one is not competing for producing manufactured goods — the application of routine manufacturing production techniques to add value — then perhaps one can compete in the market for *ideas* that, broadly defined, is the addition of value through design, invention, innovation, creativity, first-mover advantages, and so on. In the market for ideas in tradables (either directly, as in service industries such as finance, or indirectly, in creativity embedded in goods) one is competing with the United States and other advanced-market economies (and, in fields such as engineering, East Asian economies). Again, the question should be whether the expansion of the education of the typical young person from 8 to 9 years of school at existing (or feasible) levels of quality will really transform Mexico's ability to raise productivity in the global market for ideas. As we demonstrated above, one of the key social issues in the United States is that among college graduates the demand for skills was shifting toward the upper tail of skills. The markets for ideas often display superstar features.

## Discovering the discoverers

We do not wish to overstate our case. We merely suggest a new range of policies that should be taken into consideration in discussions about which education policies should be pursued. We are suggesting that, however desirable for social policy reasons educational policies aimed at addressing broad-based quality and promoting equality of access are (and we have no issue with these arguments), they are unlikely to be of great economic significance in the short to medium term. This is just pointing out the unpleasant but obvious—during all of the lost decades of stagnating (or falling) levels of output per worker in Latin America, average levels of educational attainment moved steadily upward. If the business-as-usual expansions of existing educational systems were capable of producing growth acceleration, then the impacts should have been widely noticeable by now.[43]

What we are proposing is to at least consider policies that have the following three features:

1. encouraging better performance among the top performers,
2. emphasizing broadening the base of talent across socioeconomic groups by proactively identifying and encouraging academic excellence outside the group of students who are currently affluent, and
3. creating an environment conducive to entrepreneurship so that new ideas in the production of tradables can flourish.

### Discovering the discoverers

The adoption of imitative technology requires a country to develop the social capability to effectively adapt and use the technologies in their production system.[44] That is, the transfer of existing technology needs the appropriate institutions to be successful and entrepreneurs who decide how to use it in the most effective way, given the other inputs of production.[45] Optimal production strategies greatly differ across sectors. To produce manufactured goods, Mexico must be able to compete with China and Vietnam; to produce low-end portable services, Mexico must be able to compete with India and Ireland, while to be able to produce high-end ideas, Mexico must be able to compete with the United States and Israel.

Thus, to foster economic growth, a country has to "learn what it is good at producing."[46] The level of education of the workforce affects what there is to be discovered in a country's capability set as discoverers lead "self-discovery." In the process of Schumpeterian entrepreneurship, one needs a critical mass of people of high ability to put together factors in a new way. And Mexico is failing to achieve this.

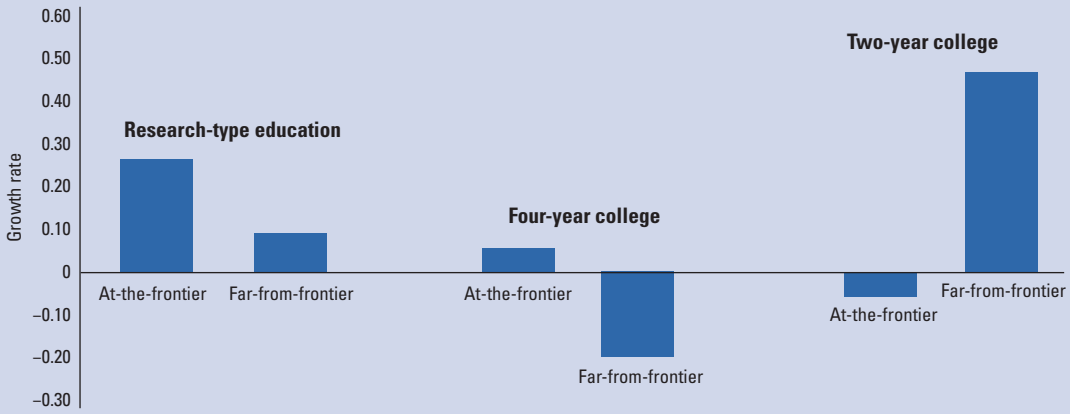
Aghion et al. have shown how the composition of its human capital and its distance from the technological frontier affect a country's economic growth.[47] They show that countries closer to the frontier may benefit the most from investment in research education because this may foster the creation of knowledge and the process of innovation. On the other hand, research education can also have a significant impact on growth and development in countries far from the frontier. In the case of the United States, even in far-from-the-frontier states, increased spending in research-type education has a positive effect on economic growth (Figure 9). As described in the previous section, even in Mexico the superstar phenomenon shows that returns to the top are high and the demand for highly educated and able workers is increasing.

### Expansion of opportunity by identifying talent

Some 45.1% of the population aged 15–19 years is not in school in Mexico.[48] Only 62% of those not in school are employed; the remaining 38% are not engaged in any productive activity (i.e., employment, education, or training). As we can see from Figure 10, educational attainment stratifies sharply on household income: only half the poorest 20% even reach ninth grade.

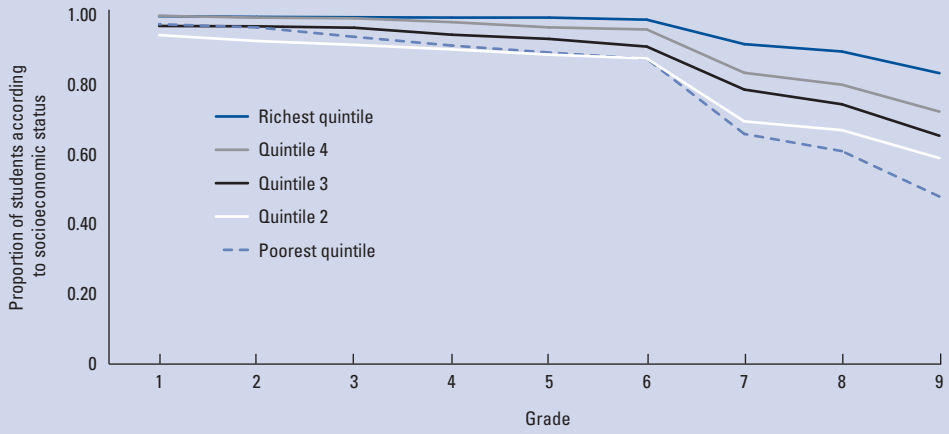
This means that not even all children in the age cohort are taking the PISA test. This implies that, by selecting students for the PISA on the basis of socioeconomic status, not ability, Mexico is recruiting from a narrow base. If potentially high-ability children from low-income backgrounds drop out, there is a loss to the pool of potential discovers. Mexico would never attempt the *Mundial de futból* by selecting players only from a small stratum of the population; why is Mexico attempting to do this with the *economic Mundial*?

**Figure 9** Effect on per-employee growth rate of US$1,000 per person in additional spending at different levels of education in states near and far from the technological frontier




Source: Aghion et al. 2005

**Figure 10** Educational attainment profile, ages 15–19, by per capita household groups




Source: http://econ.worldbank.org/projects/edattain/
Note: Groups from per capita household expenditures are based on analysis of data from IHS-WDR07.

## Allocation of talent to global tradables

All these factors combined significantly affect the allocation of talents — that is, the relationship between the reward structure of a society and the way individuals allocate their talent between productive and unproductive activities. The allocation of talent in a society is an important determinant of output and growth. Murphy et al. show how, although general talent is not occupation-specific, its allocation critically depends on the returns to ability between different sectors and the set of incentives faced by individuals.[49] That is, if we exclude those individuals who have exceptional natural talent for a specific task, such as singing opera or playing basketball, we are left with other individuals who may have higher intelligence and ability that gives them a competitive advantage in any occupation they choose. In the case of Mexico, highly educated individuals would choose professional activities insulated from international competition because of the low-average quality of the education they received at secondary and tertiary levels. These are the non-tradable occupations described in Table 5.

Moreover, the institutional setting, legal framework, and social status attached to different occupations will affect how individuals choose their professions. As previously shown, education in Mexico is stratified by income and ability to pay, not by talent and intellectual ability. This reinforces not only the lack of emphasis on expanding high-quality education, but also perpetuates low social mobility and great inequality. This selection process also affects the way individuals perceive the fairness of institutions and how society rewards their effort and commitment. A self-replicating elite is more likely to be in favor of the status quo. Therefore, productive

**Table 5** The allocation of talent

| Type | Tradable | Non-tradable |
|---|---|---|
| Innovation | Growth-enhancing professions (e.g., entrepreneurs, engineers, designers) | Nationally regulated professions (e.g., doctors) |
| Re-distribution | | Rent-seeking professions (e.g., lawyers, lobbyists) |

ability may be less socially valuable than rent-seeking behavior.[50] In these circumstances, therefore, talent would end up being concentrated in the non-tradable and rent-seeking activities (Table 5). These are the low-growth professions as opposed to growth-enhancing ones. If institutions do not encourage private initiative, social mobility, and productive activities, then talented individuals will choose occupations that do not face competition; low-quality education in international terms means there is a high ability assigned to non-tradable occupations to limit competition. This would create a significant distortion in the allocation of people, because highly productive individuals would choose socially unproductive occupations.

We are aware that these views fly in the face of the vast majority of recommendations about education. Again, we are not disputing that the usual recommendations — which tend to focus on system expansion in access; broad-based improvements in quality; and, if anything, reducing inequality in outcomes by focusing on the low-performing schools and students — are correct as educational policies for a variety of social and internal educational reasons. However, the typical (average scoring) Mexican 15-year-old student is roughly at the 18th percentile of the skills distribution of OECD 15-year-olds. Moreover, that is roughly average school completion in Mexico, while other countries have much higher average completion levels. So the typical school leaver and labor market entrant in Mexico is probably near the bottom 10–15% of the skills distribution of the typical labor market entrant in the United States or other OECD countries. It is difficult to believe that the available marginal and gradual improvements in the skills of the typical school leaver will have immediate, growth-accelerating effects by in any way facilitating a structural transformation in the Mexican economy or an expansion in productivity.

## Conclusion

Education, research, scientific discovery, innovation, and economic growth are closely related. This chapter has shown that traditional education policies that focus on expanding the educational system at the *average*, while they may have many benefits, are unlikely to make Mexico competitive in the knowledge-based global economy. On the other hand, the chapter has suggested exploring measures to enhance the country's productive capabilities and foster economic growth. An effective development strategy would not simply raise the *average* schooling levels of the population, but would rather enhance the *top*. In this regard, a combination of focus on the upper tail and on the expansion of opportunity is needed to enable Mexico to compete globally. The emphasis should be on both "discovering the discoverers" by developing the educational system based on the quality accessible to the top and fostering global standards of performance, and on proactively identifying low-income, high-ability individuals to facilitate educational and economic mobility.

## Notes

1 See Santibañez et al. 2005, p.17. This is calculated by taking completion indicators of the *Secretaria of Educación*, 2003. There are no data on how many of the upper secondary graduates enter college.

2 Villa and Pacheco 2004 and Santibañez et al. 2005.

3 The latest paper on this topic is that of Hanushek and Woessmann 2008. The literature about the role of schooling attainment (aggregated into measures of "schooling capital") on economic growth has shown mixed results, with the contribution to aggregate output at best equal to the contribution one would have expected from the microeconomic returns; see Pritchett 2006.

4 Developed jointly by OECD member countries through the OECD's Directorate for Education, PISA aims to measure how far students approaching the end of compulsory education have acquired some of the knowledge and skills essential for full participation in the global economy. The PISA test is conducted every three years with 15-year-old students across more than 50 countries to assess their scholastic capabilities in reading as well as their mathematic and scientific literacy. For more information, please see: http://www.pisa.oecd.org/.

In this chapter, data from PISA 2003 were used instead of the most recent 2006 data since the main focus of that year's test was on mathematics as opposed to science for the 2006 edition. That is, in each edition of the PISA assessment one of the three domains (reading, mathematics, science) is examined in depth. It was believed more appropriate for the purpose of this chapter to use the results of PISA 2003 to examine students' performance in mathematics, since in PISA 2006 mathematics was only a minor subject of assessment. Moreover, it is important to note that the mathematics test scores from PISA 2006 are consistent with the data from PISA 2003; the relative ranking of Mexico, the United States, and Korea remains unchanged.

5 We show here the figure for mathematics only because it appears to be the most readily comparable subject across countries. Analogous figures for science, reading, and problem solving are available from the authors upon request, at: Lant_Pritchett@hks.harvard.edu, Martina_Viarengo@hks.harvard.edu

6 These are: level 1 (358–420), level 2 (420–482), level 3 (482–545), level 4 (545–607), level 5 (607–669), and level 6 (above 669). In order to be assigned to a level of proficiency, a student must provide the right answer to the majority of the questions of the related level. See Table A1 in Annex A for a description of the students' skills and knowledge at each level of proficiency.

7 PISA 2003, p. 11.

8 PISA 2003, Technical Report (p. 261). Refer to Table A1 in Annex A for a description of the other levels of proficiency.

9 PISA 2003, Technical Report (p. 261). This corresponds to levels of proficiency 5 and 6.

10 Since the test is constructed to have mean 500 and standard deviation 100, the level 625 is roughly at the tenth percentile.

11 See Filmer et al. 2006 for work done in connection with calculating the number of students above a potential Millennium Development Goal that constructs cohert estimates from tested students and learning profiles.

12 These calculations are based on a recent paper using TIMSS questions given to students in only two states of India, extrapolated to the national level. Although these calculations are the best that can be done, they are far from "official" and should be taken as rough approximations.

13 In 2005, the website that listed the results was not functional. Coincidentally, the 2005 contest was held in Mexico.

14 One can simulate the differences in averages that would be consistent with the observed differences among the top six students assuming they are drawing from populations proportional to the cohort sizes. A simulation based just on these Olympiad scores produces inferred differences in central tendency (assuming equal variances) consistent with the rankings of large-scale tests for these countries — for example, it shows that the Slovak Republic has much better average scores than Thailand or India but does worse only because of size.

15 Santibañez et al. 2005, p. ix.

16 Krueger 1999.

17 Autor 2007.

18 Autor et al. 2005.

19 This appears even more striking when we look at how fast the relative change has occurred: in 1970, 0.01 percent of taxpayers only earned 70 times as much as the average; in 1998, the richest 13,000 US families had incomes 300 times greater than the average family; see Krugman 2002.

20 Rosen 1981.

21 Cragg and Epelbaum 1996.

22 See Filmer and Pritchett 1996; Pritchet, 2004.

23 This far from solves the problem, as even the student standard deviation depends on the underlying evaluation instrument — a test that was far too hard for the tested population might return as very low student standard deviation because the scores cluster on zero. Often in empirical studies the standard deviation of the assessment is itself normalized and then impacts are reported as effect sizes, but the effect sizes may or may not be comparable.

24 Hanushek 2003, 2006.

25 Hanushek 2007, p. 9.

26 Hanushek at al. 2005; Vegas and Umansky 2005.

27 Mizala and Romaguera 2004, Table 2.

28 Vegas 2005.

29 Mizala and Romaguera 2004, Table 2.

30 Vegas 2005.

31 Vegas 2005.

32 Menezes-Filho and Pazello 2004.

33 Gordon and Vegas 2005.

34 Hanushek 2007.

35 Surveys of the evidence on class size include Hanushek 1986, 1996; Card and Krueger 1996.

36 Gordon and Vegas 2005.

37 Krueger 1999. We acknowledge the limitations of Krueger's study; see Hoxby 2000; Hanushek 2007. The purpose here is only to show the maximum possible gain in case the policy was effective.

38 Mizala and Romaguera 2004.

39 Mizala and Romaguera 2004.

40 Mizala and Romaguera 2005.

41 Krueger 1999.

42 A study by Woessmann 2003 summarized in Pritchett 2004 shows that, even using plausible techniques for identifying the causal impacts of class-size reductions and examining the evidence across more than a dozen OECD countries using the TIMSS data, *none* of them find an effect as large as Krueger suggests and most of them are very near zero. Although identification is an issue, even class-size impacts identified with randomized experiments in contexts such as India and Kenya find essentially no effect.

43 Pritchett 2006.

44 Abramovitz 1986, p. 387.

45 Hausmann and Rodrik 2003 describe how, even in the case of complete information on technology, entrepreneurs would play a key role in deciding what to produce with it.

46 Hausmann and Rodrik 2003.

47 Aghion et al. 2006.

48 OECD 2008, p. 22.

49 Murphy et al. 1991.

50 This refers to "the socially costly pursuit of wealth transfers"; see Tollison 1997, p. 506.

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# Annex A

**Table A1** PISA 2003: Levels of Mathematics Proficiency

| | |
|---|---|
| 6 | At Level 6 students can conceptualise, generalise, and utilise information based on their investigations and modelling of complex problem situations. They can link different information sources and representations and flexibly translate among them. Students at this level are capable of advanced mathematical thinking and reasoning. These students can apply their insight and understandings along with a mastery of symbolic and formal mathematical operations and relationships to develop new approaches and strategies for attacking novel situations. Students at this level can formulate and precisely communicate their actions and reflections regarding their findings, interpretations, arguments, and the appropriateness of these to the original situations. |
| 5 | At Level 5 students can develop and work with models for complex situations, identifying constraints and specifying assumptions. They can select, compare, and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterisations, and insight pertaining to these situations. They can reflect on their actions and formulate and communicate their interpretations and reasoning. |
| 4 | At Level 4 students can work effectively with explicit models for complex concrete situations that may involve constraints or call for making assumptions. They can select and integrate different representations, including symbolic, linking them directly to aspects of real-world situations. Students at this level can utilise well-developed skills and reason flexibly, with some insight, in these contexts. They can construct and communicate explanations and arguments based on their interpretations, arguments and actions. |
| 3 | At Level 3 students can execute clearly described procedures, including those that require sequential decisions. They can select and apply simple problem-solving strategies. Students at this level can interpret and use representations based on different information sources and reason directly from them. They can develop short communications reporting their interpretations, results and reasoning. |
| 2 | At Level 2 students can interpret and recognise situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can employ basic algorithms, formulae, procedures, or conventions. They are capable of direct reasoning and making literal interpretations of the results. |
| 1 | At Level 1 students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and to carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are obvious and follow immediately from the given stimuli. |

Source: OECD. PISA 2003 Technical Report. 2005, p. 261, figure 16.4. Available at http://www.pisa.oecd.org/dataoecd/49/60/35188570.pdf
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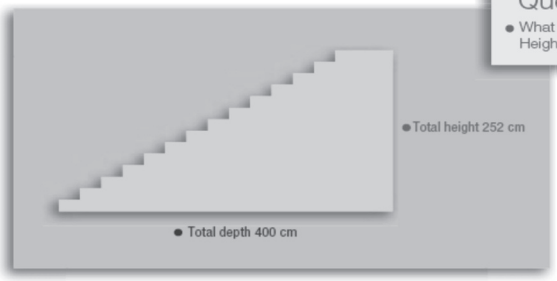
# Annex A (continued)

**Table A2** PISA 2003: Mathematics, sample questions

## STAIRCASE

The diagram below illustrates a staircase with 14 steps and a total height of 252 cm :



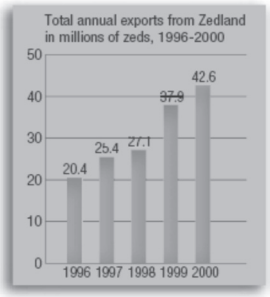

**Question**

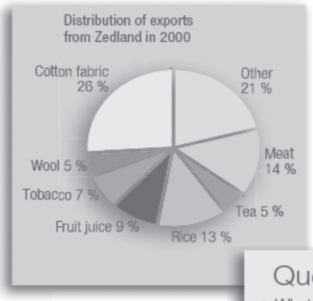
- What is the height of each of the 14 steps?
  Height: ..... cm

This short response question is situated in a daily life context. The student has to interpret and solve the problem which uses two different representation modes: language, including numbers, and graphical. This question also has redundant information (i.e., the depth is 400 cm) which can be confusing for students, but this is not unusual in real-world problem solving. The actual procedure needed is a simple division. As this is a basic operation with numbers (252 divided by 14) the question belongs to the reproduction competency cluster. All the required information is presented in a recognisable situation and the students can extract the relevant information from this. The question has a difficulty of 421 score points (Level 2).

## EXPORTS

The graphics below show information about exports from Zedland, a country that uses zeds as its currency.




This multiple-choice question is situated in a public context and is in the uncertainty content area. It consists of reading data from a bar chart and a pie chart, and combining that data to carry out a basic number operation. Specifically, it involves decoding the charts by looking at the total of annual exports of the year 2000 (42.6 million zeds) and at the percentage coming from Fruit Juice exports (9%). It is this activity and the process of connecting these numbers by an appropriate numerical operation (9% of 42.6) that places this question in the connections competency cluster. The question has a difficulty of 565 score points (Level 4).

**Question**

- What was the value of fruit juice exported from Zedland in 2000?
  A. 1.8 million zeds.
  B. 2.3 million zeds.
  C. 2.4 million zeds.
  D. 3.4 million zeds.
  E. 3.8 million zeds.

## WALKING

The picture shows the footprints of a man walking.
The pacelength P is the distance between the rear of two consecutive footprints.

For men, the formula, $\frac{n}{P} = 140$, gives an approximate relationship between n and P where:

n = number of steps per minute, and
P = pacelength in metres.


**Question**

- If the formula applies to Heiko's walking and Heiko takes 70 steps per minute, what is Heiko's pacelength?
  Show your work.

This open-constructed response question is situated in a personal context. The question is about the relationship between the number of steps per minute and pacelength, which means that it is in the change and relationships content area. Students need to solve the problem by substitution into a simple formula and carrying out a routine calculation: if n/p = 140, and n = 70, what is the value of p? The competencies needed involve reproducing practised knowledge, performing routine procedures, the application of standard technical skills, manipulating expressions containing symbols and formulae, and carrying out computations. With this combination of competencies, and the real-world setting that students must handle, the question has a difficulty of 611 score points (Level 5).

Source: OECD. *First Results* from PISA 2003, pp 6–7. Available at http://www.pisa.oecd.org/dataoecd/49/60/35188570.pdf
Reproduced by permission of the OECD.

## Annex A (continued)

**Table A3** PISA 2003: Number of students above the advanced international benchmark in mathematics

| Country | Percent of total test takers | Number of test takers | Cohort size |
|---|---|---|---|
| India* | 52.3 | 11,503,247 | 21,994,737 |
| Korea, Rep. | 97.2 | 681,426 | 701,056 |
| Mexico | 60.0 | 1,204,632 | 2,007,721 |
| Slovak Republic | 75.0 | 63,821 | 85,095 |
| Thailand | 71.2 | 727,055 | 1,021,145 |
| United States | 88.0 | 3,676,652 | 4,178,014 |

| Country | Percent of test takers scoring > 625 | Number of test takers scoring > 625 | Cohort size |
|---|---|---|---|
| India* | 1.00 | 95,659 | 21,994,737 |
| Korea, Rep. | 18.20 | 127,592 | 701,056 |
| Mexico | 0.29 | 5,822 | 2,007,721 |
| Slovak Republic | 9.42 | 8,016 | 85,095 |
| Thailand | 1.51 | 15,419 | 1,021,145 |
| United States | 6.52 | 272,406 | 4,178,014 |

Source: UNESCO Statistical Yearbook; PISA 2003; World Bank, 2003

* TIMSS 2003 estimate for India is 101,000; here it is adjusted by the US TIMSS/PISA ratio and is equal to 95,659. This is because India did not participate in PISA 2003, so we are using test scores directly comparable to the TIMSS 2003 developed by Das and Zajonc (2008) and adjusting them to account for the differences between TIMSS and PISA (TIMSS is taken by 4th and 8th grade students and has questions more closely related to the curriculum, whereas PISA is taken by 15 -year-old students and measures literacy in the subject.)

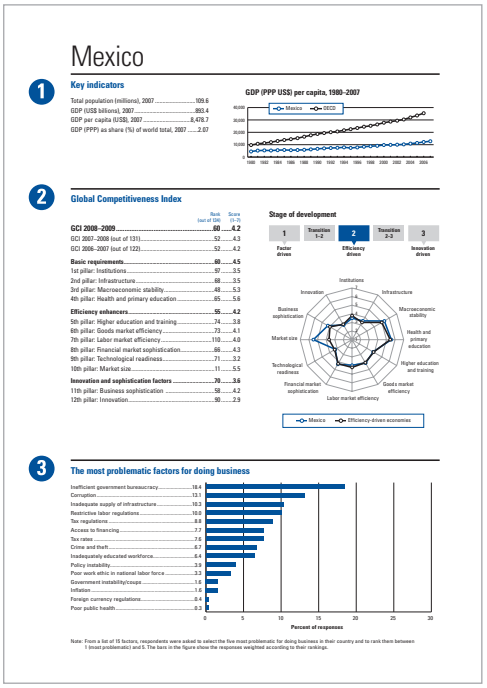
Note: Percent of test takers = gross enrollment in secondary education in the country (net enrollment data were not available for the Slovak Republic); test takers as percent of cohort = percentage of test takers in the math test as a share of the total number of 15-year-olds in the country; percent of test takers scoring > 625 = percentage of test takers who achieved a score greater than 625 in the math test; test takers scoring >625 as percent of cohort = percentage of test takers who achieved a score greater than 625 in the math test as a share of the total number of 15-year-olds in the country; and cohort size = total number of 15-year-olds in the country.

# Part 3

# Country Profiles

# How to Read the Country Profiles

The Country Profiles section presents a two-page profile for Mexico and selected comparators, as follows: Brazil, Chile, China, Hungary, India, Indonesia, Korea, Rep., South Africa and Turkey.




## Page 1

### 1 Key indicators

The first section presents a selection of key indicators:

- Population figures come from the United Nations Population Fund (UNFPA)'s *State of World Population 2007,* the World Bank's *World Development Indicators 2008,* and the Economist Intelligence Unit's *CountryData Database,* as well as national sources.

- Macroeconomic data come from the April 2008 edition of the International Monetary Fund (IMF)'s *World Economic Outlook.*

- The chart on the upper right-hand side displays the evolution of GDP per capita adjusted for purchasing power parity (PPP), from 1980 through 2007 (or the period for which data are available) for the country under review (blue line). The source for these figures is the April 2008 edition of the IMF's *World Economic Outlook.* The black line plots the aggregate performance of the group of economies to which the country under review belongs. We draw on the World Bank's classification of economies, which divides the world into six regions ("East Asia and the Pacific," "Europe and Central Asia," "Latin America and the Caribbean," "Middle East and North Africa," "South Asia," and "Sub-Saharan Africa") and two income groups ("high-income OECD" and "other high income"). GDP aggregates (only available through 2006) are from the World Bank's *World Development Indicators Online Database* (data retrieved in August 2008).

### 2 Global Competitiveness Index

This section details the country's performance on the various components of the Global Competitiveness Index (GCI). The first column shows the country's ranks among the 134 economies included in the *Global Competitiveness Report 2008-2009*, while the second column presents the scores. For more information on the methodology of the GCI, please refer to Chapter 1.1 of this *Report.*

On the right-hand side, a chart shows the country's performance in the 12 pillars of the GCI (blue line) measured up against the average scores across all the countries in the same stage of development (black line).

### 3 The most problematic factors for doing business

This chart summarizes those factors seen by business executives as the most problematic for doing business in their country. The information is drawn from the 2008 edition of the World Economic Forum's Executive Opinion Survey. From a list of 15 factors, respondents were asked to select the five most problematic ones, and to rank those from 1 (most problematic) to 5. The results were then tabulated and weighted according to the ranking assigned by respondents.

**Page 2**

## 4 The Global Competitiveness Index in detail

This page presents the rank achieved by a country on each of the indicators entering the composition of the GCI. Indicators are organized by pillar. Please refer to the appendix of Chapter 1.1 for the detailed structure of the GCI.

Next to the rank, a colored square indicates whether the indicator constitutes an advantage (blue square) or a disadvantage (black square) for the country. In order to identify variables as advantages or disadvantages, the following rules were applied:

- For those economies ranked in the top 10 in the overall GCI, individual variables ranked between 1 and 10 are considered to be advantages. Any variables ranked below 10 are considered to be disadvantages.

- For those economies ranked from 11 to 50 in the overall GCI, variables ranked higher than the economy's own rank are considered to be advantages. Any variables ranked equal to or lower than the economy's overall rank are considered to be disadvantages.

- For those economies ranked lower than 50 in the overall GCI, any individual variables ranked higher than 51 are considered as advantages. Any variables ranked lower than 50 are considered as disadvantages.

For indicators allocated a half-weight in the GCI, only the first instance is shown on this page. The Data Tables included in the *Global Competitiveness Report 2008-2009* provide detailed rankings and scores for all the variables of the GCI.


Mexico

4 The Global Competitiveness Index in detail

■ Competitive Advantage ■ Competitive Disadvantage

| INDICATOR | RANK/134 |
|---|---|
| **1st pillar: Institutions** | |
| 1.01 Property rights | 89 |
| 1.02 Intellectual property protection | 82 |
| 1.03 Diversion of public funds | 95 |
| 1.04 Public trust of politicians | 98 |
| 1.05 Judicial independence | 86 |
| 1.06 Favoritism in decisions of government officials | 80 |
| 1.07 Wastefulness of government spending | 80 |
| 1.08 Burden of government regulation | 121 |
| 1.09 Efficiency of legal framework | 111 |
| 1.10 Transparency of government policymaking | 94 |
| 1.11 Business costs of terrorism | 71 |
| 1.12 Business costs of crime and violence | 125 |
| 1.13 Organized crime | 127 |
| 1.14 Reliability of police services | 124 |
| 1.15 Ethical behavior of firms | 82 |
| 1.16 Strength of auditing and reporting standards | 71 |
| 1.17 Efficacy of corporate boards | 82 |
| 1.18 Protection of minority shareholders' interests | 69 |
| **2nd pillar: Infrastructure** | |
| 2.01 Quality of overall infrastructure | 76 |
| 2.02 Quality of roads | 66 |
| 2.03 Quality of railroad infrastructure | 72 |
| 2.04 Quality of port infrastructure | 84 |
| 2.05 Quality of air transport infrastructure | 56 |
| 2.06 Available seat kilometers* | 18 |
| 2.07 Quality of electricity supply | 87 |
| 2.08 Telephone lines* | 68 |
| **3rd pillar: Macroeconomic stability** | |
| 3.01 Government surplus/deficit* | 59 |
| 3.02 National savings rate* | 74 |
| 3.03 Inflation* | 57 |
| 3.04 Interest rate spread* | 54 |
| 3.05 Government debt* | 34 |
| **4th pillar: Health and primary education** | |
| 4.01 Business impact of malaria | 37 |
| 4.02 Malaria incidence* | 75 |
| 4.03 Business impact of tuberculosis | 37 |
| 4.04 Tuberculosis incidence* | 39 |
| 4.05 Business impact of HIV/AIDS | 68 |
| 4.06 HIV prevalence* | 68 |
| 4.07 Infant mortality* | 77 |
| 4.08 Life expectancy* | 50 |
| 4.09 Quality of primary education | 116 |
| 4.10 Primary enrollment* | 23 |
| 4.11 Education expenditure* | 31 |
| **5th pillar: Higher education and training** | |
| 5.01 Secondary enrollment* | 67 |
| 5.02 Tertiary enrollment* | 74 |
| 5.03 Quality of the educational system | 109 |
| 5.04 Quality of math and science education | 127 |
| 5.05 Quality of management schools | 53 |
| 5.06 Internet access in schools | 76 |
| 5.07 Local availability of research and training services | 55 |
| 5.08 Extent of staff training | 87 |
| **6th pillar: Goods market efficiency** | |
| 6.01 Intensity of local competition | 78 |
| 6.02 Extent of market dominance | 103 |
| 6.03 Effectiveness of anti-monopoly policy | 92 |
| 6.04 Extent and effect of taxation | 89 |
| 6.05 Total tax rate* | 92 |
| 6.06 No. of procedures required to start a business* | 44 |
| 6.07 Time required to start a business* | 61 |
| 6.08 Agricultural policy costs | 105 |
| 6.09 Prevalence of trade barriers | 55 |
| 6.10 Trade-weighted tariff rate* | 105 |
| 6.11 Prevalence of foreign ownership | 25 |
| 6.12 Business impact of rules on FDI | 62 |
| 6.13 Burden of customs procedures | 74 |
| 6.14 Degree of customer orientation | 55 |
| 6.15 Buyer sophistication | 52 |
| **7th pillar: Labor market efficiency** | |
| 7.01 Cooperation in labor-employer relations | 69 |
| 7.02 Flexibility of wage determination | 72 |
| 7.03 Non-wage labor costs* | 89 |
| 7.04 Rigidity of employment* | 99 |
| 7.05 Hiring and firing practices | 91 |
| 7.06 Firing costs* | 81 |
| 7.07 Pay and productivity | 70 |
| 7.08 Reliance on professional management | 76 |
| 7.09 Brain drain | 64 |
| 7.10 Female participation in labor force* | 115 |
| **8th pillar: Financial market sophistication** | |
| 8.01 Financial market sophistication | 56 |
| 8.02 Financing through local equity market | 77 |
| 8.03 Ease of access to loans | 95 |
| 8.04 Venture capital availability | 39 |
| 8.05 Restriction on capital flows | 45 |
| 8.06 Strength of investor protection* | 26 |
| 8.07 Soundness of banks | 55 |
| 8.08 Regulation of securities exchanges | 43 |
| 8.09 Legal rights index* | 93 |
| **9th pillar: Technological readiness** | |
| 9.01 Availability of latest technologies | 92 |
| 9.02 Firm-level technology absorption | 92 |
| 9.03 Laws relating to ICT | 69 |
| 9.04 FDI and technology transfer | 60 |
| 9.05 Mobile telephone subscribers* | 80 |
| 9.06 Internet users* | 63 |
| 9.07 Personal computers* | 55 |
| 9.08 Broadband Internet subscribers* | 56 |
| **10th pillar: Market size** | |
| 10.01 Domestic market size* | 12 |
| 10.02 Foreign market size* | 16 |
| **11th pillar: Business sophistication** | |
| 11.01 Local supplier quantity | 55 |
| 11.02 Local supplier quality | 46 |
| 11.03 State of cluster development | 58 |
| 11.04 Nature of competitive advantage | 68 |
| 11.05 Value chain breadth | 59 |
| 11.06 Control of international distribution | 69 |
| 11.07 Production process sophistication | 67 |
| 11.08 Extent of marketing | 53 |
| 11.09 Willingness to delegate authority | 54 |
| **12th pillar: Innovation** | |
| 12.01 Capacity for innovation | 67 |
| 12.02 Quality of scientific research institutions | 79 |
| 12.03 Company spending on R&D | 71 |
| 12.04 University-industry research collaboration | 84 |
| 12.05 Gov't procurement of advanced tech products | 104 |
| 12.06 Availability of scientists and engineers | 105 |
| 12.07 Utility patents* | 56 |

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

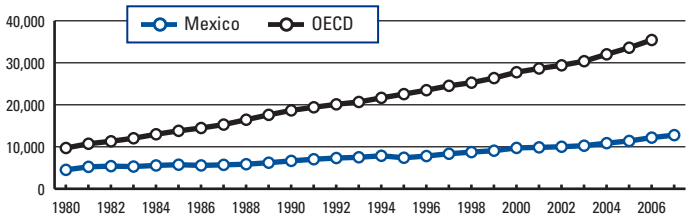
# List of Countries

# Mexico

## Key indicators

Total population (millions), 2007 ..... 109.6
GDP (US$ billions), 2007 ..... 893.4
GDP per capita (US$), 2007 ..... 8,478.7
GDP (PPP) as share (%) of world total, 2007 ..... 2.07

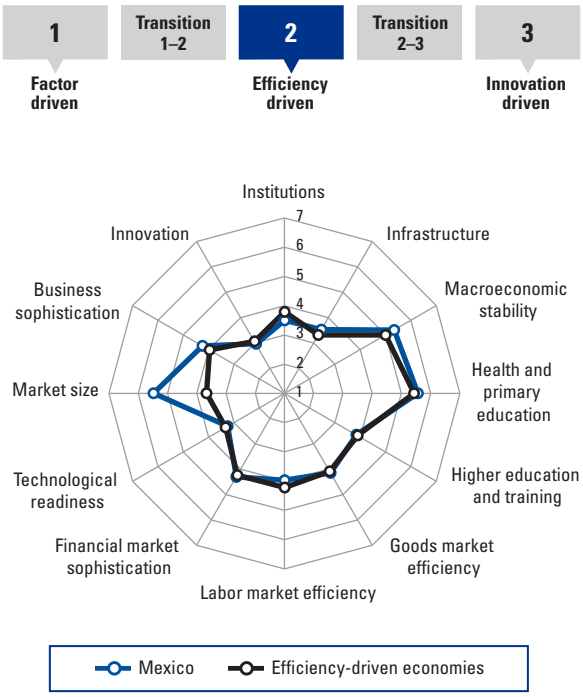
**GDP (PPP US$) per capita, 1980–2007**



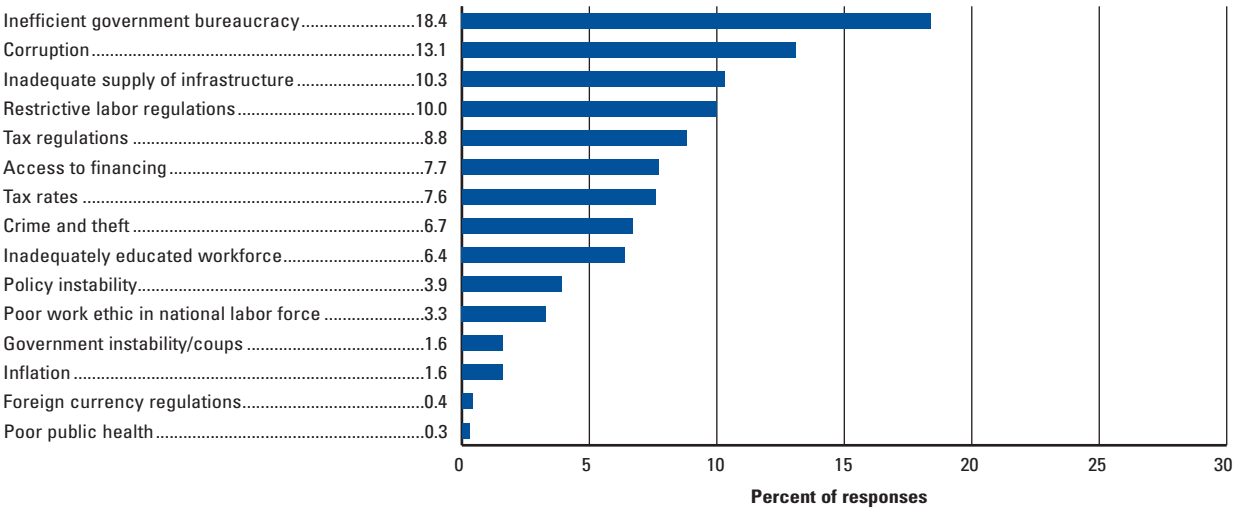

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **60** | **4.2** |
| GCI 2007–2008 (out of 131) | 52 | 4.3 |
| GCI 2006–2007 (out of 122) | 52 | 4.2 |
| **Basic requirements** | **60** | **4.5** |
| 1st pillar: Institutions | 97 | 3.5 |
| 2nd pillar: Infrastructure | 68 | 3.5 |
| 3rd pillar: Macroeconomic stability | 48 | 5.3 |
| 4th pillar: Health and primary education | 65 | 5.6 |
| **Efficiency enhancers** | **55** | **4.2** |
| 5th pillar: Higher education and training | 74 | 3.8 |
| 6th pillar: Goods market efficiency | 73 | 4.1 |
| 7th pillar: Labor market efficiency | 110 | 4.0 |
| 8th pillar: Financial market sophistication | 66 | 4.3 |
| 9th pillar: Technological readiness | 71 | 3.2 |
| 10th pillar: Market size | 11 | 5.5 |
| **Innovation and sophistication factors** | **70** | **3.6** |
| 11th pillar: Business sophistication | 58 | 4.2 |
| 12th pillar: Innovation | 90 | 2.9 |

**Stage of development**




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

# Mexico

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 89 | |
| 1.02 | Intellectual property protection | 82 | |
| 1.03 | Diversion of public funds | 95 | |
| 1.04 | Public trust of politicians | 98 | |
| 1.05 | Judicial independence | 86 | |
| 1.06 | Favoritism in decisions of government officials | 90 | |
| 1.07 | Wastefulness of government spending | 80 | |
| 1.08 | Burden of government regulation | 121 | |
| 1.09 | Efficiency of legal framework | 111 | |
| 1.10 | Transparency of government policymaking | 94 | |
| 1.11 | Business costs of terrorism | 71 | |
| 1.12 | Business costs of crime and violence | 125 | |
| 1.13 | Organized crime | 127 | |
| 1.14 | Reliability of police services | 124 | |
| 1.15 | Ethical behavior of firms | 82 | |
| 1.16 | Strength of auditing and reporting standards | 71 | |
| 1.17 | Efficacy of corporate boards | 82 | |
| 1.18 | Protection of minority shareholders' interests | 69 | |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 76 | |
| 2.02 | Quality of roads | 66 | |
| 2.03 | Quality of railroad infrastructure | 72 | |
| 2.04 | Quality of port infrastructure | 94 | |
| 2.05 | Quality of air transport infrastructure | 56 | |
| 2.06 | Available seat kilometers* | 18 | ■ |
| 2.07 | Quality of electricity supply | 87 | |
| 2.08 | Telephone lines* | 68 | |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 59 | |
| 3.02 | National savings rate* | 74 | |
| 3.03 | Inflation* | 57 | |
| 3.04 | Interest rate spread* | 54 | |
| 3.05 | Government debt* | 34 | ■ |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 37 | ■ |
| 4.02 | Malaria incidence* | 75 | |
| 4.03 | Business impact of tuberculosis | 37 | ■ |
| 4.04 | Tuberculosis incidence* | 39 | ■ |
| 4.05 | Business impact of HIV/AIDS | 68 | |
| 4.06 | HIV prevalence* | 68 | |
| 4.07 | Infant mortality* | 77 | |
| 4.08 | Life expectancy* | 50 | ■ |
| 4.09 | Quality of primary education | 116 | |
| 4.10 | Primary enrollment* | 23 | ■ |
| 4.11 | Education expenditure* | 31 | ■ |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 67 | |
| 5.02 | Tertiary enrollment* | 74 | |
| 5.03 | Quality of the educational system | 109 | |
| 5.04 | Quality of math and science education | 127 | |
| 5.05 | Quality of management schools | 53 | |
| 5.06 | Internet access in schools | 76 | |
| 5.07 | Local availability of research and training services | 55 | |
| 5.08 | Extent of staff training | 87 | |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 78 | |
| 6.02 | Extent of market dominance | 103 | |
| 6.03 | Effectiveness of anti-monopoly policy | 92 | |
| 6.04 | Extent and effect of taxation | 89 | |
| 6.05 | Total tax rate* | 92 | |
| 6.06 | No. of procedures required to start a business* | 44 | ■ |
| 6.07 | Time required to start a business* | 61 | |
| 6.08 | Agricultural policy costs | 105 | |
| 6.09 | Prevalence of trade barriers | 55 | |
| 6.10 | Trade-weighted tariff rate* | 105 | |
| 6.11 | Prevalence of foreign ownership | 25 | ■ |
| 6.12 | Business impact of rules on FDI | 62 | |
| 6.13 | Burden of customs procedures | 74 | |
| 6.14 | Degree of customer orientation | 55 | |
| 6.15 | Buyer sophistication | 52 | |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 68 | |
| 7.02 | Flexibility of wage determination | 72 | |
| 7.03 | Non-wage labor costs* | 89 | |
| 7.04 | Rigidity of employment* | 99 | |
| 7.05 | Hiring and firing practices | 91 | |
| 7.06 | Firing costs* | 81 | |
| 7.07 | Pay and productivity | 70 | |
| 7.08 | Reliance on professional management | 76 | |
| 7.09 | Brain drain | 64 | |
| 7.10 | Female participation in labor force* | 115 | |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 56 | |
| 8.02 | Financing through local equity market | 77 | |
| 8.03 | Ease of access to loans | 95 | |
| 8.04 | Venture capital availability | 99 | |
| 8.05 | Restriction on capital flows | 45 | ■ |
| 8.06 | Strength of investor protection* | 26 | ■ |
| 8.07 | Soundness of banks | 55 | |
| 8.08 | Regulation of securities exchanges | 43 | ■ |
| 8.09 | Legal rights index* | 93 | |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 92 | |
| 9.02 | Firm-level technology absorption | 92 | |
| 9.03 | Laws relating to ICT | 69 | |
| 9.04 | FDI and technology transfer | 60 | |
| 9.05 | Mobile telephone subscribers* | 80 | |
| 9.06 | Internet users* | 63 | |
| 9.07 | Personal computers* | 55 | |
| 9.08 | Broadband Internet subscribers* | 56 | |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 12 | ■ |
| 10.02 | Foreign market size* | 16 | ■ |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 55 | |
| 11.02 | Local supplier quality | 46 | ■ |
| 11.03 | State of cluster development | 58 | |
| 11.04 | Nature of competitive advantage | 68 | |
| 11.05 | Value chain breadth | 59 | |
| 11.06 | Control of international distribution | 69 | |
| 11.07 | Production process sophistication | 67 | |
| 11.08 | Extent of marketing | 53 | |
| 11.09 | Willingness to delegate authority | 54 | |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 67 | |
| 12.02 | Quality of scientific research institutions | 79 | |
| 12.03 | Company spending on R&D | 71 | |
| 12.04 | University-industry research collaboration | 84 | |
| 12.05 | Gov't procurement of advanced tech products | 104 | |
| 12.06 | Availability of scientists and engineers | 105 | |
| 12.07 | Utility patents* | 56 | |

* Hard data

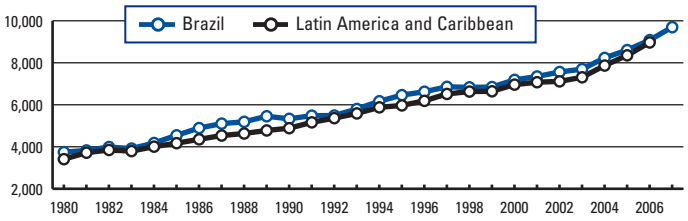
Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# Brazil

## Key indicators

Total population (millions), 2007 .....191.3
GDP (US$ billions), 2007.....1,313.6
GDP per capita (US$), 2007 .....6,937.9
GDP (PPP) as share (%) of world total, 2007 .....2.81

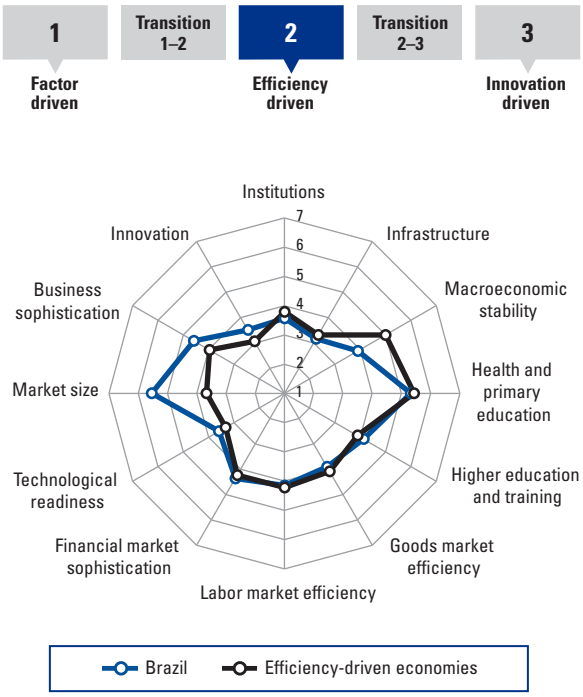
**GDP (PPP US$) per capita, 1980–2007**



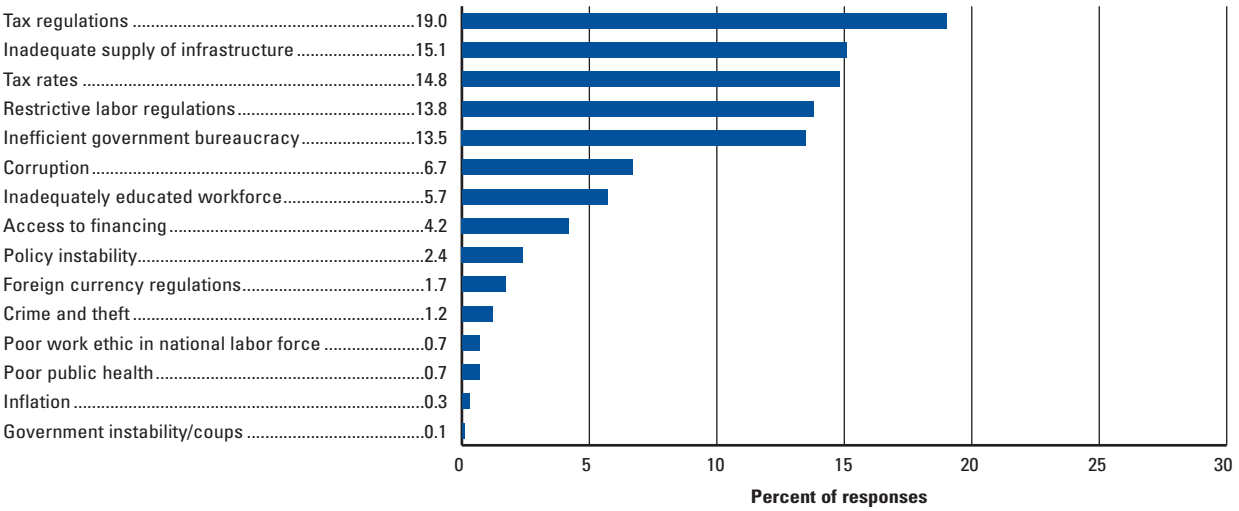

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **64** | **4.1** |
| GCI 2007–2008 (out of 131) | 72 | 4.0 |
| GCI 2006–2007 (out of 122) | 66 | 4.1 |
| **Basic requirements** | **96** | **4.0** |
| 1st pillar: Institutions | 91 | 3.6 |
| 2nd pillar: Infrastructure | 78 | 3.2 |
| 3rd pillar: Macroeconomic stability | 122 | 3.9 |
| 4th pillar: Health and primary education | 79 | 5.3 |
| **Efficiency enhancers** | **51** | **4.3** |
| 5th pillar: Higher education and training | 58 | 4.1 |
| 6th pillar: Goods market efficiency | 101 | 3.9 |
| 7th pillar: Labor market efficiency | 91 | 4.2 |
| 8th pillar: Financial market sophistication | 64 | 4.4 |
| 9th pillar: Technological readiness | 56 | 3.6 |
| 10th pillar: Market size | 10 | 5.5 |
| **Innovation and sophistication factors** | **42** | **4.0** |
| 11th pillar: Business sophistication | 35 | 4.6 |
| 12th pillar: Innovation | 43 | 3.5 |

**Stage of development**




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

# Brazil

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 70 | |
| 1.02 | Intellectual property protection | 79 | |
| 1.03 | Diversion of public funds | 118 | |
| 1.04 | Public trust of politicians | 122 | |
| 1.05 | Judicial independence | 68 | |
| 1.06 | Favoritism in decisions of government officials | 63 | |
| 1.07 | Wastefulness of government spending | 129 | |
| 1.08 | Burden of government regulation | 133 | |
| 1.09 | Efficiency of legal framework | 98 | |
| 1.10 | Transparency of government policymaking | 101 | |
| 1.11 | Business costs of terrorism | 12 | ■ |
| 1.12 | Business costs of crime and violence | 123 | |
| 1.13 | Organized crime | 116 | |
| 1.14 | Reliability of police services | 117 | |
| 1.15 | Ethical behavior of firms | 89 | |
| 1.16 | Strength of auditing and reporting standards | 60 | |
| 1.17 | Efficacy of corporate boards | 46 | ■ |
| 1.18 | Protection of minority shareholders' interests | 42 | ■ |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 98 | |
| 2.02 | Quality of roads | 110 | |
| 2.03 | Quality of railroad infrastructure | 86 | |
| 2.04 | Quality of port infrastructure | 123 | |
| 2.05 | Quality of air transport infrastructure | 101 | |
| 2.06 | Available seat kilometers* | 12 | ■ |
| 2.07 | Quality of electricity supply | 58 | |
| 2.08 | Telephone lines* | 62 | |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 91 | |
| 3.02 | National savings rate* | 86 | |
| 3.03 | Inflation* | 54 | |
| 3.04 | Interest rate spread* | 131 | |
| 3.05 | Government debt* | 85 | |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 66 | |
| 4.02 | Malaria incidence* | 101 | |
| 4.03 | Business impact of tuberculosis | 51 | |
| 4.04 | Tuberculosis incidence* | 64 | |
| 4.05 | Business impact of HIV/AIDS | 71 | |
| 4.06 | HIV prevalence* | 86 | |
| 4.07 | Infant mortality* | 88 | |
| 4.08 | Life expectancy* | 66 | |
| 4.09 | Quality of primary education | 119 | |
| 4.10 | Primary enrollment* | 58 | |
| 4.11 | Education expenditure* | 64 | |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 14 | ■ |
| 5.02 | Tertiary enrollment* | 76 | |
| 5.03 | Quality of the educational system | 117 | |
| 5.04 | Quality of math and science education | 124 | |
| 5.05 | Quality of management schools | 58 | |
| 5.06 | Internet access in schools | 67 | |
| 5.07 | Local availability of research and training services | 26 | ■ |
| 5.08 | Extent of staff training | 46 | ■ |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 43 | ■ |
| 6.02 | Extent of market dominance | 32 | ■ |
| 6.03 | Effectiveness of anti-monopoly policy | 36 | ■ |
| 6.04 | Extent and effect of taxation | 134 | |
| 6.05 | Total tax rate* | 116 | |
| 6.06 | No. of procedures required to start a business* | 125 | |
| 6.07 | Time required to start a business* | 127 | |
| 6.08 | Agricultural policy costs | 27 | ■ |
| 6.09 | Prevalence of trade barriers | 106 | |
| 6.10 | Trade-weighted tariff rate* | 92 | |
| 6.11 | Prevalence of foreign ownership | 80 | |
| 6.12 | Business impact of rules on FDI | 82 | |
| 6.13 | Burden of customs procedures | 127 | |
| 6.14 | Degree of customer orientation | 56 | |
| 6.15 | Buyer sophistication | 69 | |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 84 | |
| 7.02 | Flexibility of wage determination | 106 | |
| 7.03 | Non-wage labor costs* | 123 | |
| 7.04 | Rigidity of employment* | 93 | |
| 7.05 | Hiring and firing practices | 112 | |
| 7.06 | Firing costs* | 67 | |
| 7.07 | Pay and productivity | 66 | |
| 7.08 | Reliance on professional management | 25 | ■ |
| 7.09 | Brain drain | 34 | ■ |
| 7.10 | Female participation in labor force* | 75 | |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 21 | ■ |
| 8.02 | Financing through local equity market | 56 | |
| 8.03 | Ease of access to loans | 77 | |
| 8.04 | Venture capital availability | 79 | |
| 8.05 | Restriction on capital flows | 119 | |
| 8.06 | Strength of investor protection* | 50 | ■ |
| 8.07 | Soundness of banks | 24 | ■ |
| 8.08 | Regulation of securities exchanges | 28 | ■ |
| 8.09 | Legal rights index* | 119 | |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 58 | |
| 9.02 | Firm-level technology absorption | 42 | ■ |
| 9.03 | Laws relating to ICT | 49 | ■ |
| 9.04 | FDI and technology transfer | 43 | ■ |
| 9.05 | Mobile telephone subscribers* | 78 | |
| 9.06 | Internet users* | 57 | |
| 9.07 | Personal computers* | 50 | ■ |
| 9.08 | Broadband Internet subscribers* | 52 | |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 9 | ■ |
| 10.02 | Foreign market size* | 23 | ■ |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 13 | ■ |
| 11.02 | Local supplier quality | 41 | ■ |
| 11.03 | State of cluster development | 43 | ■ |
| 11.04 | Nature of competitive advantage | 96 | |
| 11.05 | Value chain breadth | 66 | |
| 11.06 | Control of international distribution | 46 | ■ |
| 11.07 | Production process sophistication | 33 | ■ |
| 11.08 | Extent of marketing | 27 | ■ |
| 11.09 | Willingness to delegate authority | 37 | ■ |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 27 | ■ |
| 12.02 | Quality of scientific research institutions | 43 | ■ |
| 12.03 | Company spending on R&D | 31 | ■ |
| 12.04 | University-industry research collaboration | 50 | ■ |
| 12.05 | Gov't procurement of advanced tech products | 84 | |
| 12.06 | Availability of scientists and engineers | 57 | |
| 12.07 | Utility patents* | 58 | |

* Hard data

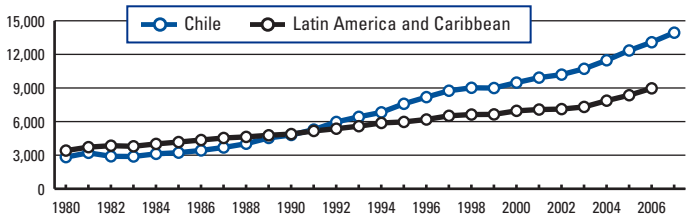
Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# Chile

## Key indicators

Total population (millions), 2007 ..... 16.6
GDP (US$ billions), 2007 ..... 163.8
GDP per capita (US$), 2007 ..... 9,879.1
GDP (PPP) as share (%) of world total, 2007 ..... 0.36

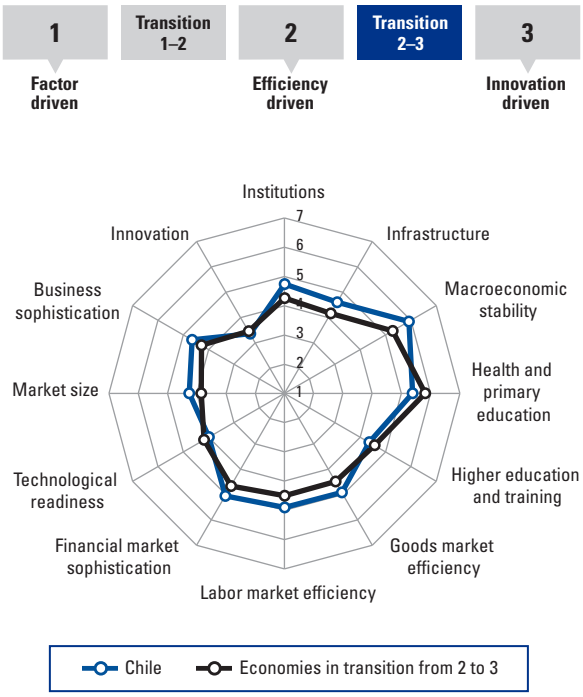
### GDP (PPP US$) per capita, 1980–2007



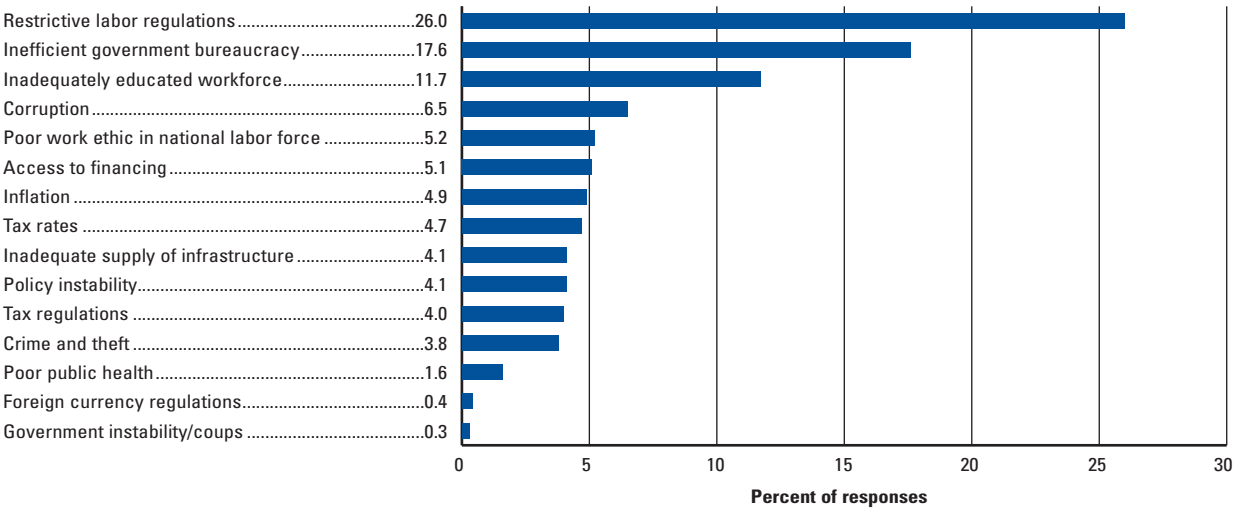

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **28** | **4.7** |
| GCI 2007–2008 (out of 131) | 26 | 4.8 |
| GCI 2006–2007 (out of 122) | 27 | 4.8 |
| **Basic requirements** | **36** | **5.1** |
| 1st pillar: Institutions | 37 | 4.7 |
| 2nd pillar: Infrastructure | 30 | 4.6 |
| 3rd pillar: Macroeconomic stability | 14 | 5.9 |
| 4th pillar: Health and primary education | 73 | 5.4 |
| **Efficiency enhancers** | **30** | **4.6** |
| 5th pillar: Higher education and training | 50 | 4.3 |
| 6th pillar: Goods market efficiency | 26 | 4.9 |
| 7th pillar: Labor market efficiency | 17 | 4.9 |
| 8th pillar: Financial market sophistication | 29 | 5.1 |
| 9th pillar: Technological readiness | 42 | 4.0 |
| 10th pillar: Market size | 47 | 4.3 |
| **Innovation and sophistication factors** | **44** | **4.0** |
| 11th pillar: Business sophistication | 31 | 4.7 |
| 12th pillar: Innovation | 56 | 3.3 |

### Stage of development




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

# Chile

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 40 | |
| 1.02 | Intellectual property protection | 63 | |
| 1.03 | Diversion of public funds | 52 | |
| 1.04 | Public trust of politicians | 42 | |
| 1.05 | Judicial independence | 52 | |
| 1.06 | Favoritism in decisions of government officials | 41 | |
| 1.07 | Wastefulness of government spending | 49 | |
| 1.08 | Burden of government regulation | 34 | |
| 1.09 | Efficiency of legal framework | 30 | |
| 1.10 | Transparency of government policymaking | 26 | ■ |
| 1.11 | Business costs of terrorism | 27 | ■ |
| 1.12 | Business costs of crime and violence | 84 | |
| 1.13 | Organized crime | 32 | |
| 1.14 | Reliability of police services | 16 | ■ |
| 1.15 | Ethical behavior of firms | 23 | ■ |
| 1.16 | Strength of auditing and reporting standards | 32 | |
| 1.17 | Efficacy of corporate boards | 7 | ■ |
| 1.18 | Protection of minority shareholders' interests | 32 | |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 29 | |
| 2.02 | Quality of roads | 22 | ■ |
| 2.03 | Quality of railroad infrastructure | 73 | |
| 2.04 | Quality of port infrastructure | 37 | |
| 2.05 | Quality of air transport infrastructure | 24 | ■ |
| 2.06 | Available seat kilometers* | 39 | |
| 2.07 | Quality of electricity supply | 49 | |
| 2.08 | Telephone lines* | 63 | |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 10 | ■ |
| 3.02 | National savings rate* | 51 | |
| 3.03 | Inflation* | 60 | |
| 3.04 | Interest rate spread* | 23 | ■ |
| 3.05 | Government debt* | 7 | ■ |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 26 | ■ |
| 4.02 | Malaria incidence* | 1 | ■ |
| 4.03 | Business impact of tuberculosis | 22 | ■ |
| 4.04 | Tuberculosis incidence* | 31 | |
| 4.05 | Business impact of HIV/AIDS | 43 | |
| 4.06 | HIV prevalence* | 68 | |
| 4.07 | Infant mortality* | 39 | |
| 4.08 | Life expectancy* | 29 | |
| 4.09 | Quality of primary education | 110 | |
| 4.10 | Primary enrollment* | 99 | |
| 4.11 | Education expenditure* | 84 | |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 54 | |
| 5.02 | Tertiary enrollment* | 41 | |
| 5.03 | Quality of the educational system | 86 | |
| 5.04 | Quality of math and science education | 107 | |
| 5.05 | Quality of management schools | 19 | ■ |
| 5.06 | Internet access in schools | 41 | |
| 5.07 | Local availability of research and training services | 46 | |
| 5.08 | Extent of staff training | 48 | |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 19 | ■ |
| 6.02 | Extent of market dominance | 57 | |
| 6.03 | Effectiveness of anti-monopoly policy | 25 | ■ |
| 6.04 | Extent and effect of taxation | 45 | |
| 6.05 | Total tax rate* | 12 | ■ |
| 6.06 | No. of procedures required to start a business* | 58 | |
| 6.07 | Time required to a business* | 61 | |
| 6.08 | Agricultural policy costs | 3 | ■ |
| 6.09 | Prevalence of trade barriers | 5 | ■ |
| 6.10 | Trade-weighted tariff rate* | 57 | |
| 6.11 | Prevalence of foreign ownership | 11 | ■ |
| 6.12 | Business impact of rules on FDI | 19 | ■ |
| 6.13 | Burden of customs procedures | 7 | ■ |
| 6.14 | Degree of customer orientation | 47 | |
| 6.15 | Buyer sophistication | 29 | |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 51 | |
| 7.02 | Flexibility of wage determination | 6 | ■ |
| 7.03 | Non-wage labor costs* | 12 | ■ |
| 7.04 | Rigidity of employment* | 32 | |
| 7.05 | Hiring and firing practices | 74 | |
| 7.06 | Firing costs* | 81 | |
| 7.07 | Pay and productivity | 21 | ■ |
| 7.08 | Reliance on professional management | 18 | ■ |
| 7.09 | Brain drain | 6 | ■ |
| 7.10 | Female participation in labor force* | 111 | |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 26 | ■ |
| 8.02 | Financing through local equity market | 10 | ■ |
| 8.03 | Ease of access to loans | 28 | |
| 8.04 | Venture capital availability | 37 | |
| 8.05 | Restriction on capital flows | 36 | |
| 8.06 | Strength of investor protection* | 26 | ■ |
| 8.07 | Soundness of banks | 18 | ■ |
| 8.08 | Regulation of securities exchanges | 14 | ■ |
| 8.09 | Legal rights index* | 72 | |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 42 | |
| 9.02 | Firm-level technology absorption | 33 | |
| 9.03 | Laws relating to ICT | 26 | ■ |
| 9.04 | FDI and technology transfer | 31 | |
| 9.05 | Mobile telephone subscribers* | 55 | |
| 9.06 | Internet users* | 51 | |
| 9.07 | Personal computers* | 53 | |
| 9.08 | Broadband Internet subscribers* | 38 | |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 47 | |
| 10.02 | Foreign market size* | 43 | |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 20 | ■ |
| 11.02 | Local supplier quality | 28 | |
| 11.03 | State of cluster development | 53 | |
| 11.04 | Nature of competitive advantage | 69 | |
| 11.05 | Value chain breadth | 55 | |
| 11.06 | Control of international distribution | 24 | ■ |
| 11.07 | Production process sophistication | 36 | |
| 11.08 | Extent of marketing | 18 | ■ |
| 11.09 | Willingness to delegate authority | 36 | |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 57 | |
| 12.02 | Quality of scientific research institutions | 62 | |
| 12.03 | Company spending on R&D | 64 | |
| 12.04 | University-industry research collaboration | 51 | |
| 12.05 | Gov't procurement of advanced tech products | 53 | |
| 12.06 | Availability of scientists and engineers | 35 | |
| 12.07 | Utility patents* | 40 | |

* Hard data

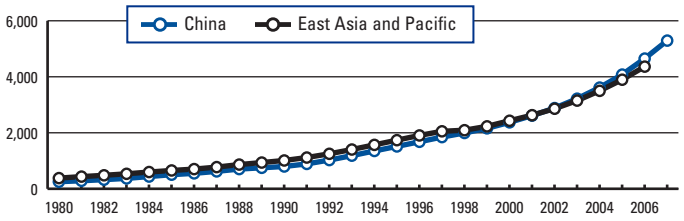
Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# China

## Key indicators

Total population (millions), 2007 .....1,331.4
GDP (US$ billions), 2007.....3,250.8
GDP per capita (US$), 2007 .....2,460.8
GDP (PPP) as share (%) of world total, 2007 .....10.83

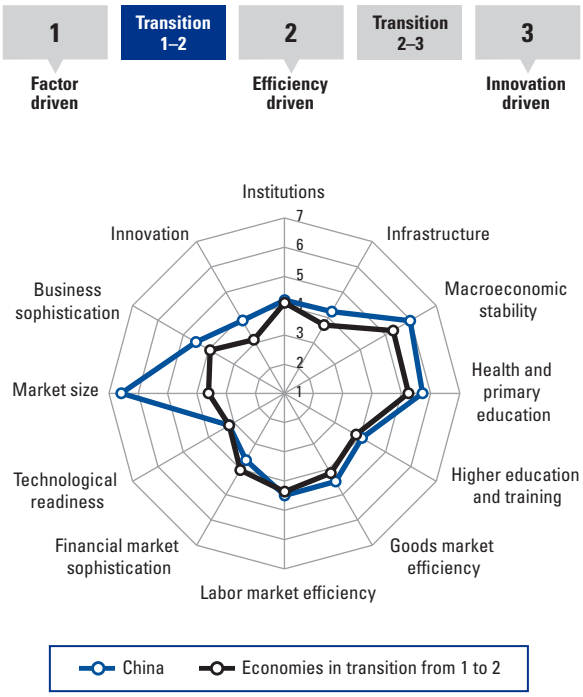
**GDP (PPP US$) per capita, 1980–2007**



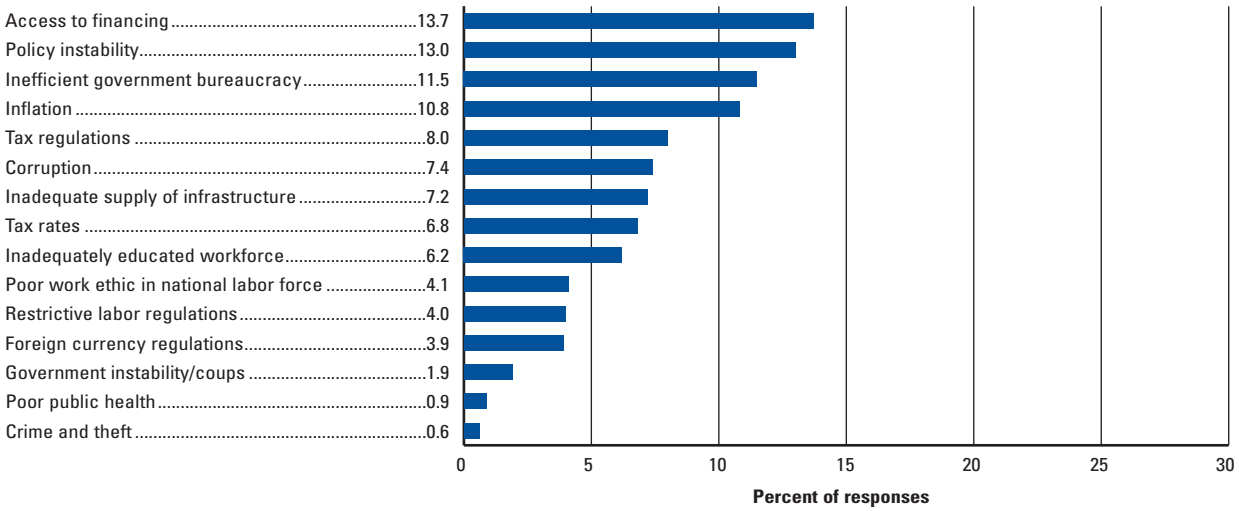

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **30** | **4.7** |
| GCI 2007–2008 (out of 131) | 34 | 4.6 |
| GCI 2006–2007 (out of 122) | 34 | 4.6 |
| **Basic requirements** | **42** | **5.0** |
| 1st pillar: Institutions | 56 | 4.2 |
| 2nd pillar: Infrastructure | 47 | 4.2 |
| 3rd pillar: Macroeconomic stability | 11 | 5.9 |
| 4th pillar: Health and primary education | 50 | 5.7 |
| **Efficiency enhancers** | **40** | **4.4** |
| 5th pillar: Higher education and training | 64 | 4.1 |
| 6th pillar: Goods market efficiency | 51 | 4.5 |
| 7th pillar: Labor market efficiency | 51 | 4.5 |
| 8th pillar: Financial market sophistication | 109 | 3.6 |
| 9th pillar: Technological readiness | 77 | 3.2 |
| 10th pillar: Market size | 2 | 6.6 |
| **Innovation and sophistication factors** | **32** | **4.2** |
| 11th pillar: Business sophistication | 43 | 4.5 |
| 12th pillar: Innovation | 28 | 3.9 |

**Stage of development**




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

# China

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 54 | ■ |
| 1.02 | Intellectual property protection | 53 | ■ |
| 1.03 | Diversion of public funds | 66 | ■ |
| 1.04 | Public trust of politicians | 36 | ■ |
| 1.05 | Judicial independence | 69 | ■ |
| 1.06 | Favoritism in decisions of government officials | 47 | ■ |
| 1.07 | Wastefulness of government spending | 36 | ■ |
| 1.08 | Burden of government regulation | 23 | ■ |
| 1.09 | Efficiency of legal framework | 54 | ■ |
| 1.10 | Transparency of government policymaking | 46 | ■ |
| 1.11 | Business costs of terrorism | 89 | ■ |
| 1.12 | Business costs of crime and violence | 56 | ■ |
| 1.13 | Organized crime | 84 | ■ |
| 1.14 | Reliability of police services | 50 | ■ |
| 1.15 | Ethical behavior of firms | 60 | ■ |
| 1.16 | Strength of auditing and reporting standards | 86 | ■ |
| 1.17 | Efficacy of corporate boards | 90 | ■ |
| 1.18 | Protection of minority shareholders' interests | 94 | ■ |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 58 | ■ |
| 2.02 | Quality of roads | 51 | ■ |
| 2.03 | Quality of railroad infrastructure | 28 | ■ |
| 2.04 | Quality of port infrastructure | 54 | ■ |
| 2.05 | Quality of air transport infrastructure | 74 | ■ |
| 2.06 | Available seat kilometers* | 2 | ■ |
| 2.07 | Quality of electricity supply | 68 | ■ |
| 2.08 | Telephone lines* | 47 | ■ |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 49 | ■ |
| 3.02 | National savings rate* | 5 | ■ |
| 3.03 | Inflation* | 62 | ■ |
| 3.04 | Interest rate spread* | 33 | ■ |
| 3.05 | Government debt* | 22 | ■ |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 77 | ■ |
| 4.02 | Malaria incidence* | 71 | ■ |
| 4.03 | Business impact of tuberculosis | 73 | ■ |
| 4.04 | Tuberculosis incidence* | 87 | ■ |
| 4.05 | Business impact of HIV/AIDS | 48 | ■ |
| 4.06 | HIV prevalence* | 23 | ■ |
| 4.07 | Infant mortality* | 80 | ■ |
| 4.08 | Life expectancy* | 55 | ■ |
| 4.09 | Quality of primary education | 34 | ■ |
| 4.10 | Primary enrollment* | 5 | ■ |
| 4.11 | Education expenditure* | 120 | ■ |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 92 | ■ |
| 5.02 | Tertiary enrollment* | 81 | ■ |
| 5.03 | Quality of the educational system | 55 | ■ |
| 5.04 | Quality of math and science education | 38 | ■ |
| 5.05 | Quality of management schools | 74 | ■ |
| 5.06 | Internet access in schools | 33 | ■ |
| 5.07 | Local availability of research and training services | 39 | ■ |
| 5.08 | Extent of staff training | 42 | ■ |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 27 | ■ |
| 6.02 | Extent of market dominance | 39 | ■ |
| 6.03 | Effectiveness of anti-monopoly policy | 55 | ■ |
| 6.04 | Extent and effect of taxation | 36 | ■ |
| 6.05 | Total tax rate* | 120 | ■ |
| 6.06 | No. of procedures required to start a business* | 108 | ■ |
| 6.07 | Time required to start a business* | 83 | ■ |
| 6.08 | Agricultural policy costs | 6 | ■ |
| 6.09 | Prevalence of trade barriers | 72 | ■ |
| 6.10 | Trade-weighted tariff rate* | 122 | ■ |
| 6.11 | Prevalence of foreign ownership | 105 | ■ |
| 6.12 | Business impact of rules on FDI | 55 | ■ |
| 6.13 | Burden of customs procedures | 42 | ■ |
| 6.14 | Degree of customer orientation | 73 | ■ |
| 6.15 | Buyer sophistication | 21 | ■ |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 65 | ■ |
| 7.02 | Flexibility of wage determination | 52 | ■ |
| 7.03 | Non-wage labor costs* | 126 | ■ |
| 7.04 | Rigidity of employment* | 32 | ■ |
| 7.05 | Hiring and firing practices | 53 | ■ |
| 7.06 | Firing costs* | 108 | ■ |
| 7.07 | Pay and productivity | 9 | ■ |
| 7.08 | Reliance on professional management | 46 | ■ |
| 7.09 | Brain drain | 36 | ■ |
| 7.10 | Female participation in labor force* | 32 | ■ |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 83 | ■ |
| 8.02 | Financing through local equity market | 80 | ■ |
| 8.03 | Ease of access to loans | 99 | ■ |
| 8.04 | Venture capital availability | 49 | ■ |
| 8.05 | Restriction on capital flows | 121 | ■ |
| 8.06 | Strength of investor protection* | 67 | ■ |
| 8.07 | Soundness of banks | 108 | ■ |
| 8.08 | Regulation of securities exchanges | 109 | ■ |
| 8.09 | Legal rights index* | 93 | ■ |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 83 | ■ |
| 9.02 | Firm-level technology absorption | 46 | ■ |
| 9.03 | Laws relating to ICT | 47 | ■ |
| 9.04 | FDI and technology transfer | 79 | ■ |
| 9.05 | Mobile telephone subscribers* | 90 | ■ |
| 9.06 | Internet users* | 85 | ■ |
| 9.07 | Personal computers* | 81 | ■ |
| 9.08 | Broadband Internet subscribers* | 49 | ■ |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 2 | ■ |
| 10.02 | Foreign market size* | 1 | ■ |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 18 | ■ |
| 11.02 | Local supplier quality | 62 | ■ |
| 11.03 | State of cluster development | 19 | ■ |
| 11.04 | Nature of competitive advantage | 71 | ■ |
| 11.05 | Value chain breadth | 56 | ■ |
| 11.06 | Control of international distribution | 47 | ■ |
| 11.07 | Production process sophistication | 59 | ■ |
| 11.08 | Extent of marketing | 62 | ■ |
| 11.09 | Willingness to delegate authority | 58 | ■ |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 25 | ■ |
| 12.02 | Quality of scientific research institutions | 37 | ■ |
| 12.03 | Company spending on R&D | 24 | ■ |
| 12.04 | University-industry research collaboration | 23 | ■ |
| 12.05 | Gov't procurement of advanced tech products | 20 | ■ |
| 12.06 | Availability of scientists and engineers | 52 | ■ |
| 12.07 | Utility patents* | 54 | ■ |

* Hard data

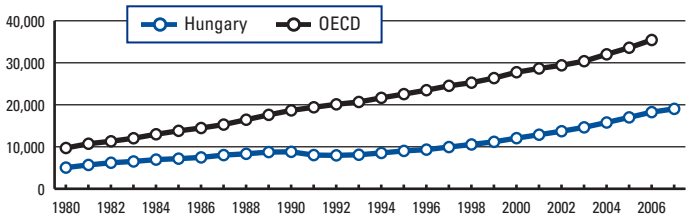
Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# Hungary

## Key indicators

Total population (millions), 2007 .....10.0
GDP (US$ billions), 2007.....138.4
GDP per capita (US$), 2007 .....13,762.2
GDP (PPP) as share (%) of world total, 2007 .....0.30

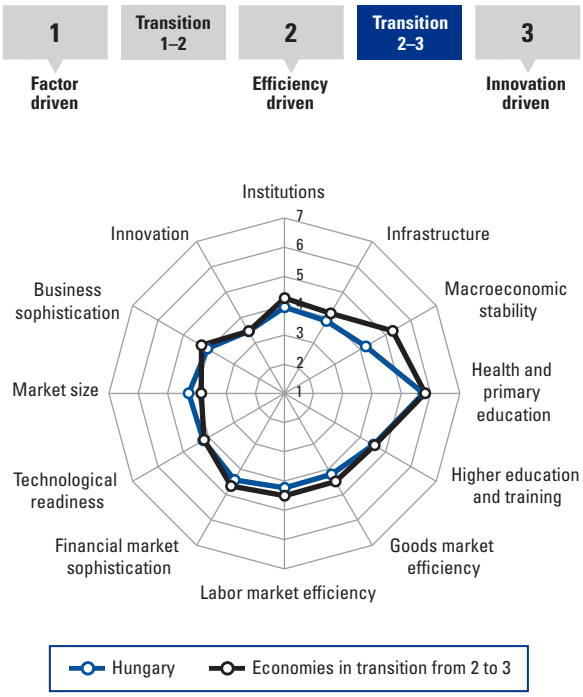
**GDP (PPP US$) per capita, 1980–2007**



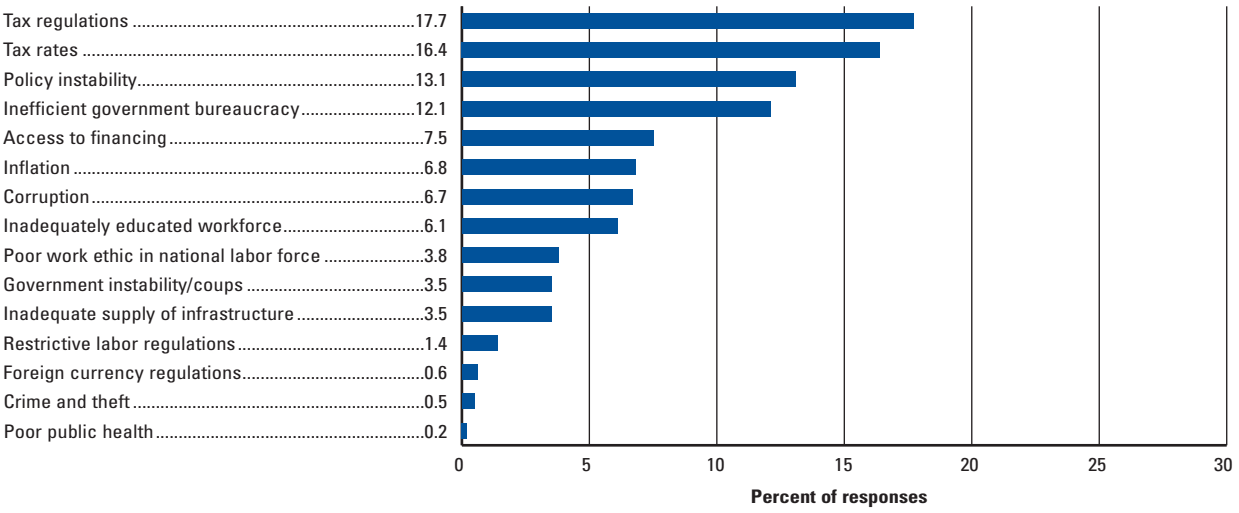

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **62** | **4.2** |
| GCI 2007–2008 (out of 131) | 47 | 4.4 |
| GCI 2006–2007 (out of 122) | 38 | 4.5 |
| **Basic requirements** | **64** | **4.4** |
| 1st pillar: Institutions | 64 | 3.9 |
| 2nd pillar: Infrastructure | 57 | 3.9 |
| 3rd pillar: Macroeconomic stability | 115 | 4.2 |
| 4th pillar: Health and primary education | 49 | 5.7 |
| **Efficiency enhancers** | **48** | **4.3** |
| 5th pillar: Higher education and training | 40 | 4.5 |
| 6th pillar: Goods market efficiency | 66 | 4.2 |
| 7th pillar: Labor market efficiency | 83 | 4.2 |
| 8th pillar: Financial market sophistication | 61 | 4.4 |
| 9th pillar: Technological readiness | 40 | 4.2 |
| 10th pillar: Market size | 45 | 4.3 |
| **Innovation and sophistication factors** | **55** | **3.7** |
| 11th pillar: Business sophistication | 68 | 4.0 |
| 12th pillar: Innovation | 45 | 3.4 |

**Stage of development**




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

# Hungary

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 46 | ■ |
| 1.02 | Intellectual property protection | 45 | ■ |
| 1.03 | Diversion of public funds | 79 | |
| 1.04 | Public trust of politicians | 94 | |
| 1.05 | Judicial independence | 55 | |
| 1.06 | Favoritism in decisions of government officials | 112 | |
| 1.07 | Wastefulness of government spending | 125 | |
| 1.08 | Burden of government regulation | 128 | |
| 1.09 | Efficiency of legal framework | 81 | |
| 1.10 | Transparency of government policymaking | 117 | |
| 1.11 | Business costs of terrorism | 21 | ■ |
| 1.12 | Business costs of crime and violence | 45 | ■ |
| 1.13 | Organized crime | 50 | ■ |
| 1.14 | Reliability of police services | 46 | ■ |
| 1.15 | Ethical behavior of firms | 93 | |
| 1.16 | Strength of auditing and reporting standards | 51 | |
| 1.17 | Efficacy of corporate boards | 88 | |
| 1.18 | Protection of minority shareholders' interests | 66 | |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 55 | |
| 2.02 | Quality of roads | 67 | |
| 2.03 | Quality of railroad infrastructure | 41 | ■ |
| 2.04 | Quality of port infrastructure | 70 | |
| 2.05 | Quality of air transport infrastructure | 70 | |
| 2.06 | Available seat kilometers* | 68 | |
| 2.07 | Quality of electricity supply | 50 | ■ |
| 2.08 | Telephone lines* | 36 | ■ |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 123 | |
| 3.02 | National savings rate* | 95 | |
| 3.03 | Inflation* | 98 | |
| 3.04 | Interest rate spread* | 12 | ■ |
| 3.05 | Government debt* | 110 | |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 9 | ■ |
| 4.02 | Malaria incidence* | 1 | ■ |
| 4.03 | Business impact of tuberculosis | 48 | ■ |
| 4.04 | Tuberculosis incidence* | 37 | ■ |
| 4.05 | Business impact of HIV/AIDS | 13 | ■ |
| 4.06 | HIV prevalence* | 23 | ■ |
| 4.07 | Infant mortality* | 31 | ■ |
| 4.08 | Life expectancy* | 55 | |
| 4.09 | Quality of primary education | 47 | ■ |
| 4.10 | Primary enrollment* | 96 | |
| 4.11 | Education expenditure* | 26 | ■ |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 42 | ■ |
| 5.02 | Tertiary enrollment* | 17 | ■ |
| 5.03 | Quality of the educational system | 87 | |
| 5.04 | Quality of math and science education | 36 | ■ |
| 5.05 | Quality of management schools | 73 | |
| 5.06 | Internet access in schools | 26 | ■ |
| 5.07 | Local availability of research and training services | 73 | |
| 5.08 | Extent of staff training | 101 | |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 38 | ■ |
| 6.02 | Extent of market dominance | 74 | |
| 6.03 | Effectiveness of anti-monopoly policy | 44 | ■ |
| 6.04 | Extent and effect of taxation | 133 | |
| 6.05 | Total tax rate* | 105 | |
| 6.06 | No. of procedures required to start a business* | 19 | ■ |
| 6.07 | Time required to start a business* | 33 | ■ |
| 6.08 | Agricultural policy costs | 117 | |
| 6.09 | Prevalence of trade barriers | 29 | ■ |
| 6.10 | Trade-weighted tariff rate* | 5 | ■ |
| 6.11 | Prevalence of foreign ownership | 9 | ■ |
| 6.12 | Business impact of rules on FDI | 40 | ■ |
| 6.13 | Burden of customs procedures | 49 | ■ |
| 6.14 | Degree of customer orientation | 114 | |
| 6.15 | Buyer sophistication | 95 | |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 77 | |
| 7.02 | Flexibility of wage determination | 67 | |
| 7.03 | Non-wage labor costs* | 120 | |
| 7.04 | Rigidity of employment* | 48 | ■ |
| 7.05 | Hiring and firing practices | 67 | |
| 7.06 | Firing costs* | 61 | |
| 7.07 | Pay and productivity | 75 | |
| 7.08 | Reliance on professional management | 86 | |
| 7.09 | Brain drain | 81 | |
| 7.10 | Female participation in labor force* | 54 | |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 59 | |
| 8.02 | Financing through local equity market | 95 | |
| 8.03 | Ease of access to loans | 74 | |
| 8.04 | Venture capital availability | 82 | |
| 8.05 | Restriction on capital flows | 35 | ■ |
| 8.06 | Strength of investor protection* | 86 | |
| 8.07 | Soundness of banks | 81 | |
| 8.08 | Regulation of securities exchanges | 58 | |
| 8.09 | Legal rights index* | 29 | ■ |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 65 | |
| 9.02 | Firm-level technology absorption | 68 | |
| 9.03 | Laws relating to ICT | 56 | |
| 9.04 | FDI and technology transfer | 16 | ■ |
| 9.05 | Mobile telephone subscribers* | 30 | ■ |
| 9.06 | Internet users* | 39 | ■ |
| 9.07 | Personal computers* | 32 | ■ |
| 9.08 | Broadband Internet subscribers* | 32 | ■ |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 49 | ■ |
| 10.02 | Foreign market size* | 33 | ■ |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 76 | |
| 11.02 | Local supplier quality | 63 | |
| 11.03 | State of cluster development | 51 | |
| 11.04 | Nature of competitive advantage | 61 | |
| 11.05 | Value chain breadth | 46 | ■ |
| 11.06 | Control of international distribution | 115 | |
| 11.07 | Production process sophistication | 55 | |
| 11.08 | Extent of marketing | 77 | |
| 11.09 | Willingness to delegate authority | 122 | |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 46 | ■ |
| 12.02 | Quality of scientific research institutions | 24 | ■ |
| 12.03 | Company spending on R&D | 83 | |
| 12.04 | University-industry research collaboration | 30 | ■ |
| 12.05 | Gov't procurement of advanced tech products | 116 | |
| 12.06 | Availability of scientists and engineers | 49 | ■ |
| 12.07 | Utility patents* | 31 | ■ |

* Hard data

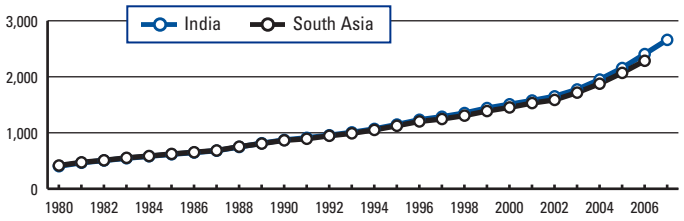
Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# India

## Key indicators

Total population (millions), 2007 .....1,135.6
GDP (US$ billions), 2007.....1,098.9
GDP per capita (US$), 2007 .....977.7
GDP (PPP) as share (%) of world total, 2007 .....4.58

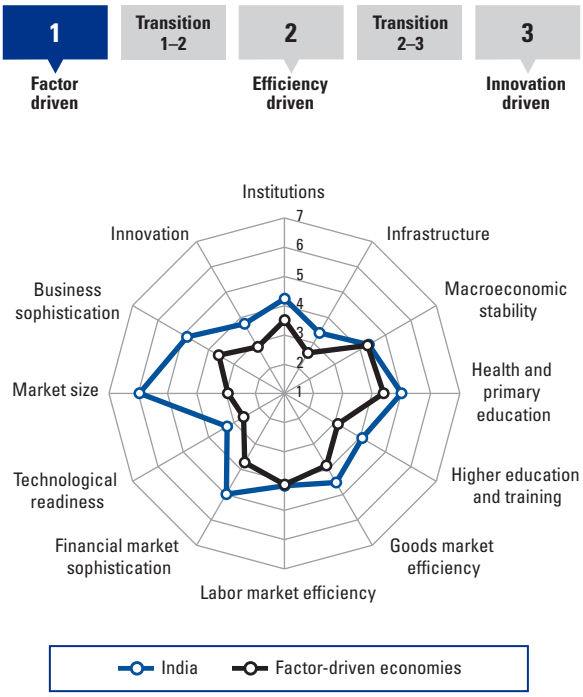
**GDP (PPP US$) per capita, 1980–2007**



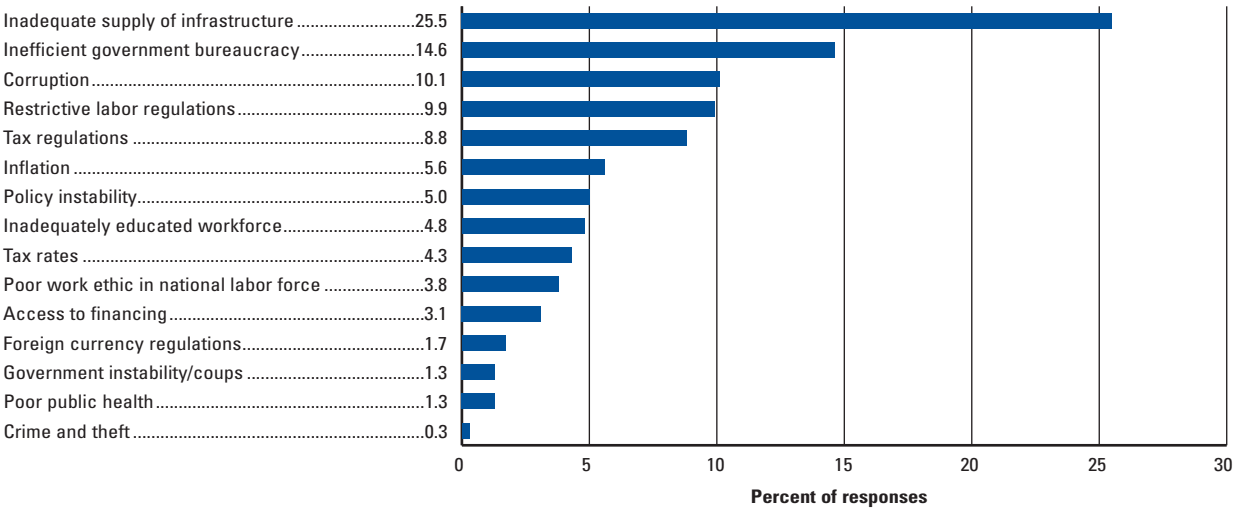

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **50** | **4.3** |
| GCI 2007–2008 (out of 131) | 48 | 4.3 |
| GCI 2006–2007 (out of 122) | 42 | 4.5 |
| **Basic requirements** | **80** | **4.2** |
| 1st pillar: Institutions | 53 | 4.2 |
| 2nd pillar: Infrastructure | 72 | 3.4 |
| 3rd pillar: Macroeconomic stability | 109 | 4.3 |
| 4th pillar: Health and primary education | 100 | 5.0 |
| **Efficiency enhancers** | **33** | **4.5** |
| 5th pillar: Higher education and training | 63 | 4.1 |
| 6th pillar: Goods market efficiency | 47 | 4.5 |
| 7th pillar: Labor market efficiency | 89 | 4.2 |
| 8th pillar: Financial market sophistication | 34 | 5.0 |
| 9th pillar: Technological readiness | 69 | 3.3 |
| 10th pillar: Market size | 5 | 6.0 |
| **Innovation and sophistication factors** | **27** | **4.3** |
| 11th pillar: Business sophistication | 27 | 4.8 |
| 12th pillar: Innovation | 32 | 3.7 |

**Stage of development**




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 52 | ■ |
| 1.02 | Intellectual property protection | 57 | ■ |
| 1.03 | Diversion of public funds | 55 | ■ |
| 1.04 | Public trust of politicians | 84 | ■ |
| 1.05 | Judicial independence | 43 | ■ |
| 1.06 | Favoritism in decisions of government officials | 58 | ■ |
| 1.07 | Wastefulness of government spending | 62 | ■ |
| 1.08 | Burden of government regulation | 90 | ■ |
| 1.09 | Efficiency of legal framework | 42 | ■ |
| 1.10 | Transparency of government policymaking | 55 | ■ |
| 1.11 | Business costs of terrorism | 106 | ■ |
| 1.12 | Business costs of crime and violence | 53 | ■ |
| 1.13 | Organized crime | 71 | ■ |
| 1.14 | Reliability of police services | 62 | ■ |
| 1.15 | Ethical behavior of firms | 61 | ■ |
| 1.16 | Strength of auditing and reporting standards | 30 | ■ |
| 1.17 | Efficacy of corporate boards | 45 | ■ |
| 1.18 | Protection of minority shareholders' interests | 33 | ■ |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 90 | ■ |
| 2.02 | Quality of roads | 87 | ■ |
| 2.03 | Quality of railroad infrastructure | 21 | ■ |
| 2.04 | Quality of port infrastructure | 93 | ■ |
| 2.05 | Quality of air transport infrastructure | 66 | ■ |
| 2.06 | Available seat kilometers* | 10 | ■ |
| 2.07 | Quality of electricity supply | 108 | ■ |
| 2.08 | Telephone lines* | 107 | ■ |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 127 | ■ |
| 3.02 | National savings rate* | 19 | ■ |
| 3.03 | Inflation* | 77 | ■ |
| 3.04 | Interest rate spread* | 69 | ■ |
| 3.05 | Government debt* | 113 | ■ |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 107 | ■ |
| 4.02 | Malaria incidence* | 100 | ■ |
| 4.03 | Business impact of tuberculosis | 92 | ■ |
| 4.04 | Tuberculosis incidence* | 99 | ■ |
| 4.05 | Business impact of HIV/AIDS | 98 | ■ |
| 4.06 | HIV prevalence* | 68 | ■ |
| 4.07 | Infant mortality* | 105 | ■ |
| 4.08 | Life expectancy* | 105 | ■ |
| 4.09 | Quality of primary education | 80 | ■ |
| 4.10 | Primary enrollment* | 94 | ■ |
| 4.11 | Education expenditure* | 77 | ■ |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 104 | ■ |
| 5.02 | Tertiary enrollment* | 98 | ■ |
| 5.03 | Quality of the educational system | 37 | ■ |
| 5.04 | Quality of math and science education | 17 | ■ |
| 5.05 | Quality of management schools | 12 | ■ |
| 5.06 | Internet access in schools | 60 | ■ |
| 5.07 | Local availability of research and training services | 32 | ■ |
| 5.08 | Extent of staff training | 34 | ■ |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 11 | ■ |
| 6.02 | Extent of market dominance | 19 | ■ |
| 6.03 | Effectiveness of anti-monopoly policy | 28 | ■ |
| 6.04 | Extent and effect of taxation | 28 | ■ |
| 6.05 | Total tax rate* | 117 | ■ |
| 6.06 | No. of procedures required to start a business* | 108 | ■ |
| 6.07 | Time required to start a business* | 77 | ■ |
| 6.08 | Agricultural policy costs | 82 | ■ |
| 6.09 | Prevalence of trade barriers | 69 | ■ |
| 6.10 | Trade-weighted tariff rate* | 131 | ■ |
| 6.11 | Prevalence of foreign ownership | 69 | ■ |
| 6.12 | Business impact of rules on FDI | 61 | ■ |
| 6.13 | Burden of customs procedures | 72 | ■ |
| 6.14 | Degree of customer orientation | 45 | ■ |
| 6.15 | Buyer sophistication | 38 | ■ |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 44 | ■ |
| 7.02 | Flexibility of wage determination | 54 | ■ |
| 7.03 | Non-wage labor costs* | 69 | ■ |
| 7.04 | Rigidity of employment* | 48 | ■ |
| 7.05 | Hiring and firing practices | 104 | ■ |
| 7.06 | Firing costs* | 85 | ■ |
| 7.07 | Pay and productivity | 45 | ■ |
| 7.08 | Reliance on professional management | 24 | ■ |
| 7.09 | Brain drain | 49 | ■ |
| 7.10 | Female participation in labor force* | 122 | ■ |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 33 | ■ |
| 8.02 | Financing through local equity market | 8 | ■ |
| 8.03 | Ease of access to loans | 42 | ■ |
| 8.04 | Venture capital availability | 27 | ■ |
| 8.05 | Restriction on capital flows | 83 | ■ |
| 8.06 | Strength of investor protection* | 26 | ■ |
| 8.07 | Soundness of banks | 51 | ■ |
| 8.08 | Regulation of securities exchanges | 25 | ■ |
| 8.09 | Legal rights index* | 29 | ■ |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 43 | ■ |
| 9.02 | Firm-level technology absorption | 26 | ■ |
| 9.03 | Laws relating to ICT | 38 | ■ |
| 9.04 | FDI and technology transfer | 20 | ■ |
| 9.05 | Mobile telephone subscribers* | 115 | ■ |
| 9.06 | Internet users* | 84 | ■ |
| 9.07 | Personal computers* | 96 | ■ |
| 9.08 | Broadband Internet subscribers* | 92 | ■ |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 4 | ■ |
| 10.02 | Foreign market size* | 5 | ■ |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 4 | ■ |
| 11.02 | Local supplier quality | 37 | ■ |
| 11.03 | State of cluster development | 24 | ■ |
| 11.04 | Nature of competitive advantage | 83 | ■ |
| 11.05 | Value chain breadth | 28 | ■ |
| 11.06 | Control of international distribution | 29 | ■ |
| 11.07 | Production process sophistication | 41 | ■ |
| 11.08 | Extent of marketing | 28 | ■ |
| 11.09 | Willingness to delegate authority | 25 | ■ |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 35 | ■ |
| 12.02 | Quality of scientific research institutions | 27 | ■ |
| 12.03 | Company spending on R&D | 29 | ■ |
| 12.04 | University-industry research collaboration | 45 | ■ |
| 12.05 | Gov't procurement of advanced tech products | 88 | ■ |
| 12.06 | Availability of scientists and engineers | 3 | ■ |
| 12.07 | Utility patents* | 57 | ■ |

* Hard data

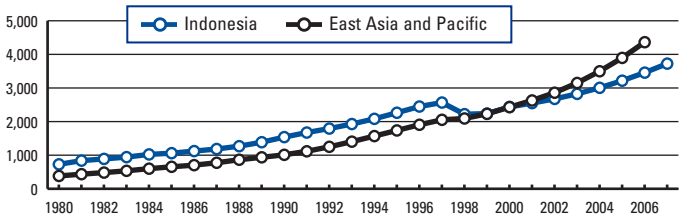
Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# Indonesia

## Key indicators

Total population (millions), 2007 .....228.1
GDP (US$ billions), 2007.....432.9
GDP per capita (US$), 2007 .....1,924.7
GDP (PPP) as share (%) of world total, 2007 .....1.30

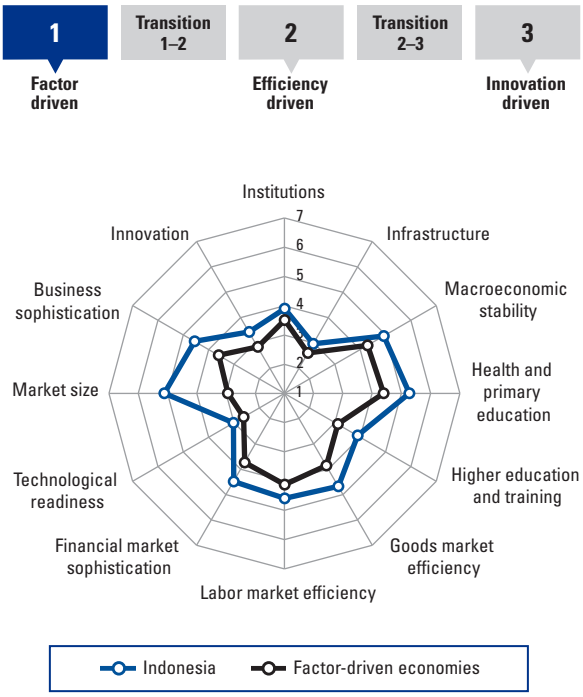
**GDP (PPP US$) per capita, 1980–2007**



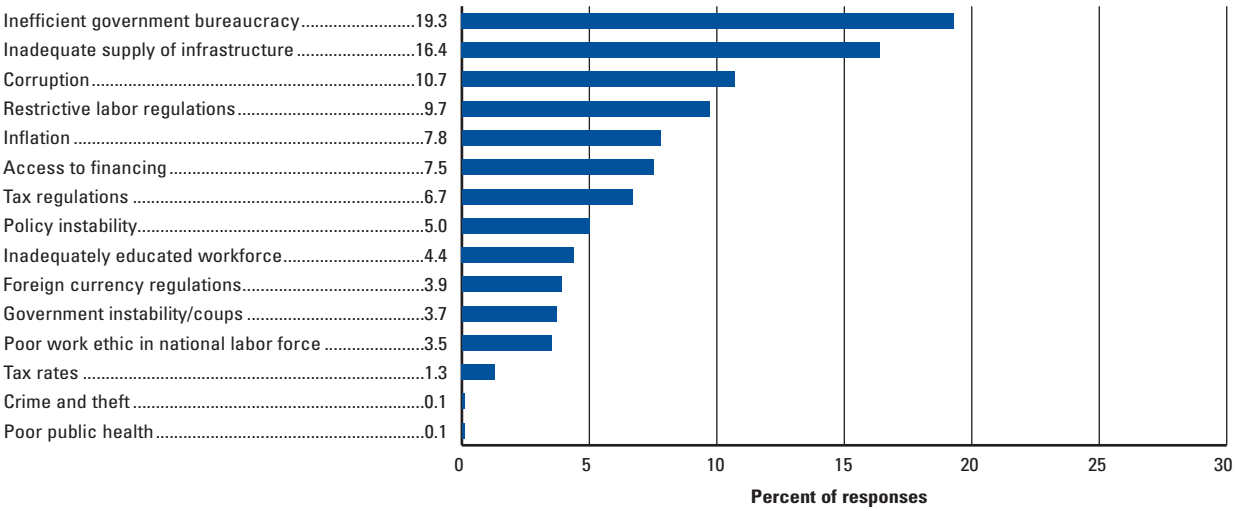

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **55** | **4.3** |
| GCI 2007–2008 (out of 131) | 54 | 4.2 |
| GCI 2006–2007 (out of 122) | 54 | 4.2 |
| **Basic requirements** | **76** | **4.3** |
| 1st pillar: Institutions | 68 | 3.9 |
| 2nd pillar: Infrastructure | 86 | 3.0 |
| 3rd pillar: Macroeconomic stability | 72 | 4.9 |
| 4th pillar: Health and primary education | 87 | 5.3 |
| **Efficiency enhancers** | **49** | **4.3** |
| 5th pillar: Higher education and training | 71 | 3.9 |
| 6th pillar: Goods market efficiency | 37 | 4.7 |
| 7th pillar: Labor market efficiency | 43 | 4.6 |
| 8th pillar: Financial market sophistication | 57 | 4.5 |
| 9th pillar: Technological readiness | 88 | 3.0 |
| 10th pillar: Market size | 17 | 5.1 |
| **Innovation and sophistication factors** | **45** | **4.0** |
| 11th pillar: Business sophistication | 39 | 4.5 |
| 12th pillar: Innovation | 47 | 3.4 |

**Stage of development**




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

# Indonesia

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 117 | ■ |
| 1.02 | Intellectual property protection | 102 | ■ |
| 1.03 | Diversion of public funds | 68 | ■ |
| 1.04 | Public trust of politicians | 59 | ■ |
| 1.05 | Judicial independence | 80 | ■ |
| 1.06 | Favoritism in decisions of government officials | 45 | ■ |
| 1.07 | Wastefulness of government spending | 23 | ■ |
| 1.08 | Burden of government regulation | 45 | ■ |
| 1.09 | Efficiency of legal framework | 66 | ■ |
| 1.10 | Transparency of government policymaking | 121 | ■ |
| 1.11 | Business costs of terrorism | 81 | ■ |
| 1.12 | Business costs of crime and violence | 47 | ■ |
| 1.13 | Organized crime | 61 | ■ |
| 1.14 | Reliability of police services | 85 | ■ |
| 1.15 | Ethical behavior of firms | 97 | ■ |
| 1.16 | Strength of auditing and reporting standards | 75 | ■ |
| 1.17 | Efficacy of corporate boards | 27 | ■ |
| 1.18 | Protection of minority shareholders' interests | 34 | ■ |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 96 | ■ |
| 2.02 | Quality of roads | 105 | ■ |
| 2.03 | Quality of railroad infrastructure | 58 | ■ |
| 2.04 | Quality of port infrastructure | 104 | ■ |
| 2.05 | Quality of air transport infrastructure | 75 | ■ |
| 2.06 | Available seat kilometers* | 23 | ■ |
| 2.07 | Quality of electricity supply | 92 | ■ |
| 2.08 | Telephone lines* | 100 | ■ |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 84 | ■ |
| 3.02 | National savings rate* | 40 | ■ |
| 3.03 | Inflation* | 79 | ■ |
| 3.04 | Interest rate spread* | 74 | ■ |
| 3.05 | Government debt* | 63 | ■ |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 93 | ■ |
| 4.02 | Malaria incidence* | 96 | ■ |
| 4.03 | Business impact of tuberculosis | 86 | ■ |
| 4.04 | Tuberculosis incidence* | 109 | ■ |
| 4.05 | Business impact of HIV/AIDS | 78 | ■ |
| 4.06 | HIV prevalence* | 50 | ■ |
| 4.07 | Infant mortality* | 88 | ■ |
| 4.08 | Life expectancy* | 89 | ■ |
| 4.09 | Quality of primary education | 51 | ■ |
| 4.10 | Primary enrollment* | 48 | ■ |
| 4.11 | Education expenditure* | 126 | ■ |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 102 | ■ |
| 5.02 | Tertiary enrollment* | 91 | ■ |
| 5.03 | Quality of the educational system | 39 | ■ |
| 5.04 | Quality of math and science education | 46 | ■ |
| 5.05 | Quality of management schools | 48 | ■ |
| 5.06 | Internet access in schools | 58 | ■ |
| 5.07 | Local availability of research and training services | 43 | ■ |
| 5.08 | Extent of staff training | 31 | ■ |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 44 | ■ |
| 6.02 | Extent of market dominance | 28 | ■ |
| 6.03 | Effectiveness of anti-monopoly policy | 29 | ■ |
| 6.04 | Extent and effect of taxation | 16 | ■ |
| 6.05 | Total tax rate* | 46 | ■ |
| 6.06 | No. of procedures required to start a business* | 103 | ■ |
| 6.07 | Time required to start a business* | 123 | ■ |
| 6.08 | Agricultural policy costs | 15 | ■ |
| 6.09 | Prevalence of trade barriers | 34 | ■ |
| 6.10 | Trade-weighted tariff rate* | 66 | ■ |
| 6.11 | Prevalence of foreign ownership | 24 | ■ |
| 6.12 | Business impact of rules on FDI | 42 | ■ |
| 6.13 | Burden of customs procedures | 95 | ■ |
| 6.14 | Degree of customer orientation | 46 | ■ |
| 6.15 | Buyer sophistication | 25 | ■ |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 19 | ■ |
| 7.02 | Flexibility of wage determination | 79 | ■ |
| 7.03 | Non-wage labor costs* | 30 | ■ |
| 7.04 | Rigidity of employment* | 87 | ■ |
| 7.05 | Hiring and firing practices | 19 | ■ |
| 7.06 | Firing costs* | 117 | ■ |
| 7.07 | Pay and productivity | 18 | ■ |
| 7.08 | Reliance on professional management | 47 | ■ |
| 7.09 | Brain drain | 19 | ■ |
| 7.10 | Female participation in labor force* | 102 | ■ |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 72 | ■ |
| 8.02 | Financing through local equity market | 19 | ■ |
| 8.03 | Ease of access to loans | 65 | ■ |
| 8.04 | Venture capital availability | 41 | ■ |
| 8.05 | Restriction on capital flows | 37 | ■ |
| 8.06 | Strength of investor protection* | 39 | ■ |
| 8.07 | Soundness of banks | 121 | ■ |
| 8.08 | Regulation of securities exchanges | 37 | ■ |
| 8.09 | Legal rights index* | 52 | ■ |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 61 | ■ |
| 9.02 | Firm-level technology absorption | 65 | ■ |
| 9.03 | Laws relating to ICT | 71 | ■ |
| 9.04 | FDI and technology transfer | 24 | ■ |
| 9.05 | Mobile telephone subscribers* | 100 | ■ |
| 9.06 | Internet users* | 107 | ■ |
| 9.07 | Personal computers* | 105 | ■ |
| 9.08 | Broadband Internet subscribers* | 100 | ■ |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 16 | ■ |
| 10.02 | Foreign market size* | 24 | ■ |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 50 | ■ |
| 11.02 | Local supplier quality | 57 | ■ |
| 11.03 | State of cluster development | 18 | ■ |
| 11.04 | Nature of competitive advantage | 38 | ■ |
| 11.05 | Value chain breadth | 36 | ■ |
| 11.06 | Control of international distribution | 35 | ■ |
| 11.07 | Production process sophistication | 72 | ■ |
| 11.08 | Extent of marketing | 55 | ■ |
| 11.09 | Willingness to delegate authority | 28 | ■ |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 53 | ■ |
| 12.02 | Quality of scientific research institutions | 39 | ■ |
| 12.03 | Company spending on R&D | 34 | ■ |
| 12.04 | University-industry research collaboration | 54 | ■ |
| 12.05 | Gov't procurement of advanced tech products | 87 | ■ |
| 12.06 | Availability of scientists and engineers | 31 | ■ |
| 12.07 | Utility patents* | 84 | ■ |

* Hard data

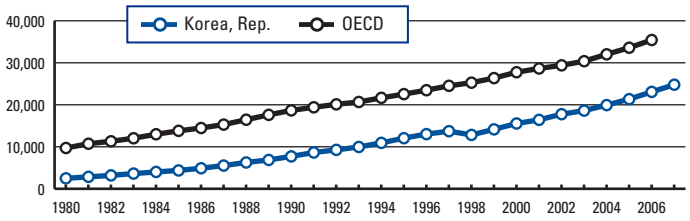
Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# Korea, Rep.

## Key indicators

Total population (millions), 2007 .....48.1
GDP (US$ billions), 2007.....957.1
GDP per capita (US$), 2007 .....19,750.8
GDP (PPP) as share (%) of world total, 2007 .....1.85

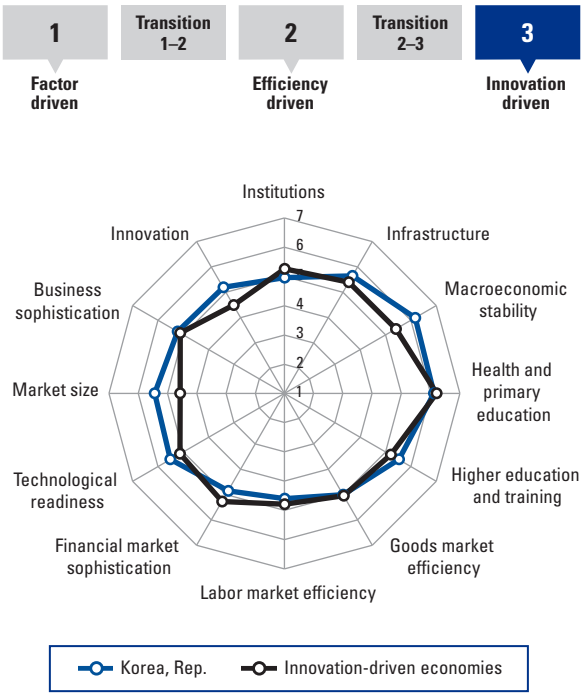
**GDP (PPP US$) per capita, 1980–2007**



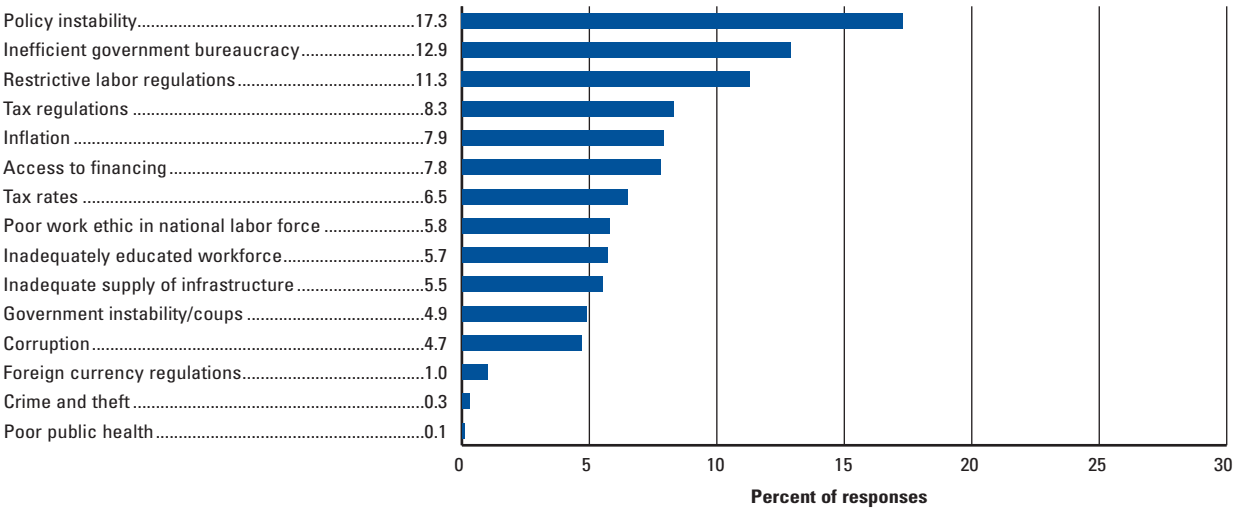

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **13** | **5.3** |
| GCI 2007–2008 (out of 131) | 11 | 5.4 |
| GCI 2006–2007 (out of 122) | 23 | 5.1 |
| **Basic requirements** | **16** | **5.7** |
| 1st pillar: Institutions | 28 | 4.9 |
| 2nd pillar: Infrastructure | 15 | 5.6 |
| 3rd pillar: Macroeconomic stability | 4 | 6.1 |
| 4th pillar: Health and primary education | 26 | 6.1 |
| **Efficiency enhancers** | **15** | **5.2** |
| 5th pillar: Higher education and training | 12 | 5.5 |
| 6th pillar: Goods market efficiency | 22 | 5.0 |
| 7th pillar: Labor market efficiency | 41 | 4.6 |
| 8th pillar: Financial market sophistication | 37 | 4.9 |
| 9th pillar: Technological readiness | 13 | 5.5 |
| 10th pillar: Market size | 13 | 5.4 |
| **Innovation and sophistication factors** | **10** | **5.2** |
| 11th pillar: Business sophistication | 16 | 5.2 |
| 12th pillar: Innovation | 9 | 5.2 |

**Stage of development**




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

# Korea, Rep.

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 39 | ■ |
| 1.02 | Intellectual property protection | 26 | ■ |
| 1.03 | Diversion of public funds | 27 | ■ |
| 1.04 | Public trust of politicians | 25 | ■ |
| 1.05 | Judicial independence | 45 | ■ |
| 1.06 | Favoritism in decisions of government officials | 22 | ■ |
| 1.07 | Wastefulness of government spending | 33 | ■ |
| 1.08 | Burden of government regulation | 24 | ■ |
| 1.09 | Efficiency of legal framework | 38 | ■ |
| 1.10 | Transparency of government policymaking | 44 | ■ |
| 1.11 | Business costs of terrorism | 65 | ■ |
| 1.12 | Business costs of crime and violence | 42 | ■ |
| 1.13 | Organized crime | 43 | ■ |
| 1.14 | Reliability of police services | 31 | ■ |
| 1.15 | Ethical behavior of firms | 27 | ■ |
| 1.16 | Strength of auditing and reporting standards | 36 | ■ |
| 1.17 | Efficacy of corporate boards | 18 | ■ |
| 1.18 | Protection of minority shareholders' interests | 37 | ■ |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 18 | ■ |
| 2.02 | Quality of roads | 13 | ■ |
| 2.03 | Quality of railroad infrastructure | 7 | ■ |
| 2.04 | Quality of port infrastructure | 29 | ■ |
| 2.05 | Quality of air transport infrastructure | 26 | ■ |
| 2.06 | Available seat kilometers* | 19 | ■ |
| 2.07 | Quality of electricity supply | 21 | ■ |
| 2.08 | Telephone lines* | 17 | ■ |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 30 | ■ |
| 3.02 | National savings rate* | 29 | ■ |
| 3.03 | Inflation* | 40 | ■ |
| 3.04 | Interest rate spread* | 3 | ■ |
| 3.05 | Government debt* | 40 | ■ |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 85 | ■ |
| 4.02 | Malaria incidence* | 72 | ■ |
| 4.03 | Business impact of tuberculosis | 76 | ■ |
| 4.04 | Tuberculosis incidence* | 83 | ■ |
| 4.05 | Business impact of HIV/AIDS | 60 | ■ |
| 4.06 | HIV prevalence* | 1 | ■ |
| 4.07 | Infant mortality* | 31 | ■ |
| 4.08 | Life expectancy* | 22 | ■ |
| 4.09 | Quality of primary education | 20 | ■ |
| 4.10 | Primary enrollment* | 24 | ■ |
| 4.11 | Education expenditure* | 71 | ■ |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 35 | ■ |
| 5.02 | Tertiary enrollment* | 3 | ■ |
| 5.03 | Quality of the educational system | 29 | ■ |
| 5.04 | Quality of math and science education | 11 | ■ |
| 5.05 | Quality of management schools | 30 | ■ |
| 5.06 | Internet access in schools | 5 | ■ |
| 5.07 | Local availability of research and training services | 20 | ■ |
| 5.08 | Extent of staff training | 10 | ■ |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 49 | ■ |
| 6.02 | Extent of market dominance | 26 | ■ |
| 6.03 | Effectiveness of anti-monopoly policy | 23 | ■ |
| 6.04 | Extent and effect of taxation | 31 | ■ |
| 6.05 | Total tax rate* | 33 | ■ |
| 6.06 | No. of procedures required to start a business* | 75 | ■ |
| 6.07 | Time required to start a business* | 36 | ■ |
| 6.08 | Agricultural policy costs | 38 | ■ |
| 6.09 | Prevalence of trade barriers | 39 | ■ |
| 6.10 | Trade-weighted tariff rate* | 99 | ■ |
| 6.11 | Prevalence of foreign ownership | 54 | ■ |
| 6.12 | Business impact of rules on FDI | 51 | ■ |
| 6.13 | Burden of customs procedures | 18 | ■ |
| 6.14 | Degree of customer orientation | 13 | ■ |
| 6.15 | Buyer sophistication | 10 | ■ |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 95 | ■ |
| 7.02 | Flexibility of wage determination | 43 | ■ |
| 7.03 | Non-wage labor costs* | 46 | ■ |
| 7.04 | Rigidity of employment* | 65 | ■ |
| 7.05 | Hiring and firing practices | 45 | ■ |
| 7.06 | Firing costs* | 108 | ■ |
| 7.07 | Pay and productivity | 14 | ■ |
| 7.08 | Reliance on professional management | 42 | ■ |
| 7.09 | Brain drain | 33 | ■ |
| 7.10 | Female participation in labor force* | 80 | ■ |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 35 | ■ |
| 8.02 | Financing through local equity market | 11 | ■ |
| 8.03 | Ease of access to loans | 26 | ■ |
| 8.04 | Venture capital availability | 16 | ■ |
| 8.05 | Restriction on capital flows | 65 | ■ |
| 8.06 | Strength of investor protection* | 50 | ■ |
| 8.07 | Soundness of banks | 73 | ■ |
| 8.08 | Regulation of securities exchanges | 31 | ■ |
| 8.09 | Legal rights index* | 52 | ■ |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 22 | ■ |
| 9.02 | Firm-level technology absorption | 15 | ■ |
| 9.03 | Laws relating to ICT | 2 | ■ |
| 9.04 | FDI and technology transfer | 28 | ■ |
| 9.05 | Mobile telephone subscribers* | 47 | ■ |
| 9.06 | Internet users* | 8 | ■ |
| 9.07 | Personal computers* | 20 | ■ |
| 9.08 | Broadband Internet subscribers* | 4 | ■ |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 14 | ■ |
| 10.02 | Foreign market size* | 9 | ■ |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 23 | ■ |
| 11.02 | Local supplier quality | 29 | ■ |
| 11.03 | State of cluster development | 8 | ■ |
| 11.04 | Nature of competitive advantage | 13 | ■ |
| 11.05 | Value chain breadth | 12 | ■ |
| 11.06 | Control of international distribution | 12 | ■ |
| 11.07 | Production process sophistication | 17 | ■ |
| 11.08 | Extent of marketing | 20 | ■ |
| 11.09 | Willingness to delegate authority | 26 | ■ |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 9 | ■ |
| 12.02 | Quality of scientific research institutions | 14 | ■ |
| 12.03 | Company spending on R&D | 7 | ■ |
| 12.04 | University-industry research collaboration | 12 | ■ |
| 12.05 | Gov't procurement of advanced tech products | 2 | ■ |
| 12.06 | Availability of scientists and engineers | 19 | ■ |
| 12.07 | Utility patents* | 7 | ■ |

* Hard data

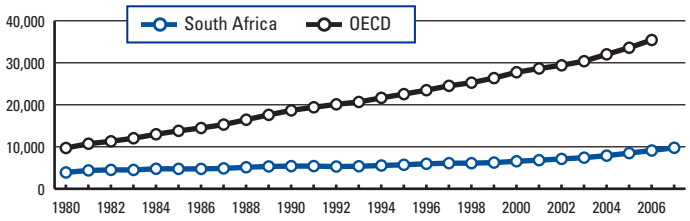
Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# South Africa

## Key indicators

Total population (millions), 2007 .....47.7
GDP (US$ billions), 2007.....282.6
GDP per capita (US$), 2007 .....5,906.5
GDP (PPP) as share (%) of world total, 2007 .....0.72

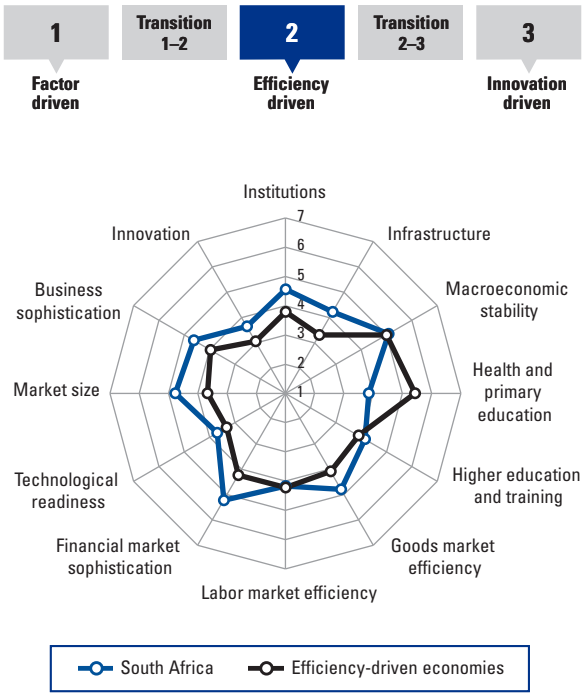
**GDP (PPP US$) per capita, 1980–2007**



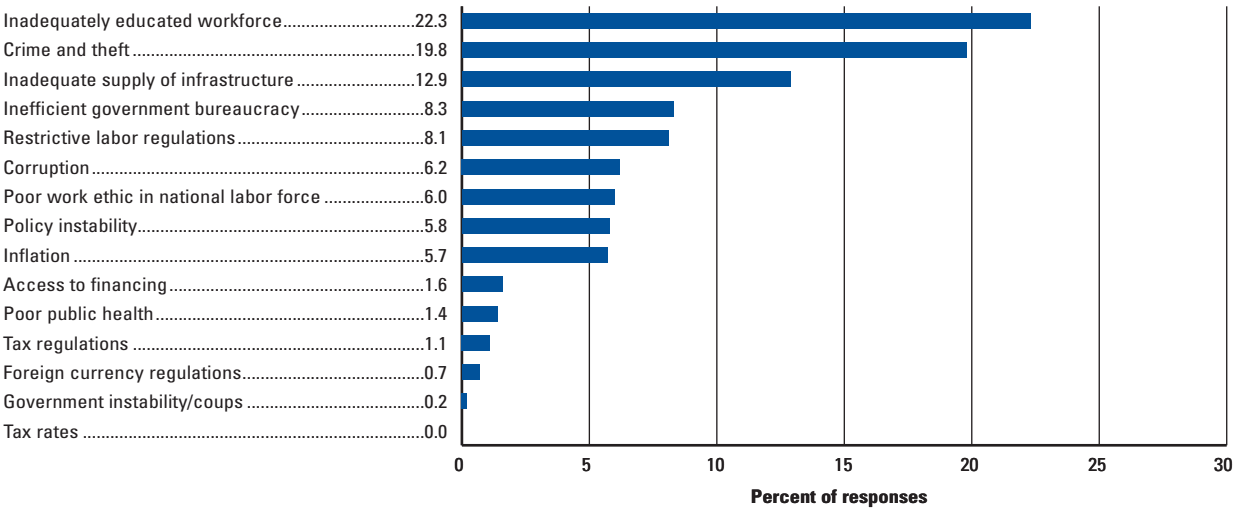

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **45** | **4.4** |
| GCI 2007–2008 (out of 131) | 44 | 4.4 |
| GCI 2006–2007 (out of 122) | 35 | 4.5 |
| **Basic requirements** | **69** | **4.4** |
| 1st pillar: Institutions | 46 | 4.6 |
| 2nd pillar: Infrastructure | 48 | 4.2 |
| 3rd pillar: Macroeconomic stability | 63 | 5.1 |
| 4th pillar: Health and primary education | 122 | 3.8 |
| **Efficiency enhancers** | **35** | **4.5** |
| 5th pillar: Higher education and training | 57 | 4.1 |
| 6th pillar: Goods market efficiency | 31 | 4.8 |
| 7th pillar: Labor market efficiency | 88 | 4.2 |
| 8th pillar: Financial market sophistication | 24 | 5.2 |
| 9th pillar: Technological readiness | 49 | 3.7 |
| 10th pillar: Market size | 23 | 4.8 |
| **Innovation and sophistication factors** | **36** | **4.1** |
| 11th pillar: Business sophistication | 33 | 4.6 |
| 12th pillar: Innovation | 37 | 3.6 |

**Stage of development**




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

# South Africa

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 20 | ■ |
| 1.02 | Intellectual property protection | 23 | ■ |
| 1.03 | Diversion of public funds | 49 | ■ |
| 1.04 | Public trust of politicians | 50 | ■ |
| 1.05 | Judicial independence | 30 | ■ |
| 1.06 | Favoritism in decisions of government officials | 50 | ■ |
| 1.07 | Wastefulness of government spending | 29 | ■ |
| 1.08 | Burden of government regulation | 95 | ■ |
| 1.09 | Efficiency of legal framework | 20 | ■ |
| 1.10 | Transparency of government policymaking | 29 | ■ |
| 1.11 | Business costs of terrorism | 36 | ■ |
| 1.12 | Business costs of crime and violence | 134 | ■ |
| 1.13 | Organized crime | 126 | ■ |
| 1.14 | Reliability of police services | 109 | ■ |
| 1.15 | Ethical behavior of firms | 42 | ■ |
| 1.16 | Strength of auditing and reporting standards | 4 | ■ |
| 1.17 | Efficacy of corporate boards | 8 | ■ |
| 1.18 | Protection of minority shareholders' interests | 13 | ■ |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 46 | ■ |
| 2.02 | Quality of roads | 40 | ■ |
| 2.03 | Quality of railroad infrastructure | 37 | ■ |
| 2.04 | Quality of port infrastructure | 49 | ■ |
| 2.05 | Quality of air transport infrastructure | 25 | ■ |
| 2.06 | Available seat kilometers* | 21 | ■ |
| 2.07 | Quality of electricity supply | 101 | ■ |
| 2.08 | Telephone lines* | 91 | ■ |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 47 | ■ |
| 3.02 | National savings rate* | 102 | ■ |
| 3.03 | Inflation* | 91 | ■ |
| 3.04 | Interest rate spread* | 45 | ■ |
| 3.05 | Government debt* | 54 | ■ |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 95 | ■ |
| 4.02 | Malaria incidence* | 85 | ■ |
| 4.03 | Business impact of tuberculosis | 129 | ■ |
| 4.04 | Tuberculosis incidence* | 134 | ■ |
| 4.05 | Business impact of HIV/AIDS | 133 | ■ |
| 4.06 | HIV prevalence* | 132 | ■ |
| 4.07 | Infant mortality* | 101 | ■ |
| 4.08 | Life expectancy* | 121 | ■ |
| 4.09 | Quality of primary education | 104 | ■ |
| 4.10 | Primary enrollment* | 97 | ■ |
| 4.11 | Education expenditure* | 32 | ■ |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 44 | ■ |
| 5.02 | Tertiary enrollment* | 93 | ■ |
| 5.03 | Quality of the educational system | 110 | ■ |
| 5.04 | Quality of math and science education | 132 | ■ |
| 5.05 | Quality of management schools | 25 | ■ |
| 5.06 | Internet access in schools | 91 | ■ |
| 5.07 | Local availability of research and training services | 29 | ■ |
| 5.08 | Extent of staff training | 15 | ■ |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 59 | ■ |
| 6.02 | Extent of market dominance | 33 | ■ |
| 6.03 | Effectiveness of anti-monopoly policy | 13 | ■ |
| 6.04 | Extent and effect of taxation | 25 | ■ |
| 6.05 | Total tax rate* | 45 | ■ |
| 6.06 | No. of procedures required to start a business* | 44 | ■ |
| 6.07 | Time required to start a business* | 70 | ■ |
| 6.08 | Agricultural policy costs | 12 | ■ |
| 6.09 | Prevalence of trade barriers | 43 | ■ |
| 6.10 | Trade-weighted tariff rate* | 75 | ■ |
| 6.11 | Prevalence of foreign ownership | 58 | ■ |
| 6.12 | Business impact of rules on FDI | 77 | ■ |
| 6.13 | Burden of customs procedures | 58 | ■ |
| 6.14 | Degree of customer orientation | 78 | ■ |
| 6.15 | Buyer sophistication | 28 | ■ |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 119 | ■ |
| 7.02 | Flexibility of wage determination | 123 | ■ |
| 7.03 | Non-wage labor costs* | 14 | ■ |
| 7.04 | Rigidity of employment* | 81 | ■ |
| 7.05 | Hiring and firing practices | 129 | ■ |
| 7.06 | Firing costs* | 39 | ■ |
| 7.07 | Pay and productivity | 81 | ■ |
| 7.08 | Reliance on professional management | 16 | ■ |
| 7.09 | Brain drain | 72 | ■ |
| 7.10 | Female participation in labor force* | 103 | ■ |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 12 | ■ |
| 8.02 | Financing through local equity market | 4 | ■ |
| 8.03 | Ease of access to loans | 31 | ■ |
| 8.04 | Venture capital availability | 29 | ■ |
| 8.05 | Restriction on capital flows | 111 | ■ |
| 8.06 | Strength of investor protection* | 9 | ■ |
| 8.07 | Soundness of banks | 15 | ■ |
| 8.08 | Regulation of securities exchanges | 5 | ■ |
| 8.09 | Legal rights index* | 52 | ■ |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 37 | ■ |
| 9.02 | Firm-level technology absorption | 32 | ■ |
| 9.03 | Laws relating to ICT | 34 | ■ |
| 9.04 | FDI and technology transfer | 38 | ■ |
| 9.05 | Mobile telephone subscribers* | 48 | ■ |
| 9.06 | Internet users* | 95 | ■ |
| 9.07 | Personal computers* | 68 | ■ |
| 9.08 | Broadband Internet subscribers* | 77 | ■ |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 22 | ■ |
| 10.02 | Foreign market size* | 36 | ■ |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 43 | ■ |
| 11.02 | Local supplier quality | 24 | ■ |
| 11.03 | State of cluster development | 40 | ■ |
| 11.04 | Nature of competitive advantage | 72 | ■ |
| 11.05 | Value chain breadth | 75 | ■ |
| 11.06 | Control of international distribution | 37 | ■ |
| 11.07 | Production process sophistication | 43 | ■ |
| 11.08 | Extent of marketing | 15 | ■ |
| 11.09 | Willingness to delegate authority | 22 | ■ |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 36 | ■ |
| 12.02 | Quality of scientific research institutions | 31 | ■ |
| 12.03 | Company spending on R&D | 28 | ■ |
| 12.04 | University-industry research collaboration | 28 | ■ |
| 12.05 | Gov't procurement of advanced tech products | 63 | ■ |
| 12.06 | Availability of scientists and engineers | 110 | ■ |
| 12.07 | Utility patents* | 39 | ■ |

* Hard data

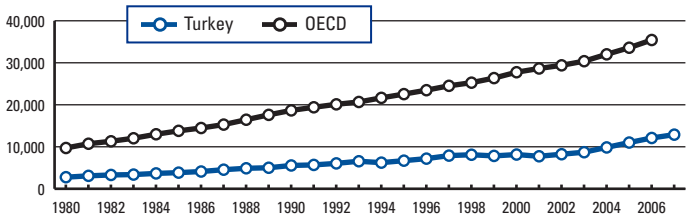
Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# Turkey

## Key indicators

Total population (millions), 2007 ..... 75.2
GDP (US$ billions), 2007 ..... 663.4
GDP per capita (US$), 2007 ..... 9,629.1
GDP (PPP) as share (%) of world total, 2007 ..... 1.37

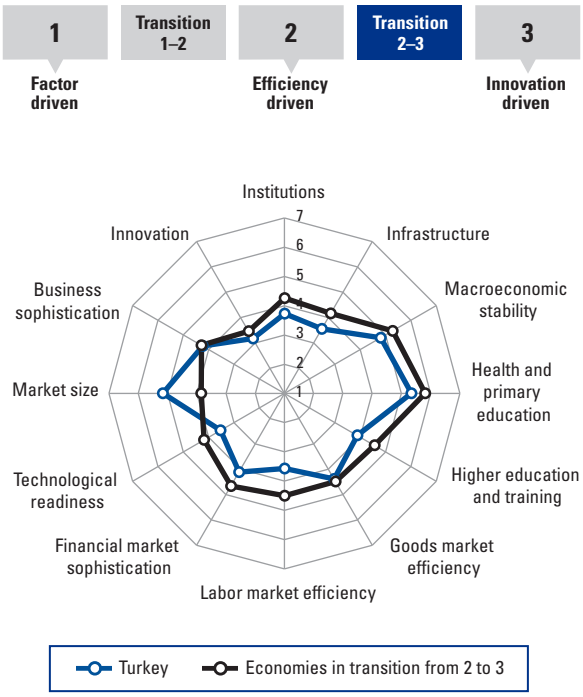
### GDP (PPP US$) per capita, 1980–2007



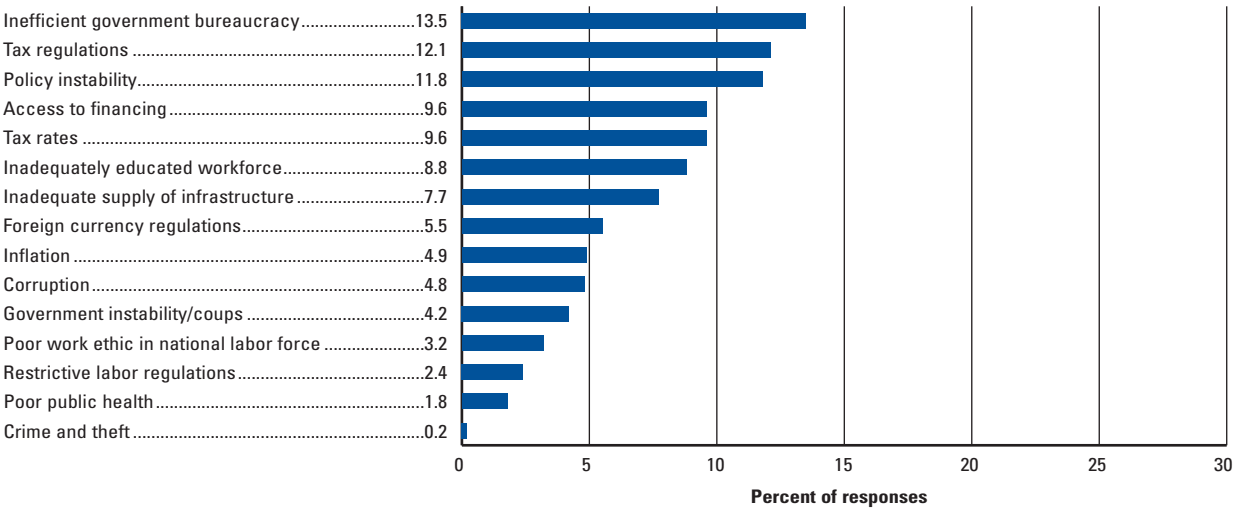

## Global Competitiveness Index

| | Rank (out of 134) | Score (1–7) |
|---|---|---|
| **GCI 2008–2009** | **63** | **4.1** |
| GCI 2007–2008 (out of 131) | 53 | 4.2 |
| GCI 2006–2007 (out of 122) | 58 | 4.1 |
| **Basic requirements** | **72** | **4.3** |
| 1st pillar: Institutions | 80 | 3.7 |
| 2nd pillar: Infrastructure | 66 | 3.5 |
| 3rd pillar: Macroeconomic stability | 79 | 4.8 |
| 4th pillar: Health and primary education | 78 | 5.3 |
| **Efficiency enhancers** | **59** | **4.1** |
| 5th pillar: Higher education and training | 72 | 3.9 |
| 6th pillar: Goods market efficiency | 55 | 4.4 |
| 7th pillar: Labor market efficiency | 125 | 3.6 |
| 8th pillar: Financial market sophistication | 76 | 4.1 |
| 9th pillar: Technological readiness | 58 | 3.5 |
| 10th pillar: Market size | 15 | 5.2 |
| **Innovation and sophistication factors** | **63** | **3.7** |
| 11th pillar: Business sophistication | 60 | 4.2 |
| 12th pillar: Innovation | 66 | 3.2 |

### Stage of development




## The most problematic factors for doing business




Note: From a list of 15 factors, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

# Turkey

## The Global Competitiveness Index in detail

■ Competitive **Advantage** ■ Competitive **Disadvantage**

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **1st pillar: Institutions** | | |
| 1.01 | Property rights | 83 | ■ |
| 1.02 | Intellectual property protection | 93 | ■ |
| 1.03 | Diversion of public funds | 83 | ■ |
| 1.04 | Public trust of politicians | 78 | ■ |
| 1.05 | Judicial independence | 64 | ■ |
| 1.06 | Favoritism in decisions of government officials | 77 | ■ |
| 1.07 | Wastefulness of government spending | 97 | ■ |
| 1.08 | Burden of government regulation | 104 | ■ |
| 1.09 | Efficiency of legal framework | 82 | ■ |
| 1.10 | Transparency of government policymaking | 97 | ■ |
| 1.11 | Business costs of terrorism | 117 | ■ |
| 1.12 | Business costs of crime and violence | 65 | ■ |
| 1.13 | Organized crime | 89 | ■ |
| 1.14 | Reliability of police services | 83 | ■ |
| 1.15 | Ethical behavior of firms | 58 | ■ |
| 1.16 | Strength of auditing and reporting standards | 79 | ■ |
| 1.17 | Efficacy of corporate boards | 127 | ■ |
| 1.18 | Protection of minority shareholders' interests | 80 | ■ |
| | **2nd pillar: Infrastructure** | | |
| 2.01 | Quality of overall infrastructure | 70 | ■ |
| 2.02 | Quality of roads | 54 | ■ |
| 2.03 | Quality of railroad infrastructure | 69 | ■ |
| 2.04 | Quality of port infrastructure | 88 | ■ |
| 2.05 | Quality of air transport infrastructure | 55 | ■ |
| 2.06 | Available seat kilometers* | 24 | ■ |
| 2.07 | Quality of electricity supply | 84 | ■ |
| 2.08 | Telephone lines* | 53 | ■ |
| | **3rd pillar: Macroeconomic stability** | | |
| 3.01 | Government surplus/deficit* | 75 | ■ |
| 3.02 | National savings rate* | 71 | ■ |
| 3.03 | Inflation* | 107 | ■ |
| 3.04 | Interest rate spread* | 55 | ■ |
| 3.05 | Government debt* | 68 | ■ |
| | **4th pillar: Health and primary education** | | |
| 4.01 | Business impact of malaria | 55 | ■ |
| 4.02 | Malaria incidence* | 80 | ■ |
| 4.03 | Business impact of tuberculosis | 54 | ■ |
| 4.04 | Tuberculosis incidence* | 48 | ■ |
| 4.05 | Business impact of HIV/AIDS | 37 | ■ |
| 4.06 | HIV prevalence* | 1 | ■ |
| 4.07 | Infant mortality* | 84 | ■ |
| 4.08 | Life expectancy* | 55 | ■ |
| 4.09 | Quality of primary education | 91 | ■ |
| 4.10 | Primary enrollment* | 77 | ■ |
| 4.11 | Education expenditure* | 90 | ■ |
| | **5th pillar: Higher education and training** | | |
| 5.01 | Secondary enrollment* | 84 | ■ |
| 5.02 | Tertiary enrollment* | 60 | ■ |
| 5.03 | Quality of the educational system | 77 | ■ |
| 5.04 | Quality of math and science education | 73 | ■ |
| 5.05 | Quality of management schools | 65 | ■ |
| 5.06 | Internet access in schools | 55 | ■ |
| 5.07 | Local availability of research and training services | 68 | ■ |
| 5.08 | Extent of staff training | 90 | ■ |

| | INDICATOR | RANK/134 | |
|---|---|---|---|
| | **6th pillar: Goods market efficiency** | | |
| 6.01 | Intensity of local competition | 42 | ■ |
| 6.02 | Extent of market dominance | 51 | ■ |
| 6.03 | Effectiveness of anti-monopoly policy | 41 | ■ |
| 6.04 | Extent and effect of taxation | 123 | ■ |
| 6.05 | Total tax rate* | 70 | ■ |
| 6.06 | No. of procedures required to start a business* | 19 | ■ |
| 6.07 | Time required to start a business* | 6 | ■ |
| 6.08 | Agricultural policy costs | 88 | ■ |
| 6.09 | Prevalence of trade barriers | 44 | ■ |
| 6.10 | Trade-weighted tariff rate* | 48 | ■ |
| 6.11 | Prevalence of foreign ownership | 42 | ■ |
| 6.12 | Business impact of rules on FDI | 50 | ■ |
| 6.13 | Burden of customs procedures | 83 | ■ |
| 6.14 | Degree of customer orientation | 69 | ■ |
| 6.15 | Buyer sophistication | 78 | ■ |
| | **7th pillar: Labor market efficiency** | | |
| 7.01 | Cooperation in labor-employer relations | 116 | ■ |
| 7.02 | Flexibility of wage determination | 83 | ■ |
| 7.03 | Non-wage labor costs* | 94 | ■ |
| 7.04 | Rigidity of employment* | 81 | ■ |
| 7.05 | Hiring and firing practices | 51 | ■ |
| 7.06 | Firing costs* | 113 | ■ |
| 7.07 | Pay and productivity | 102 | ■ |
| 7.08 | Reliance on professional management | 93 | ■ |
| 7.09 | Brain drain | 67 | ■ |
| 7.10 | Female participation in labor force* | 129 | ■ |
| | **8th pillar: Financial market sophistication** | | |
| 8.01 | Financial market sophistication | 39 | ■ |
| 8.02 | Financing through local equity market | 65 | ■ |
| 8.03 | Ease of access to loans | 75 | ■ |
| 8.04 | Venture capital availability | 97 | ■ |
| 8.05 | Restriction on capital flows | 25 | ■ |
| 8.06 | Strength of investor protection* | 50 | ■ |
| 8.07 | Soundness of banks | 114 | ■ |
| 8.08 | Regulation of securities exchanges | 69 | ■ |
| 8.09 | Legal rights index* | 93 | ■ |
| | **9th pillar: Technological readiness** | | |
| 9.01 | Availability of latest technologies | 45 | ■ |
| 9.02 | Firm-level technology absorption | 48 | ■ |
| 9.03 | Laws relating to ICT | 55 | ■ |
| 9.04 | FDI and technology transfer | 86 | ■ |
| 9.05 | Mobile telephone subscribers* | 60 | ■ |
| 9.06 | Internet users* | 68 | ■ |
| 9.07 | Personal computers* | 80 | ■ |
| 9.08 | Broadband Internet subscribers* | 50 | ■ |
| | **10th pillar: Market size** | | |
| 10.01 | Domestic market size* | 15 | ■ |
| 10.02 | Foreign market size* | 25 | ■ |
| | **11th pillar: Business sophistication** | | |
| 11.01 | Local supplier quantity | 32 | ■ |
| 11.02 | Local supplier quality | 55 | ■ |
| 11.03 | State of cluster development | 54 | ■ |
| 11.04 | Nature of competitive advantage | 91 | ■ |
| 11.05 | Value chain breadth | 38 | ■ |
| 11.06 | Control of international distribution | 51 | ■ |
| 11.07 | Production process sophistication | 56 | ■ |
| 11.08 | Extent of marketing | 70 | ■ |
| 11.09 | Willingness to delegate authority | 95 | ■ |
| | **12th pillar: Innovation** | | |
| 12.01 | Capacity for innovation | 55 | ■ |
| 12.02 | Quality of scientific research institutions | 52 | ■ |
| 12.03 | Company spending on R&D | 73 | ■ |
| 12.04 | University-industry research collaboration | 57 | ■ |
| 12.05 | Gov't procurement of advanced tech products | 106 | ■ |
| 12.06 | Availability of scientists and engineers | 59 | ■ |
| 12.07 | Utility patents* | 66 | ■ |

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country Profiles" at the beginning of this chapter.

# About the Authors

**Rodrigo Canales**

Rodrigo Canales is Assistant Professor of Organizational Behavior at the Yale School of Management. His research is centered on institutions and economic development, with a specific focus on institutions that affect the quality and levels of entrepreneurship in developing countries. Most of his research seeks to understand the process through which institutions are purposefully changed, with a focus on the role of individuals in that process. So far, he has worked on the Mexican financial sector, including on small business credit and microfinance. Related to this, he is also working on how the organization of the financial sector impacts small firms in different institutional environments. He holds a BS from the *Universidad Iberoamericana,* Mexico, and an MBA and PhD from the Massachusetts Institute of Technology.

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Arturo Franco Hernandez is Manager with the Latin America Regional Team and a Global Leadership Fellow at the World Economic Forum. Prior to joining the Forum, Mr Franco held management positions as a global adviser in business strategy and emerging issues management (social responsibility, public affairs, sustainability, and energy) for CEMEX, a Fortune 500 Corporation and a leader in the building materials industry. He previously acquired relevant public policy and international development experience consulting for the Government of Colombia and the World Bank. Mr Franco holds a BA in Economics from the *Tecnológico de Monterrey,* Mexico; an LLM in Constitutional Law from *Nuevo León* State University, Mexico; and a Master in Public Administration and International Development from Harvard University. He has also been a visiting professor and research associate for various academic institutions in the fields of Economics, Social Development, and Constitutional Law.

**Jeffrey A. Frankel**

Jeffrey A. Frankel is the James W. Harpel Professor of Capital Formation and Growth at the Belfer Center for Science and International Affairs, Harvard University. He directs the Program in International Finance and Macroeconomics at the National Bureau of Economic Research, where he is also on the Business Cycle Dating Committee, which officially declared the 2001 recession. Nominated by President Clinton in 1996 to be a member of his Council of Economic Advisers, Professor Frankel's responsibilities included international economics, macroeconomics, and the environment. Before coming to Harvard in 1999, he was Professor of Economics at the University of California at Berkeley, having joined the faculty in 1979. Past appointments also include the Federal Reserve, the Institute for International Economics, the International Monetary Fund, the University of Michigan, and Yale University. His research interests include international finance, monetary policy, regional blocs, and international environmental issues. He is the author of several books, including *American Economic Policy in the 1990s* (2002). He graduated from Swarthmore College and received his PhD in Economics from the Massachusetts Institute of Technology.

**Ricardo Hausmann**

Ricardo Hausmann is the Director of Harvard's Center for International Development and Professor of the Practice of Economic Development at the John F. Kennedy School of Government. Previously, he served as the first Chief Economist of the Inter-American Development Bank (1994–2000), where he created the Research Department. He has served as Minister of Planning of Venezuela (1992–93) and as a member of the board of the Central Bank of Venezuela. He also served as Chair of the International Monetary Fund-World Bank Development Committee. He was Professor of Economics at the *Instituto de Estudios Superiores de Administracion* (IESA) (1985–91) in Caracas, where he founded the Center for Public Policy. His research interests include issues of growth, macroeconomic stability, international finance, and the social dimensions of development. He holds a PhD in Economics from Cornell University.

**Bailey Klinger**

Bailey Klinger is Director at Entrepreneurial Finance Lab and a Fellow at Harvard's Center for International Development. His research focuses on entrepreneurship and small-business finance, as well as trade, structural transformation, and growth. He has been a consultant for the World Bank, the United Nations, the Inter-American Development Bank, and various national governments in Africa, Asia, and Latin America. He received his MPA in International Development and PhD in Public Policy from the John F. Kennedy School of Government, Harvard University.

**Robert Z. Lawrence**

Robert Z. Lawrence is Albert L. Williams Professor of International Trade and Investment, a Senior Fellow at the Peterson Institute for International Economics, and a Research Associate at the National Bureau of Economic Research. He currently serves as Faculty Chair of The Practice of Trade Policy executive program at the John F. Kennedy School of Government, Harvard University. He served as a member of the US President's Council of Economic Advisers from 1998 to 2000. Professor Lawrence has also been a Senior Fellow at the Brookings Institution. He has taught at Yale University, where he received his PhD in Economics. His research focuses on trade policy. He is the author of *Crimes and Punishments? Retaliation under the WTO*; *Regionalism, Multilateralism and Deeper Integration*; *Single World, Divided Nations?* and *Can America Compete?* He is co-author *of Has Globalization Gone Far Enough? The Costs*

*of Fragmentation in OECD Markets* (with Scott Bradford); *A Prism on Globalization; Globaphobia: Confronting Fears About Open Trade; A Vision for the World Economy;* and *Saving Free Trade: A Pragmatic Approach*. Professor Lawrence has served on the advisory boards of the Congressional Budget Office, the Overseas Development Council, and the Presidential Commission on United States-Pacific Trade and Investment Policy.

**Emilio Lozoya Austin**

Emilio Lozoya Austin is Director, Head of the Latin America Regional Team, and a Global Leadership Fellow at the World Economic Forum. Prior to joining the Forum, Mr Lozoya worked as an Investment Officer at the Inter-American Investment Corporation (the private arm of the Inter-American Development Bank) in the structured finance and distressed assets units, focusing on local currency projects/investments in different industries, as well as in the capital markets of the region. He is a co-founder of TerraDesign, a Harvard Business School startup focused on social housing with projects in Senegal and Mexico. Before launching TerraDesign, he worked in the Operations Department of the Central Bank of Mexico investing the country's international reserves in distinct securities, as well as implementing optimization strategies for the different portfolios and hedging strategies for the country's oil production. Mr Lozoya is the author of studies in monetary policy, public-policy efficiency, information technology education, and electoral systems. He holds a BSc in Economics from the *Instituto Tecnológico Autónomo de México,* Mexico; a BA in Law from the *Universidad Nacional Autónoma de México,* Mexico; and a Master in Public Administration in International Development from Harvard University.

**Irene Mia**

Irene Mia is Director and Senior Economist with the Global Competitiveness Network at the World Economic Forum. She is also responsible for competitiveness research on Latin America and Iberia. She has written and spoken extensively on issues related to national competitiveness, serving as lead author and editor on a number of regional and topical competitiveness papers and reports; notably, she is the co-editor of *The Global Information Technology Report* series. Before joining the Forum, she worked at the headquarters of Sudameris Bank in Paris for a number of years, holding various positions in the international affairs and international trade divisions. Her main research interests are in the fields of development, international trade, economic integration (with special reference to the Latin American region), and competitiveness. Dr Mia holds an MA in Latin American Studies from the Institute of Latin American Studies, London University, and a PhD in International Economic and Trade Law from L. Bocconi University, Italy.

**Ramana Nanda**

Ramana Nanda is Assistant Professor of Business Administration at the Harvard Business School. He currently teaches Entrepreneurial Management in the first year of the MBA program, and Entrepreneurial Finance in the executive education course "Launching New Ventures." The majority of Professor Nanda's research is focused on small business — and venture — finance and on the relationship between the capital markets and innovation. Related to this, he studies how government policy toward the financial sector impacts entrepreneurship, technology diffusion, and productivity growth in the economy. Professor Nanda is a Faculty Affiliate at the Center for International Development at the John F. Kennedy School of Government, Harvard University, and a Research Associate at the Center for Corporate Performance, Denmark. He received his PhD from MIT's Sloan School of Management and has a BA and an MA in Economics from Trinity College, Cambridge, United Kingdom.

**Lant Pritchett**

Lant Pritchett is Professor of the Practice of Economic Development at the John F. Kennedy School of Government, Harvard University. In addition, he works as a consultant to Google.org, is a non-resident Fellow of the Center for Global Development, and is a Senior Fellow of BREAD. He is also co-editor of the *Journal of Development Economics*. He graduated from Brigham Young University with a BS in Economics and from the Massachusetts Institute of Technology with a PhD in Economics. After finishing his PhD, Professor Pritchett joined the World Bank, where he held a number of positions in the Bank's research complex, including adviser to Lawrence Summers when he was Vice President. He has authored over 50 papers published in refereed journals, chapters in books, or as articles. In addition to economics journals, his work has appeared in specialized journals in demography, education, and health. In 2006 he published his first solo authored book, *Let Their People Come*.

**Martina Viarengo**

Martina Viarengo recently received her PhD in Economic History from the London School of Economics (LSE) and is currently a Post-doctoral Fellow at the Program on Education Policy and Governance at the John F. Kennedy School of Government, Harvard University. She is on leave from the Center for Economic Performance of the LSE where she works as a Research Economist within the Education and Skills Program. For the past several years, Dr Viarengo has been examining the labor market in the European Union and plans to devote her research at the Women and Public Policy Program (WAPPP), at the Kennedy School, to a study of the reversal of the college gender gap in OECD countries since the 1980s. Specifically, she plans to study the major trends for the OECD countries whose college gender gaps have been reversed by using internationally comparable datasets and a new interdisciplinary approach. Her aim is to create an international comparison that will facilitate an understanding of the common factors that caused this phenomenon to occur in countries very different from each other with respect to their educational systems and labor markets. In addition to her PhD, Dr Viarengo also holds a Master in Economics from Northwestern University.